UNIVERSITAT DE BARCELONA

Taxonomical revision of subfamily Anacharitinae (Hymenoptera: Cynipoidea: Figitidae)

Taxonomia de la subfamília Anacharitinae (Hymenoptera: Cynipoidea: Figitidae)

Noel Mata Casanova

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Taxonomical revision of subfamily Anacharitinae (Hymenoptera: Cynipoidea: Figitidae)

Memòria presentada per Noel Mata Casanova per a optar al títol de doctor per la Universitat de Barcelona

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(Hymenoptera: Cynipoidea: Figitidae

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"It is," said Aenea. "But diversity is different than basic-plan disparity. Once evolution gets a good basic design, it tends to throw away the variants and concentrate on the near-infinite diversity within that design ... thousands of related species ... tens of thousands."

"Trilobites," I said, getting the idea.

"Yes," said Aenea, "and when ... "

"Beetles," I said. "All those goddamn species of beetles."

The Rise of Enymion (1997), Dan Simmons

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1. INTRODUCTION

1.1. The Anacharitinae. Taxonomical position

Hymenopteran parasitoids are the most important group of insects related to pest control (Pickens & Miller, 1980; Rozova, 1991; Baranowski *et al.*, 1993; Johnson, 1993; Ovruski and Fidalgo, 1994; Díaz & Gallardo, 1996; Matrangolo *et al.*, 1997; Menezes *et al.*, 1997; Villeneuve & Trottin, 1997; Wharton *et al.*, 1998), being a keystone of many food webs within natural and agricultural ecosystems indistinctly. Despite this uppermost importance, few species are seldom used due to the scarce knowledge on their diversity and life cycles (Madrigal-Cardeño, 2001). Current estimates give only a meager 5% of total Hymenoptera diversity to be described (Buffington & Noort, 2007). Taxonomical, phylogenetical, biological and biogeographical works are fundamental to expand their knowledge and increase their chances for use them as a biological control tool.

The Cynipoidea are a superfamily of Hymenopteran parasitoids nested within the Parasitica section of the Apocrita. The Cynipoidea are usually characterized by the heavily reduced wing venation - with radial cell on the fore wings -, small size, and the laterally compressed, short and rounded metasoma. The actual consensus divides Cynipodea in five non-extinct families (Ronquist, 1999): Austrocynipidae, Cynipidae, Figitidae, Ibaliidae and Liopteridae. Broadly speaking, those five families fall in two groups: macrocynipoids and microcynipoids. Macrocynipoids do not form a monophyletic group; it includes families Austrocynipidae, Ibaliidae and Liopteridae, characterized by its larger size and their adaptations to parasitizing of wood-boring or cone-boring insect larvae. Microcynipoids on the other side do form a monophyletic group including Cynipidae and Figitidae, both families comprising about 90% of described Cynipoidea species. Despite being sister taxa, they present substantial differences: while Figitidae are parasitoids, Cynipìdae are gall makers or tenants (highly specialized phytophagous). Morphologically, they can be easily distinguished by the shape of the Rs+M vein. In Cynipidae this vein reaches to the middle of the basal vein while in Figitidae it reaches to the end.

The Figitidae comprises almost exclusively endoparasitoids of endopterygota insect larvae. Ronquist (1999) suggested the origin of Figitidae as parasitoids of gall-inducing endopterygote insects – still seen in Thrasorinae – whereas more derived shifted from gall-inducing hymenopteran larvae to aphid-parasiting hymenopteran larvae. A radiation among aphid predators soon followed: to aphid-feeding Diptera larvae (Aspicerinae, Eucoilinae, Figitinae) and to aphid-feeding Neuroptera larvae (Anacharitinae).

The family is arguably the most species diverse family within Cynipoidea (Norlander, 1984; Ronquist, 1999; Fontal-Cazalla *et al.*, 2002). There are nearly 1400 described species in 132 genera (Buffington *et al*., 2005), but the estimated global diversity is about nearly 24000 species (Norlander, 1984). Despite tropical regions being extremely species-rich (Fergusson & Hanson, 1995; Nieves-Aldrey & Fontal-Cazalla, 1997; Fontal-Cazalla & Nieves-Aldrey, 1999), the majority of described

species present a bias towards the Holartic (Dalla-Torre & Kieffer, 1910; Weld, 1952), with a much more studied microhymenopteran fauna. The classification of the family was chaotic for a long time (Ronquist, 1999), and it has been at the end of XXth century that huge efforts have been made to fix it. Nowadays, twelve subfamilies are recognized within the Figitidae: Parnipinae, Thrasorinae, Anacharitinae, Aspicerinae, Charipinae, Emarginae, Euceroptrinae, Eucolinae, Figitinae, Mikeiinae, Plectocynipinae and Pycnostigmatinae (Ronquist, 1999; Ronquist & Nieves-Aldrey, 2001; Ros-Farré & Pujade-Villar, 2007; Buffington & Liljeblad, 2008 and Paretas-Martínez *et al*., 2011). The focus of the present Thesis is subfamily Anacharitinae.

1.2. Historical background

The study of Anacharitinae began on the XIXth century with the description of *Cynips euchariοides* Dalman, 1818. The same author, in 1823, placed the species under a new designated genus: *Anacharis* Dalman, 1823. In the same paper (Dalman, 1823), he described a new species of *Cynips* Linnaeus, 1758, *C. nitidula* Dalman, 1823. The study of this new species by Haliday (in Walker, 1835) led to the designation of a new genus: *Aegilips* Haliday, 1835. Hartig (1843) described a new genus with a prominent scutellar *Xyalaspis* Hartig, 1843, with a brief description. It was not until Thomson (1862) that an attempt on Cynipodea higher taxa classification was done: he, among others, established tribe Anacharina – and, according to ICZN article 11.7, the designation is valid. Thomson included *Aegilips* and *Anacharis* but ignored *Xyalaspis*, which is not mentioned in its work. Some later attempts were those done by Förster (1869) and Cameron (1890) – the last one focused on British cynipoids – those, however, had lots of misidentifications and non-valid species, and used unreliable characters such as coloration.

The first milestone in Cynipodea studies was Dalla-Torre & Kieffer monograph (1910). In this seminal work they treated Anacharitinae as a subfamily of Figitidae, and included 7 genera among them: *Acanthaegilips* Ashmead, 1897; *Acothyreus* Ashmead, 1887; *Aegilips*; *Anacharis*; *Anacharoides* Cameron, 1904; *Prosynapsis* Dalla-Torre & Kieffer, 1910; and *Xyalaspis*. Two new genera were posteriorly added: *Paraegilips* Kieffer, 1910 and *Seitneria* Tavares, 1928. Further changes in Anacharitinae composition were done by Hedicke & Kerrich (1940): they synonymized *Paraegilips* with *Paramblynotus* Cameron, 1908 (Liopteridae: Mayrellinae).

Weld (1952) represented an updated list to Anacharitinae genera among other Cynipoidea. He displaced *Anacharoides* to Aspicerinae and included 10 genera in Anacharitinae: *Acanthaegilips*; *Acothyreus*; *Aegilips*; *Anacharis*; *Calofigites* Kieffer, 1909; *Hexacharis* Kieffer, 1907; *Paraegilips* Kieffer, 1910; *Prosynapsis* Dalla-Torre & Kieffer, 1910; *Seitneria* Tavares, 1928; and *Xyalaspis*. This work supposed also a keystone in Anacharitinae study, providing a generic key with taxonomical important features fully illustrated. Weld's work did not solve the position of two troublesome genera: *Paraegilips* and *Seitneria*. Contrary to Hedicke & Kerrich (1940), he maintained the validity of the former, but he mentioned his doubts about it longing to Anacharitinae or Liopteridae. Regarding *Seitneria*, Weld mentioned both morphological

and biological similarities to Figitinae, but he maintained the genus within Anacharitinae.

Four new genera were posteriorly described and included within Anacharitinae: *Stylobrachys* Belizin, 1951; *Petricynips* Belizin, 1961; *Solenofigites* Díaz, 1979; and *Proanacharis* Kovalev, 1996. The number of Anacharitinae genera was reduced in the following years due to synonymies: Kierych (1984) and Díaz (1986) synonymized respectively genera *Prosynapsis* and *Hexacharis* with genus *Aegilips.* Fergusson revision on British Cynipodea (1986) did not mean any changes on the generic level, but helped to fix the chaotic status of Palaearctic Anacharitinae at the specific level. Last important change during those years was removing *Stylobrachis* from Anacharitinae to Liopteridae (Kovalev, 1994).

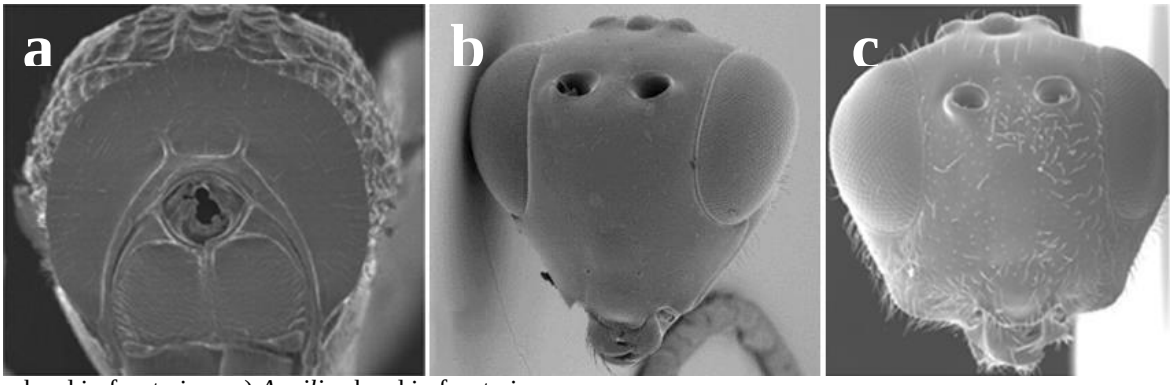
The taxonomical position of Anacharitinae has been also subject of concern. Norlander (1982) ascended Anacharitinae to family level without any further comments; this decision was not followed by most authors like Fergusson (1986), who maintained the subfamily status. Kovalev (1996) separated *Acanthaegilips* from Anacharitinae and nested it within its own subfamily, Acanthaegilipinae.

The beginning of the XXIst century was crucial for Figitidae taxonomy. Ronquist (1999) established Figitidae monophyly, with all subfamilies being monophyletic except for Figitinae – a taxonomical jumble pending of solution. Ros-Farré *et al.* (2000) solved the taxonomical position of *Acanthaegilips*, nesting it within the core Anacharitinae, close to the other Neotropical genera *Calofigites* and *Solenofigites*. The subfamily comprised 7 genera: *Acanthaegilips, Aegilips, Anacharis, Calofigites, Proanacharis, Solenofigites* and *Xyalaspis*. Furthermore, the authors established the diagnostic synapomorphies of the subfamily (see chapter 1.3). Regarding valid genera considered to be part of Anacharitinae in previous works, *Paraegilips* was considered a typical liopterid despite its small size, thus asserting the validity of Hedicke synonymization (Hedicke & Kerrich, 1940). *Seitneria* was moved to Figitinae due to its similarities with *Amphitectus, Melanips* and *Sarothrus*. *Petricynips* position was not clear; the material was severely damaged and important key characters were not possible to examine; it was excluded from Anacharitinae *sensu stricto* and remains in a doubtful position.

Ros-Farré *et al.* (2000) was the first work of Universitat de Barcelona Parasitica team focused on Anacharitinae. The diversity of genus *Acanthaegilips* was studied in the following years (Ros-Farré *et al.,* 2003; Pujade-Villar, *et al.,* 2009; Restrepo-Ortiz *et al.,* 2010). Keystone taxonomical papers were those Restrepo-Ortiz & Pujade-Villar (2010a, 2010b) in which *Acothyreus* was synonymized with *Anacharis* and *Hexacharis* was considered a valid genus. This last paper (Restrepo-Ortiz & Pujade-Villar, 2010b) also included a key for Anacharitinae genera; Weld's key (1952) was already obsolete due to new findings.

1.3. General morphology and diagnostic characters

Anacharitinae are medium-sized cynipoids, with body size ranging from 2 to 3mm, with black body. They tend to be slender than other cynipoids and present a small degree of microsculpture concentrated in mesosoma, with smooth head and metasoma. Sexual dimorphism is low, concentrated in metasoma and antennae: like other Figitidae, males present 14-segmented antennae while females present 13-segemented antennae. The subfamily is characterized by three main synapomorphies: (Ros-Farré *et al.*, 2000): (1) rounded and continuous pronotal plate (Fig. 1a), (2) triangular-shaped head in frontal view (Fig. 1b) – although in some specimens a secondary expansion of the malar area makes it more square-shaped (Fig. 1c), and (3) small broadly overlapping mandibles (Fig. 1b, 1c).



head in front view; c) *Aegilips* head in front view.

Head

The characteristic triangular head of Anacharitinae results from a compression of the malar area resulting in overlapping mandibles, in contrast with other cynipoids, which present oval-shaped head and separated mandibular pieces. The triangular head, however, can vary, ranging from strongly laterally compressed in some species of genus *Anacharis* to square-shaped in genera *Proanacharis* and *Acanthaegilopsis*, as with some species of *Aegilips* and *Xyalaspis*. This however is due to a secondary expansion of the malar area (the mandibles in those specimens are still overleaped) and do not reflect monophyly.

Compared to other cynipoids, Anacharitinae head tend to present very few features. They are smooth in most of its surface, and scarcely pubescent. Important taxonomical characters are to be found in the malar and occipital areas. The malar space can be smooth – as in *Acanthaegilopsis*, *Calofigites*, *Proanacharis* and *Solenofigites* –, present a sulcus (Fig. 2c) – *Acanthaegilips* – or coriaceous sculpture (Fig. 2d) – *Aegilips*, *Hexacharis* and *Cornaegilips*. The presence or absence of coriaceous sculpture used to be considered of taxonomical importance for distinguishing between genera (Restrepo-Ortiz & Pujade-Villar, 2010); but intrageneric variability in *Anacharis* and *Xyalaspis* has rendered this character obsolete for generic identification. However, it stills has taxonomical importance regarding intraspecific diversity. The occipital area is

smooth in most anacharitines, although carinae (Fig. 2a) and spiky processes derived from it are present (Fig. 2b).

Generic characters: Presence of occipital carina (*Solenofigites*) / Presence of anteroposterior spiky processes derived from occipital carina (*Cornaegilips*).

Specific characters: Malar area smooth / Malar area coriaceous (could be just restricted to region below the eye) / Presence of malar sulcus, more or less curved.

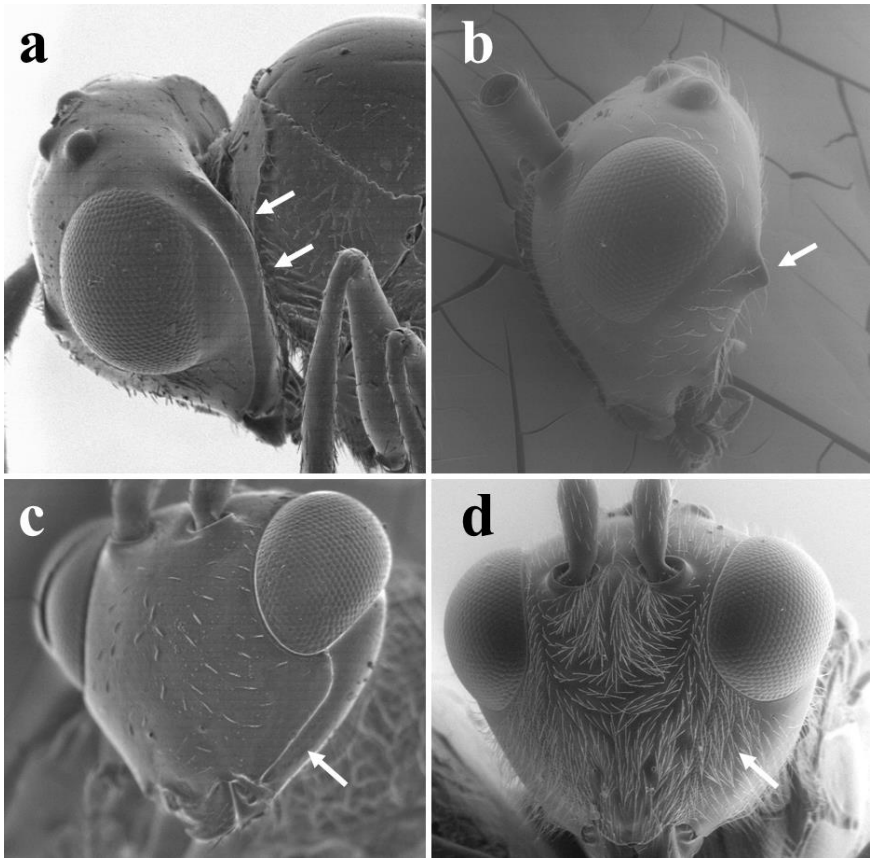


Figure 2. Head: a) occipital carina (*Solenofigites lautus*); b) occipital processes (*Cornaegilips chilensis*); c) malar sulcus (*Acanthaegilips palmirae*); d) malar coriaceous band (*Anacharis belizini*).

Antenna

Anacharitinae present cylindrical segments and placodeal sensilla. The segments are numbered from the pedicel to the apex of the flagellum. The antennae bear strong importance related to sexual dimorphism, not only in the number of segments but also in its appearance. First male flagellomeres are as broad as last ones, and usually present abundant placodeal sensilla from the first, whereas female flagellomeres tend to be thinner in the basal antennae and widen towards the apex, with scarcer placodeal sensilla in first flagellomeres, sometimes not being present until the third or the fourth flagellomere. Males can furtherly have modified flagellomeres, wether dorsolaterally expanded F2 to F5 (Fig. 3a) or excavated F3 (Fig. 3b).

Generic characters: Excavated F3 in males (*Hexacharis*).

Specific characters: Dorsolaterally expanded first flagellomeres in males (*Acanthaegilips, Solenofigites*). Presence and abundance of placodeal sensilla.

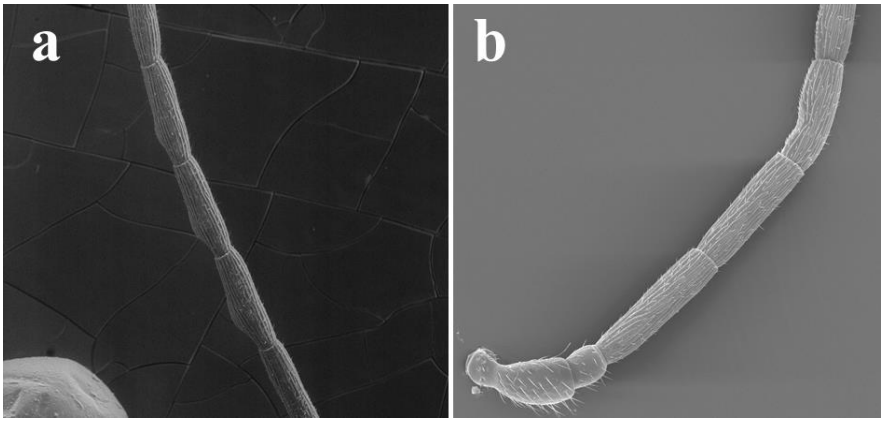


Figure 3. Male antennae: a) Dorsolaterally expanded flagellomeres (*Acanthaegilips notiobiellus*); b) excavated F3 (*Hexacharis flavipes*).

Pronotum

The pronotum in Anacharitinae is heavily reduced dorsally, so the main features are those from the front and sides. The pronotal plate is complete, and can be dorsally projected forming a small tooth rising from the sutures with mesoscutum (Fig. 1a). Lateral pronotum presents a wide range of carination: oblique carinae are always present but can be reduced to ventral pronotum, and surface can range from heavily areolate to rugose to smooth.

Specific characters: Presence of raised dorsal tooth. Extension of oblique carinae. Pronotal surface smooth, rugose or areolate.

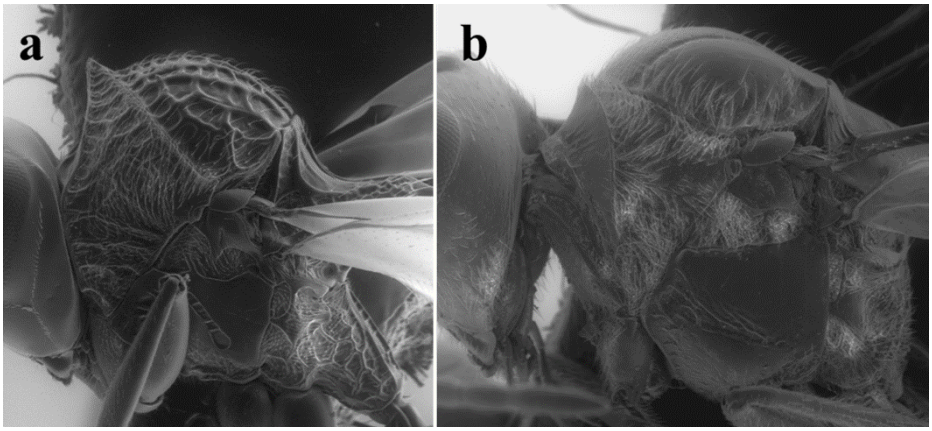


Figure 4. a) Raised dorsal tooth and carinate pronotum (*Acanthaegilips notiobiellus*); b) Pronotal plate not projected, smooth pronotum (*Anacharis mexicana*).

Mesoscutum

Dorsal mesonotum is divided in two separate and distinct portions: the mesoscutum and the scutellum. The mesoscutum is the anterior one, in contact with the pronotum, and presents characters holding important taxonomical value. Its surface

presents a high degree of microsculpture in anacharitines. The appearance and extension of notauli also should be taken into account for proper identification of species.

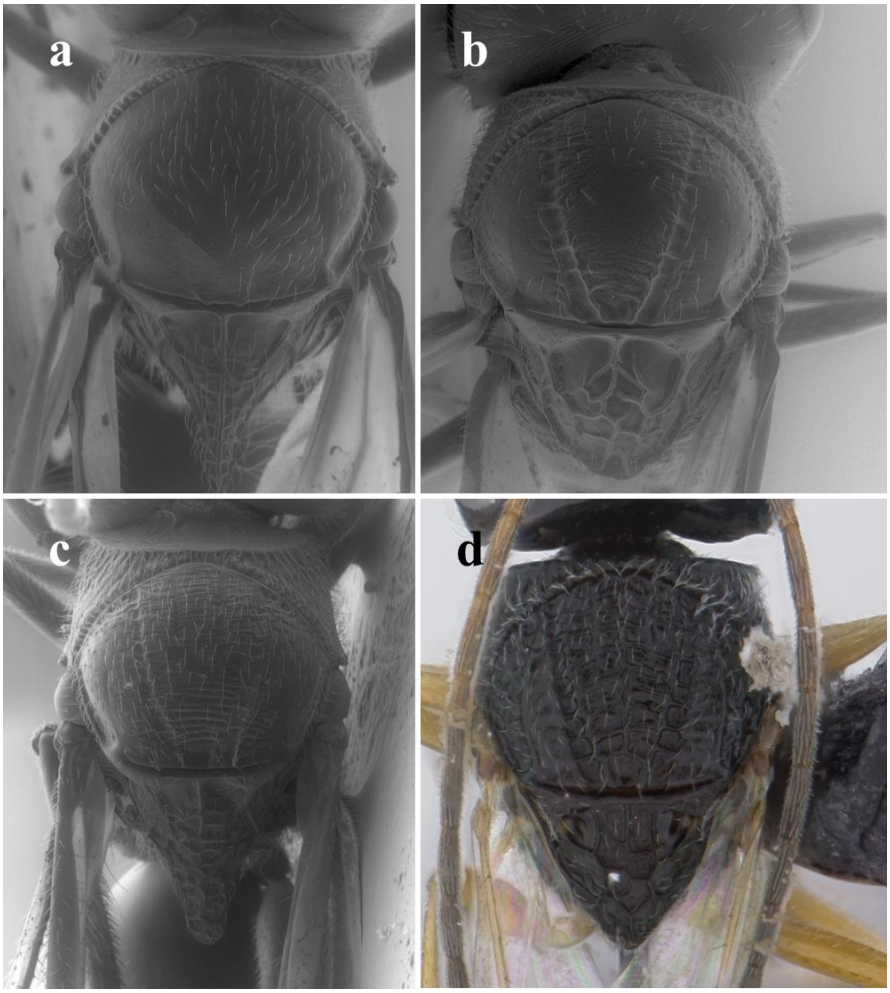


Figure 5. Mesoscutal sculpture: a) smooth mesoscutum without notauli (*Xyalaspis esbelta*); b) smooth mesoscutum with complete and carinate notauli (*Anacharis melanoneura*); c) transversely carinate mesoscutum with complete and carinate notauli (*Xyalaspis pseudolaevigata*); d) areolate mesoscutum with complete and carinate notauli (*Anacharis* sp).

Specific characters: Sculpture of mesoscutum: smooth, coriaceous, carinate, areolate. Extension and appearance of notauli: complete, effaced or absent; internal carinate sculpture present / absent.

Scutellum

The scutellum is the posterior division of the dorsal mesonotum. Anacharitinae present a markedly developed scutellum like the rest of Cynipoidea (Königsmann, 1978). The scutellar region presents important taxonomical characters, both at the generic and specific level.

As seen in subfamilies Aspicerinae (Ros-Farré & Pujade-Villar, 2006; 2011; 2013) and Figitinae (Jiménez *et al.*, 2004; 2005a; 2005b; 2006; 2008a; 2008b; 2008c), some Anacharitinae genera present a scutellar spine derived from the circumscutellar carina (Restrepo-Ortiz & Pujade-Villar, 2010); namely *Acanthaegilips*,

Acanthaegilopsis and *Xyalaspis.* This, however, should not be taken as an indication of close relationship; *Acanthaegilips* and *Xyalaspis* are distantly related (Ros-Farré *et al.*, 2000; Buffington *et al.*, 2007, 2012), and relationships of *Acanthaegilopsis* have not been solved yet. The spine also presents a high degree of intraspecific variability, from being blunt and short – a mere projection of the carina – to sharp and longer than the whole mesoscutum.

Important characters at the intraspecific level are those related to the scutellar foveae and the sculpture of the scutellum. The scutellar surface ranges from smooth to heavily areolate. While small genera tend to present one or another form, the highly diverse *Acanthaegilips, Aegilips, Anacharis* and *Xyalaspis* present the whole range of scutellar variability.

Scutellar foveae are depressed areas located in anterior scutellum, next to mesoscutal margin. Usually they are defined by a carina and symmetrically divided by the interfoveal line. However, the carina can be effaced in posterior foveae – even being absent – thus the foveae prolonged into scutellar surface. The interfoveal line can also be reduced to almost disappearing in some specimens, or extended well beyond the foveae, reaching the scutellar apex.

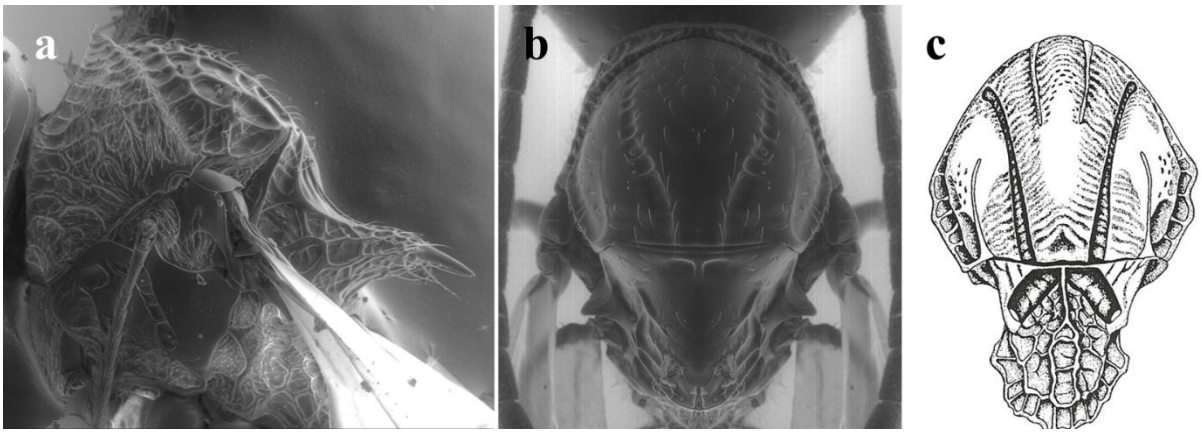


Figure 6. Scutellum: a) scutellar spine (*Acanthaegilips notiobiellus*); b) scutellar spine absent (*Aegilips papuensis*); c) scutellar spine absent, circumscutellar carina projected forming an ondulate ridge (*Proanacharis miriabilis*, from Kovalev, 1996).

Generic characters: Presence of scutellar spine (*Acanthaegilips, Acanthaegilopsis, Xyalaspis*) / Absence of scutellar spine (*Aegilips, Anacharis, Calofigites, Cornaegilips, Hexacharis, Proanacharis, Solenofigites*). Circumscutellar carina projected forming an ondulate ridge (*Proanacharis*) / Circumscutellar carina not projected (*Aegilips, Anacharis, Calofigites, Cornaegilips, Hexacharis, Solenofigites*).

Specific characters: Sculpture of scutellum: smooth, areolate. Circumscutellar carina projected or not. Extension and percurrence of scutellar foveae: posteriorly defined by carina or posteriorly effaced. Length of interfoveal line.

Mesopleuron

The mesopleuron is the lateral sclerite belonging to the central thoracic region. It is divided in two portions: the dorsal and small mesopleural triangle, and the main mesopleuron. The mesopleural triangle is depressed, sometimes striate, and densely setose; it presents small variability among Anacharitinae. On the other hand, the mesopleuron itself holds very important significance for the identification of Anacharitinae genera.

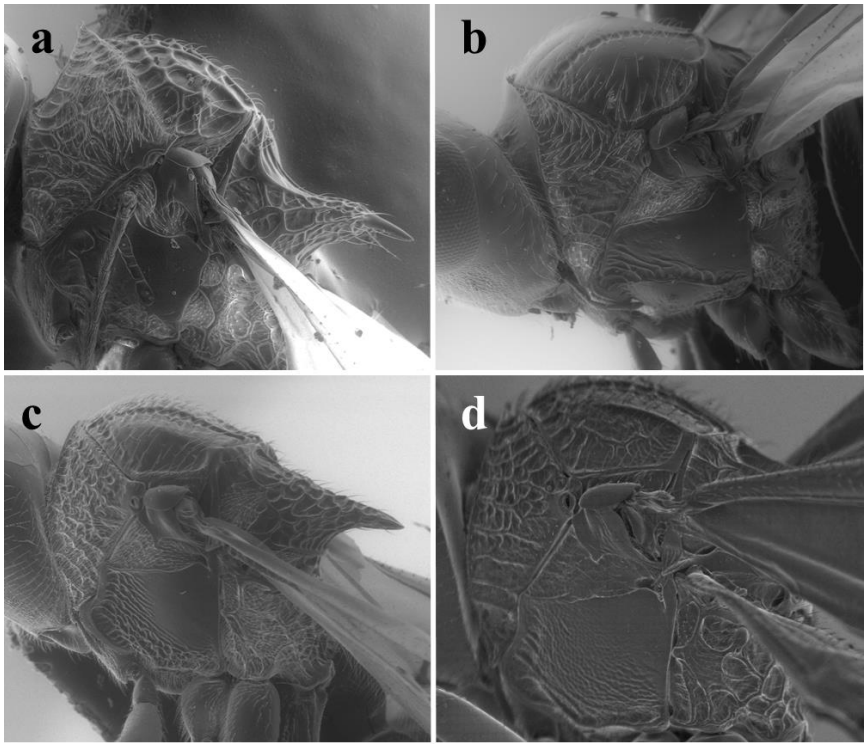


Figure 7. Pronotal sculpture: a) oblique groove (*Acanthaegilips notiobiellus*); b) transverse groove (*Anacharis melanoneura*); c) anteroventral carinate sculpture (*Xyalaspis arapahoe*); d) coriaceous sculpture (*Acanthaegilopsis malagasy*).

Generic characters: Presence of oblique mesopleural groove (*Acanthaegilips*, *Solenofigites*) / Presence of transverse mesopleural groove, strong and carinate (*Anacharis*, *Proanacharis*) or weak, sometimes effaced (*Calofigites*, *Hexacharis*) / Presence of anteroventral fringes (*Aegilips*, *Cornaegilips*, *Xyalaspis*) / Mesopleuron covered by coriaceous sculpture (*Acanthaegilopsis*).

Propodeum

Propodeum is the first abdominal tergum, which in Apocrita is fused with the thorax. Main character in the propodeum is its carinate sculpture. Usually central propodeum is delimited by two carinae and furtherly longitudinally divided by a median carina. Pubescence is located in lateral propodeum. The presence of transverse carinate sculpture, the length of the median carina, and the extension of areolate sculpture in ventral propodeum are also characters useful for distinguishing species.

Specific characters: Central propodeum: smooth, transversely carinate, ventral propodeum areolate. Median carina: incomplete, complete.

Forewing

Anacharitinae wings present reduced venation, like most Figitidae, the radial cell being their most remarkable feature. This cell is the area delimited by the veins 2r, Rs and R1. Vein R1 can present a degree of variability, sometimes not reaching Rs thus resulting in an open radial cell, a character with taxonomic importance in some genera. Further intraspecific variability can be found in vein 2rm, characteristic of genus *Hexacharis* and be useful for identifying of species in genus *Aegilips*.

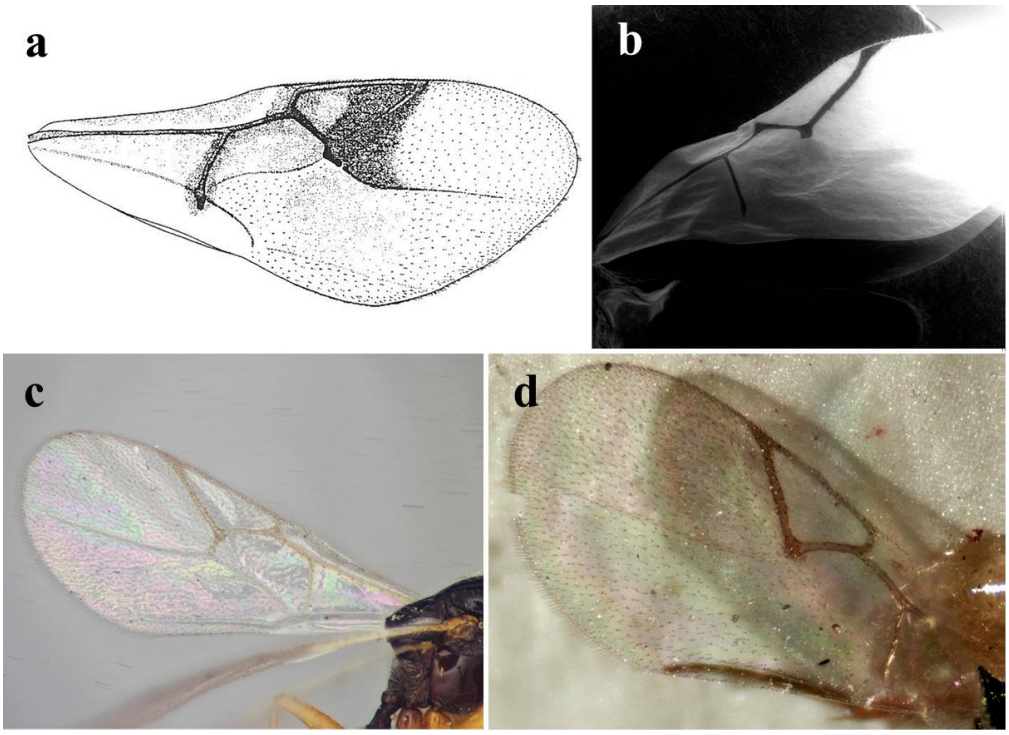


Figure 8. Forewing: a) pterostigma in *Proanacharis* sp (From Kovalev, 1996); b) open radial cell in *Acanthaegilips* sp. Closed radial cell: c) vein 2rm elongated (*Aegilips zaitzevi*); d) vein 2rm absent (*Aegilips hyalina*).

The forewings in most Anacharitinae are hyaline although a dark pterostigma is present next to the radial cell in *Proanacharis*.

Generic characters: Presence of dark pterostigma (*Proanacharis*) / Absence of pterostigma (Other Anacharitinae genera).

Specific characters: Radial cell: open, closed. Vein 2rm: elongated, absent.

Petiole

The second abdominal and first metasomal segment in apocritan Hymenoptera. Among Anacharitinae, petiole presents significant variability. The relative length to metacoxa holds important taxonomical value in genus *Anacharis*. The sculpture of petiole also holds taxonomical importance.

Specific characters: Length: More than 2 times the length of metacoxa, longer than metacoxa but not twice as long, as long as metacoxa, shorter than metacoxa but longer than wide, as long as wide. Sculpture: smooth, laterally carinate but dorsally smooth, dorsolaterally carinate.

Metasoma

The relative length of metasomal terga holds importance related to generic identification: in some genera, one or two terga (usually T3 or T4) cover most of the metasoma, while in others the length of each tergum is quite similar. The presence of punctate sculpture in the last terga is valid character for species identification.

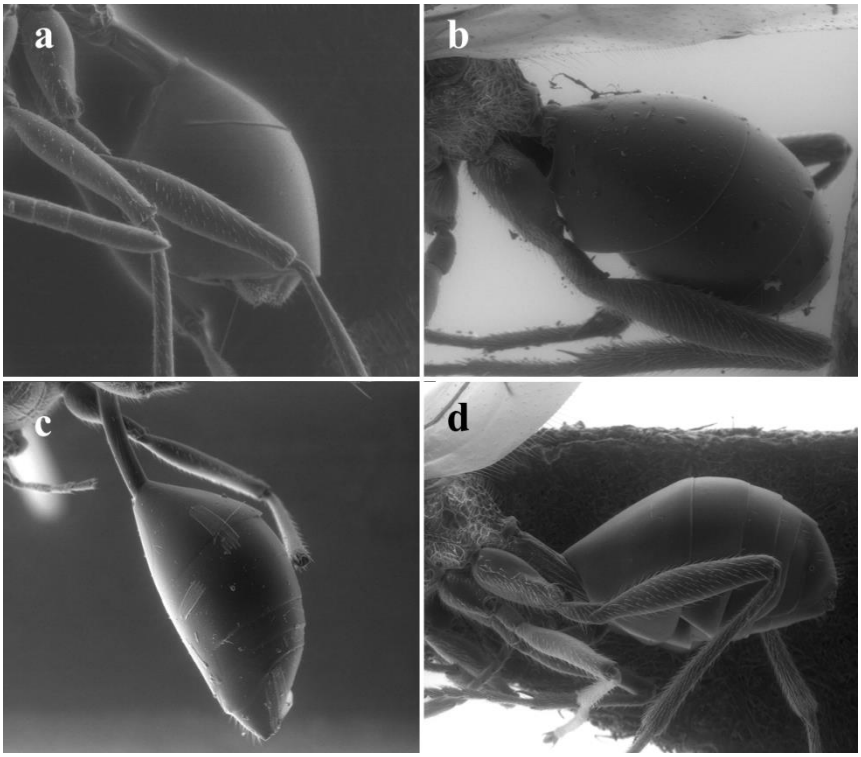


Figure 9. Metasoma: a) *Acanthaegilips* sp; b) *Xyalaspis* sp; c) and d) *Anacharis* sp.

Generic characters: T4 covering most of metasoma, T5-T7 vestigial (*Acanthaegilips, Solenofigites*) / T3 and T4 comprising about 2/3 of metasoma (*Acanthaegilopsis, Aegilips, Cornaegilips, Xyalaspis*) / T3 and T4 comprising ½ or less than metasoma, T5 and T6 similar in length to T3 and T4, T7 not vestigial (*Anacharis, Calofigites, Hexacharis, Proanacharis*).

Specific characters: Punctate sculpture: presence / absence in each metasomal tergum.

1.3.1. Morphological characterization of Anacharitinae genera

Genus *Acanthaegilips*

Head. Head triangular in front view, malar area not expanded. Presence of malar sulcus. Occipital carina absent.

Antennae. Female 13-segmented, filiform. Male 14-segmented, third to sixth flagellomeres dorsally expanded in some species. First flagellomeres broadened at distal edge in both sexes.

Mesosoma. Mesoscutum usually areolate, transverse carinate sculpture or smooth mesoscutum in some species but rare. Notauli range from being vestigial to complete, sometimes carinate. Central scutellum smooth, margins densely areolate. Scutellar spine present, usually longer than mesoscutum. Presence of oblique groove in the mesopleuron.

Forewing. Wings hyaline. Open radial cell in some species.

Metasoma. Petiole longer than metacoxa but never twice as long, costate. T4 heavily expanded, covering about 2/3 of total metasoma, T5 to T7 heavily reduced.

Genus *Acanthaegilopsis*

Head. Head quadrangular in front view, malar area secondary expanded. Malar area smooth. Occipital carina absent.

Antennae. Female 13-segmented, filiform, first flagellomeres broadened at distal edge. Male 14-segmented, filiform, all flagellomeres broad, not modified.

Mesosoma. Mesoscutum heavily areolate. Notauli complete, with strong transverse carinae. Scutellum areolate, scutellar foveae big. Scutellar spine present, slightly longer than mesoscutum. Mesopleuron covered by coriaceous sculpture, sometimes posterodorsal mesopleuron smooth.

Forewings. Wings hyaline. Radial cell always closed.

Metasoma. Petiole shorter than metacoxa, rugate. T3 and T4 covering about 2/3 of metasoma, T5 to T7 visible.

Genus *Aegilips*

Head. Triangular to quadrangular in front view. Malar area with coriaceous band. Occipital carina absent.

Antennae. Female 13-segmented, filiform, first flagellomeres broadened at distal edge. Male 14-segmented, filiform, all flagellomeres broad, not modified.

Mesosoma. Mesoscutum smooth to carinate, never areolate. Notauli absent to complete, carinate sculpture can be present or absent. Scutellum smooth to areolate, scutellar foveae can be distinguished from scutellum or not. Scutellar spine absent, circumscutellar carina not projected. Mesopleuron without any groove, presence of anteroventral carinate sculpture.

Forewings. Wings hyaline. Radial cell closed. Vein 2rm present in some species.

Metasoma. Petiole as long as metacoxa, usually shorter, costate. T3 and T4 covering about 2/3 of metasoma, T5 to T7 visible.

Genus *Anacharis*

Head. Triangular in front view. Malar area smooth or presenting coriaceous band. Occipital carina absent.

Antennae. Female 13-segmented, filiform. Male 14-segmented, filiform, flagellomeres not modified. All flagellomeres broad in both sexes.

Mesosoma. Mesoscutum smooth to coriaceous, exceptionally areolate in one species. Notauli effaced to complete, carinate sculpture can be present or absent. Scutellum smooth to areolate, scutellar foveae can be distinguished from scutellum or not. Scutellar spine absent, circumscutellar carina not projected. Mesopleuron with strong internally carinate transverse groove, sometimes with coriaceous sculpture in anteroventral region.

Forewings. Wings hyaline. Radial cell closed.

Mesosoma. Petiole from being as long as metacoxa to 2.5 times length of metacoxa; smooth, exceptionally costate in one species. T3 and T4 only ½ of metasoma.

Genus *Calofigites*

Head. Quadrangular in front view. Malar area smooth. Occipital carina absent.

Antennae. Female 13-segmented, filiform, first flagellomeres broadened at distal edge. Male unknown.

Mesosoma. Mesoscutum smooth. Notauli effaced, never carinate. Scutellum smooth, scutellar foveae superficial. Scutellar spine absent, circumscutellar carina not projected. Mesopleuron with transverse groove, absence of coriaceous sculpture in anteroventral region.

Forewings. Wings hyaline. Radial cell open in some species.

Mesosoma. Petiole as broad as long, rugate. T3 and T4 only ½ of metasoma, T5 to T7 clearly visible.

Genus *Cornaegilips*

Head. Triangular in front view. Malar area smooth. Occipital carina present, anteroposteriorly projected forming two spiky processes directed toward the pronotum.

Antennae. Female 13-segmented, filiform, first flagellomeres broadened at distal edge. Male 14-segmented, filiform, all flagellomeres broad, not modified.

Mesosoma. Mesoscutum smooth. Notauli effaced, never carinate. Scutellum smooth, scutellar foveae not distinguished from scutellar surface. Scutellar spine absent,

circumscutellar carina not projected. Mesopleuron without any groove, presence of anteroventral carinate sculpture.

Forewings. Wings hyaline. Radial cell closed.

Mesosoma. Petiole as long as metacoxa, costate. T3 and T4 covering about 2/3 of metasoma, T5 to T7 visible.

Genus *Hexacharis*

Head. Triangular in front view. Malar area with coriaceous band. Occipital carina absent.

Antennae. Female 13-segmented, filiform, first flagellomeres broadened at distal edge. Male 14-segmented, filiform, all flagellomeres broad, first flagellomere ventrally excavated on first one-third.

Mesosoma. Mesoscutum smooth. Notauli effaced, never carinate. Scutellum smooth, scutellar foveae superficial. Scutellar spine absent, circumscutellar carina not projected. Mesopleuron with transverse groove which fades and even disappears in some individuals, absence of coriaceous sculpture in anteroventral region.

Forewings. Wings hyaline. Radial cell closed. Vein 2rm present, but short and curved.

Mesosoma. Petiole as broad as long, rugate. T3 and T4 only ½ of metasoma, T5 to T7 clearly visible.

Genus *Proanacharis*

Head. Quadrangular in front view, malar area secondary expanded. Malar area smooth. Occipital carina absent.

Antennae. Female 13-segmented, filiform, first flagellomeres broadened at distal edge. Male 14-segmented, filiform, all flagellomeres broad, not modified.

Mesosoma. Mesoscutum softly carinate. Notauli complete, transver carinate sculpture present. Scutellum areolate, scutellar foveae can distinguished from scutellum. Circumscutellar carina projected forming an ondulate ridge. Mesopleuron with strong internally carinate transverse groove.

Forewings. Dark pterostigma around Rs vein. Radial cell closed.

Metasoma. Petiole as long as metacoxa, usually shorter, smooth. T3 and T4 covering about 2/3 of metasoma, T5 to T7 visible.

Genus *Solenofigites*

Head. Triangular in front view. Malar area smooth. Occipital carina present.

Antennae. Female 13-segmented, filiform, first flagellomeres broadened at distal edge. Male 14-segmented, second and third flagellomeres dorsally expanded.

Mesosoma. Mesoscutum smooth. Notauli effaced, never carinate. Scutellum smooth, scutellar foveae not distinguished from scutellar surface. Scutellar spine absent, circumscutellar carina not projected. Presence of oblique groove in the mesopleuron.

Forewings. Wings hyaline. Radial cell open in front margin.

Mesosoma. Petiole as broad as long, rugate. T4 heavily expanded, covering about 2/3 of total metasoma, T5 to T7 heavily reduced.

Genus *Xyalaspis*

Head. Triangular to quadrangular in front view. Malar area with coriaceous band, which can be heavily reduced in some species. Occipital carina absent.

Antennae. Female 13-segmented, filiform, first flagellomeres broadened at distal edge. Male 14-segmented, filiform, all flagellomeres broad, not modified.

Mesosoma. Mesoscutum smooth to areolate. Notauli absent to complete, carinate sculpture can be present or absent. Scutellum smooth to areolate, scutellar foveae can be distinguished from scutellum or not. Scutellar spine present, which can range from being just slightly projected to longer than mesoscutum. Mesopleuron without any groove, presence of anteroventral carinate sculpture.

Forewings. Wings hyaline. Radial cell closed.

Metasoma. Petiole as long as metacoxa, usually shorter, costate. T3 and T4 covering about 2/3 of metasoma, T5 to T7 visible.

1.4. Biology

As mentioned before, Figitidae are endoparasitoids of endopterygote insects. Parasitoids are those organisms who parasitize other organisms but with some important differences compared to parasites: (i) their life cycle is restricted to just one host; (ii) the parasitic stage is only a portion of its life cycle – in the case of parasitic Hymenoptera, only the larvae feed on other insects, imagos are free-living and feed on nectar honeydew or organic waste; (iii) they kill or sterilize the host, thus preventing its reproduction; (iv) they are similar in size to its host; and (v) they parasitize closely related taxa.

Figitidae, like the other parasitic cynipoids – Austrocynipidae, Ibaliidae and Liopteridae – are koinobiont endoparasitoids. The female oviposites its eggs inside the host, and the larvae develop inside the host body without disturbing its normal growth and habits, at least in the first stages of development of the parasitoid (Askew & Shaw, 1986; Quicke, 1997).

Brown lacewings belonging to Hemerobiidae (Neuroptera) (Fig. 10a) have been recorded as hosts of Anacharitinae. Hemerobiid genera *Hemerobius* Linnaeus, 1758,

Micromus Rambur, 1842, *Notobiella* Banks, 1909, *Sympherobius* Banks, 1904 and *Wesmaelius* Krüger, 1922 has been cited as hosts of Anacharitinae (Díaz, 1979; New, 1979; Kierych, 1984; Miller & Lambdin, 1985; Ferguson, 1986; Cave & Miller, 1987; Mata-Casanova *et al.*, 2014a).

Anacharitinae life cycle is poorly understood; the only records are from genus *Anacharis. Anacharis* female oviposites second and early-third instars of Hemerobiidae larvae (Cave & Miller, 1985; Miller & Lambdin, 1987), rarely first instar (Selhime & Kanavel, 1968). The female palpates the host, and bents its metasoma between its legs and inserts its ovipositor into the center of the host's dorsum (Miller & Lambdin, 1987) (Fig. 10b).

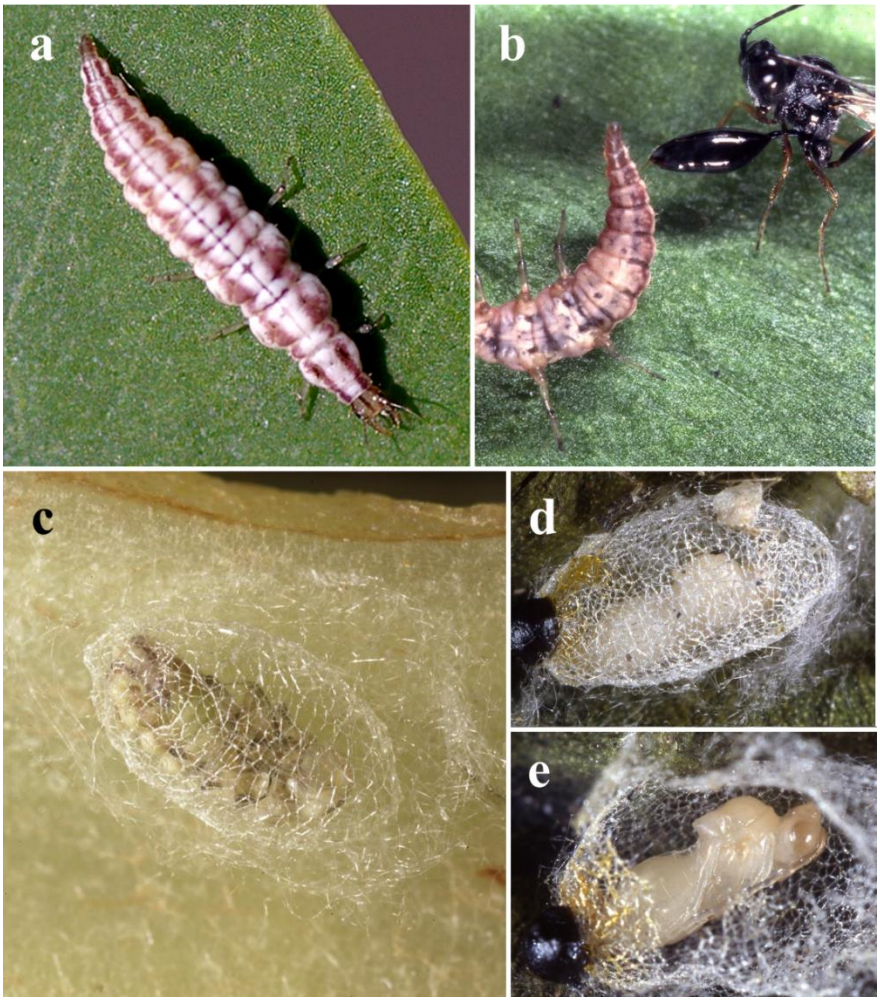


Figure 10. a) Hemerobiidae larvae (From http://bugguide.net); b) *Anacharis zealandica* Ashmead, 1900 attacking *Micromus tasmaniae* (Walker, 1860) (From http://nzacfactsheets.landcareresearch.co.nz/); c) *Micromus tasmaniae* cocoon with pupa (From http://nzacfactsheets.landcareresearch.co.nz/); d) and e) *Micromus tasmaniae* coccon with *Anacharis zealandica* pupa (From http://nzacfactsheets.landcareresearch.co.nz/).

Egg incubation and larval development lasts 7-9 days inside the host, during which it develops and spoons cocoons but does not pupate. After feeding internally, one *Anacharis* larva emerges from the ventral or lateral intertegument between opposing legs, and stays 2-5 days outside the host consuming the remains, including sclerotized areas (Handlirsch, 1886; Cave & Miller, 1985; Miller & Lambdin, 1987). After feeding

on the hosts remains, the larva pupates without forming cocoon and remains as pupa for 5-8 days (Cave & Miller, 1985), although there are records of pupa stage lasting as long as 14 days in an undetermined species of *Anacharis* (Wegenek, 1950). The adult remains 24h inside the host's cocoon while its exoskeleton hardens, emerging throw chewing a hole in the cocoon (Cave & Millar, 1985). Adult longevity is short: from 1 to 9 days (Miller & Lambdin, 1987). This may explain the difficulty of collecting Anacharitinae, with large abundance peaks very short in time, as seen in our sampling.

Anacharitinae do not present strict requirement regarding their habitat. Specimens have been reared in very different ecosystems, from tundra meadows in Alaska, Greenland and Lapland to semi-arid shrubs of Southwestern USA and tropical forest canopy in Central and South America. Altitude is neither a limitant factor; specimens have been collected from sea level locations to elevations above 3500 m in the Andean mountain range.

1.5. Geographic distribution

Anacharitinae are a cosmopolitan subfamily, being present in all continents except for Antarctica - although one genus, *Cornaegilips* sp., is endemic of the Subantarctican sub-region. Despite not being as abundant as other Figitidae subfamilies (mainly Charipinae and Eucoilinae), Anacharitinae are notoriously represented among their distribution areas: specimens have been found from Greenland and Lapland to Patagonia and New Zealand.

Before this taxonomical revision was done, Anacharitinae diversity presented an interesting pattern: whereas its highest generic diversity was in the Neotropical region (with five genera present, three of them endemic: *Acanthaegilips, Calofigites* and *Solenofigites*), the bulk of described species was concentrated in the Holarctic (59 species out of 81). Some of the most biodiversity-rich regions had a scarce record of Anacharitinae, or they were even absent – 2 species for the Australasian region and 1 species for the Afrotropical, while no Anacharitinae were known for the Indomalayan region.

The study of undetermined Anacharitinae has expanded our knowledge on the subfamily distribution. At the generic level, the Neotropical region still represents the richest region, with all genera present except for *Acanthaegilopsis* and *Proanacharis*, and having the highest score of endemism with four endemic genera: *Acanthaegilips*, *Calofigites, Cornaegilips* and *Solenofigites.* The knowledge on fauna of previously studied regions has been examined and updated: number of Holarctic species has decreased (Mata-Casanova *et al.*, 2014b, 2014c, 2015a, 2015c), while the tropical Anacharitinae diversity has increased with the description of new Neotropical (Mata-Casanova 2013b, 2014b, 2015a, 2017a), Afrotropical (Mata-Casanova *et al.*, 2013a, 2015b, 2017b), Australasian (Mata-Casanova *et al.,* 2015c) and Indomalayan species.

1.6. Phylogeny and evolutionary history

Figitidae are a monophyletic groups defined by two synapomorphies (Ronquist, 1995; 1999): the presence of a point of weakness in females in the ninth tergum at the position of the third valvula – which allows movement between the basal and distal parts of the ovipositor and allows for further ovipositor modifications –, and by having Rs+M vein issuing at the posterior end of basalis vein. Rs+M can be nebulous or spectral in some groups, but there is always a portion directed towards the posterior en of the basal vein.

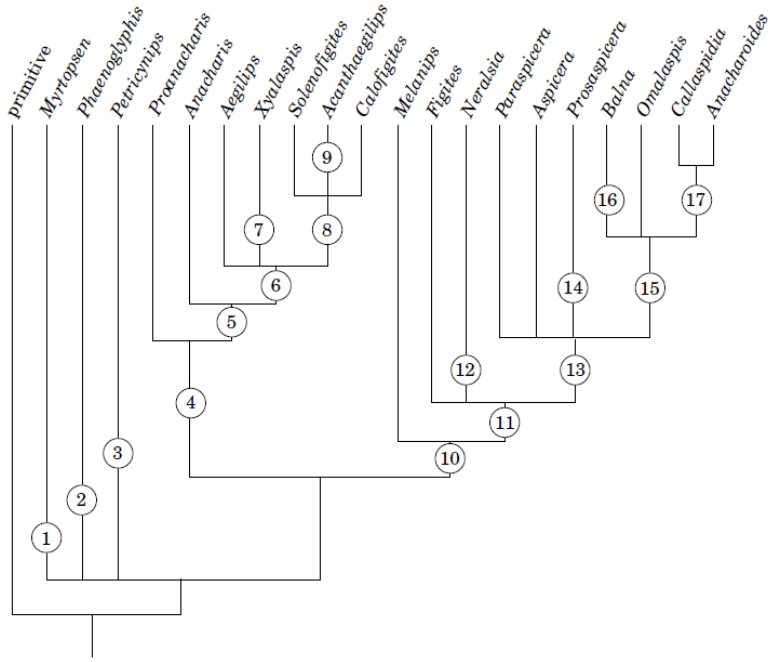


Figure 11. Anacharitinae and Aspicerinae phylogeny (From Ros-Farré *et al.*, 2000).

Ronquist (1999) made the first attempt at figitid internal phylogeny, based on features of female metasoma complemented with some other morphological and biological characters. The results supported Anacharitinae monophyly (excluding by then anacharitine *Petricynips*); *Proanacharis* appeared to be the sister lineage of all other Anacharitinae. In this analysis Charipinae appeared to be sister taxa of Anacharitinae.

Ros-Farré *et al.* (2000) conducted a cladistics analysis on higher figitid species based on 24 characters. The results (Fig. 11) supported the monophyly of Anacharitinae and the position of *Acanthaegilips* within the subfamily, closely related to the other two Neotropical endemic genera *Calofigites* and *Solenofigites*. *Proanacharis* was the sister taxa of the rest of Anacharitinae. Anacharitinae did not appear as sister taxa of Charipinae but of the cluster Aspicerinae + Figitinae *sensu lato* (including *Melanips* Haliday, 1835). Vårdal *et al.* (2003) work on the egg structure also found the same sister group relationship present in Ronquist (1999).

Subsequent approaches to cynipoid phylogeny were made based on larval comparative morphology (Nieves-Aldrey *et al.*, 2005) but they not consider Anacharitinae. Buffington *et al.* (2007) presented a phylogeny based on 165 morphological characters, 4 gene regions and life history data, studied under parsimony

analysis and Bayesian inference. Results showed Anacharitinae as sister taxa of the rest of higher Figitidae (Aspicerinae, Charipinae, Emarginae, Eucoilinae and Figitinae *sensu lato*) (Fig. 12), suggesting an earlier divergence of hemerobiid-feeding lifestyle from the main figitid line. Regarding it internal phylogeny, parsimony analysis showed two clear Anacharitinae clusters: those genera with scutellar spine (*Acanthaegilips* and *Xyalaspis*) and those without (*Aegilips*, *Anacharis* and *Hexacharis*) (Fig. 13).

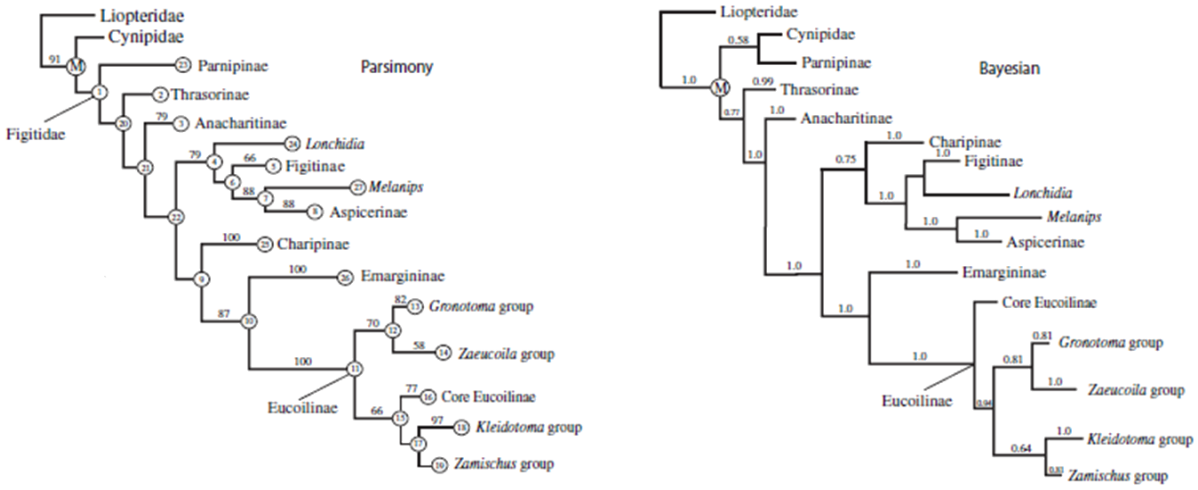


Figure 12. Anacharitinae position within Figitidae according to Parsimony and Bayesian analyses (From Buffington *et al.*, 2007).

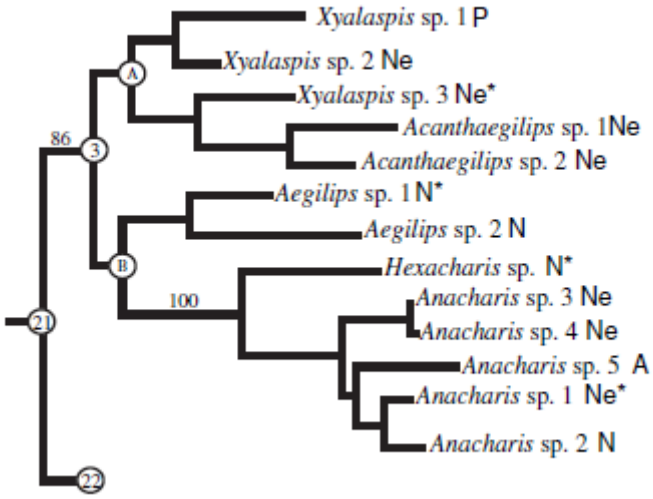


Figure 13. Anacharitinae internal phylogeny (From Buffington *et al.*, 2007).

The most recent phylogenetic analyses (Buffington *et al.*, 2012) debunked Figitidae monophyly, with gall-inducing parasites – Euceroptrinae, Mikeiinae, Plectocynipinae, Pycnostigminae, and Thrasorinae – being closer to Cynipidae than other Figitidae. Results on Anacharitinae were concordant with those of Buffington *et al.* (2007): Anacharitinae appeared as sister group of the more derived Figitidae. The divergence estimate for Anacharitinae given in Buffington *et al.* (2012) was 113 Ma, substantially younger than estimate age for Hemerobiidae and Chrysopidae – 178 Ma (Winterton *et al.*, 2010). Regarding its internal phylogeny, *Aegilips* appeared to be closer to *Xyalaspis* than to the *Anacharis-Hexacharis* clade.

1.7. Approach of the present thesis

The main focus of this thesis has been updating the taxonomical knowledge of subfamily Anacharitinae, an understudied field in Figitidae studies. As seen before, Anacharitinae present biological particularities and a keystone position in Figitidae phylogeny, so fixing their troublesome taxonomy was a necessary step before considering other in-depth analyses.

Acanthaegilips was the only Anacharitinae genus with recent data available (Ros-Farré *et al.*, 2000; Ros-Farré *et al.*, 2003; Pujade-Villar, *et al.*, 2009; Restrepo-Ortiz *et al.*, 2010); *Aegilips*, *Anacharis* and *Xyalaspis* knowledge was very outdated despite the three genera representing more than ¾ of Anacharitinae known diversity. Thus, the main aim of our thesis was to solve their taxonomical issues.

The first step was examining the type material deposited in different institutions all over the world, detailed in the Material and Methods section. In most occasions the material was studied through loans, but in case of huge collections or legal impediments a stay in the depository institution was organized. This has been the case of CNC, MLPA, USNM and ZIN. Once all type material of each genus was examined and photographed, species were compared to assess its validity and, in case it was necessary, erect new synonymies. Thus we had a stable taxonomical base for further work.

The next step was to study large series of Anacharitinae unidentified material. This step pursued three main aims: a) to broaden our knowledge on morphological diversity and distribution areas of previously known species; b) to find and describe new species and genera; and c) to have properly reference collections for future taxonomical or phylogenetical studies. This step led to the description of new genera and species, and new records. *Aegilips, Anacharis* and *Xyalaspis*, previously known mostly by Holarctic records, have now a representative record for Neotropical, Afrotropical, Indomalayan and Australasian regions.

As previously seen, the biology of Anacharitinae remains quite unknown. The most common sampling methods for Anacharitinae are passive – Malaise traps, Yellow Pan Trap – and active – sweeping – focused on imagos, which usually do not probide information on host. However, new data on host-parasite relationships has been added whenever it has been possible: those cases were specimens had been collected from Hemerobiidae cocoons.

The results are presented as a compendium of publications. Each one has its own detailed sections – introduction, material and methods, results and discussion – independent from others. An updated catalog and key for Anacharitinae species is given, and a general discussion and conclusions are given at the end.

2. OBJECTIVES

The main scope of this thesis has been to upgrade the knowledge of subfamily Anacharitinae, establishing an updated taxonomy useful for the scientific community. This has meant studying all currently described species and undetermined material to designate their diagnostic features and establish clear boundaries for each genus and species. This taxonomical update holds special relevance when talking about some relatively unknown taxa like Anacharitinae; a proper taxonomy means a secure starting point for further studies on other subjects. Along with the taxonomical focus, aspects of biology, distribution patterns and phylogeny have also been addressed.

The specific objectives of the present thesis are listed below:

1. Studying worldwide Anacharitinae biodiversity.

    a. Revision of all previously described species to assess its validity, and preparing full descriptions and illustrative plates for valid species in case of need.

    b. Identification of undetermined Anacharitinae material deposited in scientific institutions worldwide.

    c. Description of new Anacharitinae species and genera, providing complete descriptions and highlighting diagnostic characters, distribution and biology whenever it is possible.

    d. Provide illustrated plates for the newly described species, with SEM pictures of their diagnostic characters.

    e. Carry out updated and complete keys for identification of Anacharitinae species, useful for pest control, taxonomical or other studies.

2. Studying the subfamily internal phylogeny, distribution and biology.

    a. Analyze the internal relationships between different Anacharitinae genera and species.

    b. Establish Anacharitinae biogeographical history, their origin and distribution patterns.

    c. Establish, whenever it is possible, correlation between Anacharitinae and their hosts.

3. Make the results known for the scientific community, through scientific journals and national and international congresses and meetings.

3. MATERIAL AND METHODS

3.1. Provider and depository institutions of the studied material

The present thesis has been possible due to the study of huge collections of parasitoid Hymenoptera deposited in scientific institutions across the world. The directors of the thesis have an extensive record of working together with those institutions, and most of the material has been studied thanks to loans. The material was sent to Dr. Pujade-Villar (UB) by mailing agencies, or was studied during stays in the institutions by the incumbent PhD student. This has been the case of the Canadian National Collection of Insects, Arachnids and Nematodes, the Lund Museum of Zoology, the Museo de La Plata, the Russian Academy of Sciences, the Universidad Autónoma de Tamaulipas and the United States National Museum of Natural History.

Here we present an exhaustive list of the institutions whose collections have been examined. Each institution is given an acronym following the webpage: http:hbs.bishopmuseum.org/codens/codens-inst.html, which give a complete list of acronyms of the insects and arachnids collections from all over the world. The curator of each collection has been indicated:

- ANIC (Australian National Insect Collection (CSIRO), Canberra, Australia; Nicole Fisher).
- CAS (California Academy of Sciences, San Francisco, USA; Robert Zuparko).
- CNC (Canadian National Collection of Insects, Arachnids and Nematodes, Ottawa, Canada; Andrew Bennett and Sophie Cardinal).
- IAVH (Instituto Alexander von Humboldt, Villa de Leiva, Colombia; Claudia Medina).
- IFML (Instituto de Entomología – Fundación Miguel Lillo; Tucumán, Argentina; Emilia Constanza Pérez).
- MGAB (Muzeul de Istoria Naturala "Grigore Antipa", Bucharest, Romania; Melanya Stan).
- MJMO-UCOB (Museo José Manuel Osorio – Universidad Centroccidental “Lisandro Alvarado, Barquisimeto, Venezuela; Evelín Arcaya).
- MLPA (Universidad Nacional de La Plata, Museo de la Plata, La Plata, Argentina; Fabiana Gallardo).
- MNHN (Muséum National d'Histoire Naturelle, Paris, France; Magdalena Czyrnek and Claire Villemant).
- MZLU (Lund Museum of Zoology, Lund, Sweden; Christer Hansson).

- NHM (Natural History Museum, London, United Kingdom; David Notton).
- UAT (Universidad Autónoma de Tamaulipas, Ciudad Victoria, México; Juana María Coronado and Enrique Ruiz).
- UB (Universitat de Barcelona, col. JP-V, Juli Pujade-Villar)
- ULg (Université de Liège, Liège, Belgium; Pierre-Nicolas Libert)
- ULQC (University of Laval, Quebec, Canada; Jean-Marie Perron).
- USNM (United States National Museum of Natural History (Smithsonian Institution), Washington DC, USA; M. Buffington)
- ZAFU (Zhejiang Agricultural and Forest University, Linan, China; Yiping Wang).
- ZIN (Zoologicheskij Institut, Rossinskaya Akademiya Nauk, Saint Petersburg, Russia; Sergey Belokobilskij and Oleg Kovalev).
- ZMHB (Museum für Naturkunde der Humboldt-Universität, Berlin, Germany; Frank Koch).
- ZSM (Zoologische Staatssammlung Museum, München, Germany; Olga Schmidt).

The holotypes of the new taxa described are deposited in their home institutions. In case of large series belonging to CNC, IAVH, MNHN and NHM, some paratypes are also deposited in the Pujade-Villar collection (UB) due to collaboration agreements with those institutions. A total of 5861 specimens have been identified: 2722 females and 3089 males.

3.2. Morphological terminology

Morphological terms used are those stablished by Richards (1977), Ronquist (1995) and Ros-Farré *et al.* (2003). All measurements are relative except for the body length. The transfacial line is measured as the distance between the inner margins of compound eyes, measured across the face through the antennal sockets divided by the height of the eye. The malar space is measured by the distance from the lower part of the gena from the mouthparts to the ventral margin of the compound eye, divided by the height of the eye. The width of the fore wing radial cell is measured from the margin of the wing to the beginning Rs vein.

Abbreviations include F1–F12, first and subsequent flagellomeres; post-ocellar distance (POL) is the distance between the inner margins of the posterior ocelli; ocular-ocellar distance (OOL) is the shortest distance between the inner margin of the compound eye and the outer edge of the posterior ocellus and lateral–frontal ocellar

distance (LOL) is the distance between the edges of the lateral and frontal ocelli. Antennal formula includes scape, pedicel and flagellomere length and relative width in brackets.

Sexual dimorphism is low among Anacharitinae. Descriptions are based on one sex (female, whenever it is possible), with differences indicated when they are present.

3.4. Preparation, observation and illustration of specimens

Preparation of the studied material

Anacharitinae material deposited in collections – both in the University of Barcelona and institutions abroad – is dried and mounted on cardboards. However, some material we received was conserved in ethanol (70 or 95%); in those occasions, the material was left to dry and later mounted on cardboard in order to have easy access to the diagnostic features (Fig. 14a, 14b).

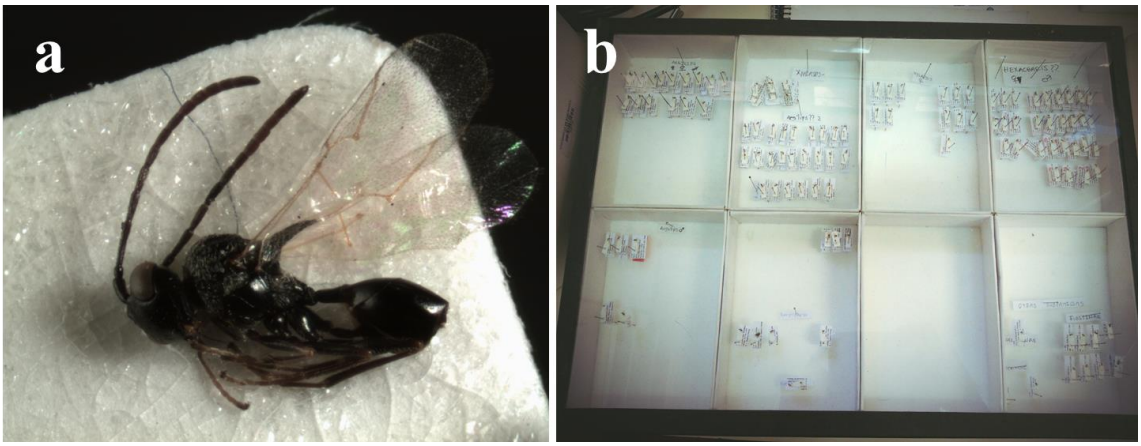


Figure 14. a) Mounted specimen on cardboard (*Acanthaegilips palmirae*). b) Anacharitinae specimens deposited for study at Universitat de Barcelona.

The UB Figitidae collection was huge due to material brought in loan from CNC by Dr. Pujade-Villar and Dr. Ros-Farré after a stay there in 2000. This material was dried, mounted and labelled by Dr. Ros-Farré. From September 2015 to December 2015 the thesis' author stayed at CNC indentyifing material collected in the years passed after Dr. Pujade-Villar and Dr. Ros-Farré stay under the supervision of Dr. Huber and Dr. Cardinal. On June 2017 the author spent two weeks visiting the USNM invited by Dr. Buffington and checking the Anacharitinae collection. We should also make mention to large amounts of unidentified material deposited at NHM loaned by Dr. Notton while the present thesis was being carried out has been.

Observation and illustration of studied material

Once dried, mounted and labelled, the material was studied under Olympus SZ30 stereomicroscope. In the case of type material, or when facing new species or troubles regarding proper identification of specimens, pictures were taken using both Zeiss Discovery V8 compound microscope with and attached InfinityX-21C digital camera – image series consisted about 15 to 20 focal planes merged with DeltaPix View-Pro AZ – and more often FEI Quanta 200 ESEM environmental scanning electron

microscope. The compound microscope is located at the Departament de Biologia Animal of the University of Barcelona, whereas the SEM used is deposited at Serveis Científico-Tècnics of the same institution.

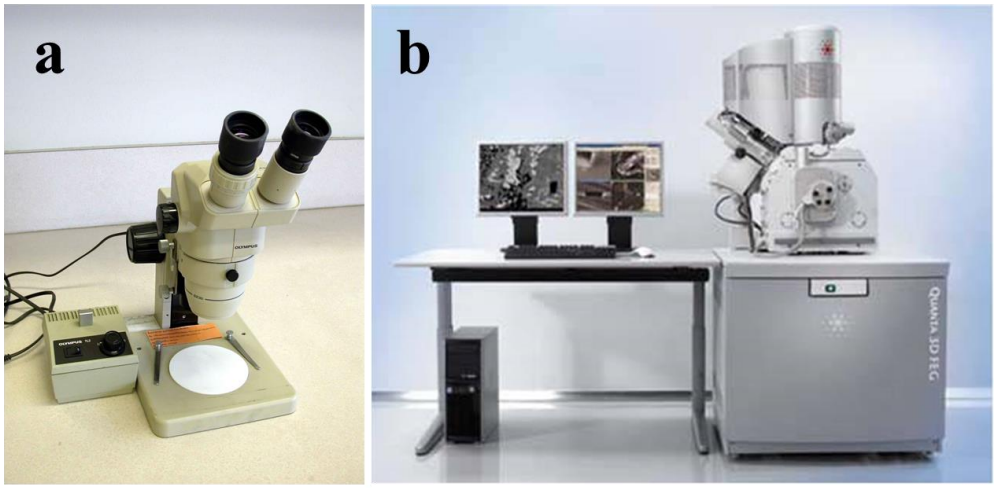


Figure 15. a) Olympus SZ30 stereomicroscope. b) FEI Quanta 200 ESEM environmental scanning electron microscope.

The obtained pictures have been used for studying the material and give some insight in troublesome identifications. Best pictures have been used for illustrating diagnostic characters of Anacharitinae species in the published papers.

4. RESULTS

4.1. Introduction to results

During the present thesis the obtained results have been presented as scientific papers; those are presented in the following list. The papers are ordered according to its status: published, accepted and under review. Published papers are furtherly ordered by year.

Published

2013:

1. *Acanthaegilopsis malagasy* gen. n. and sp. n. of Anacharitinae from Madagascar and the Comoros. *African Entomology*, 21: 161-164.

   IF: 0.690; Quartile Rank: 3; Area: Insect Science.

2. Nuevas contribuciones al conocimiento de *Acanthaegilips* en Colombia (Hymenoptera: Figitidae: Anacharitinae). *Revista Colombiana de Entomologia*, 31: 71-75.

   IF: 0.253; Quartile Rank: 4; Area: Insect Science.

2014:

3. Revision of the American Species of Genus *Xyalaspis* (Hymenoptera: Figitidae: Anacharitinae). *Annals of the American Entomological Society*, 107: 557-566.

   IF: 1.222; Quartile Rank: 2; Area: Insect Science.

4. First host record for *Acanthaegilips* (Hymenoptera: Figitidae: Anacharitinae) and description of a new species from Venezuela. *Florida Entomologist*, 97: 461-464.

   IF: 0.975; Quartile Rank: 2; Area: Insect Science.

5. Revision of the Asian species of genus *Xyalaspis* Hartig, 1843 (Hymenoptera: Figitidae: Anacharitinae). *Journal of Asia-Pacific Entomology*, 17: 569-576.

   IF: 1.080; Quartile Rank: 2; Area: Insect Science.

6. Description of two new species of Anacharitinae (Hymenoptera: Figitidae) from the Afrotropical region. *African Entomology*, 22: 545-551.

   IF: 0.690; Quartile Rank: 3; Area: Insect Science.

2015:

7. Revision of the genus *Xyalaspis* Hartig, 1843 (Hymenoptera: Figitidae: Anacharitinae) in the Western Palearctic. *Zoosystema*, 37(1): 31-43.

   IF: 0.632; Quartile Rank: 2; Area: Insect Science.

8. Current knowledge of subfamily Anacharitinae (Hymenoptera: Figitidae) in the Australasian region. *Austral Entomology*, 54: 438-444.

   IF: 1.341; Quartile Rank: 2; Area: Insect Science.

9. Description of two new species of *Anacharis* Dalman, 1823 (Hymenoptera: Figitidae, Anacharitinae) from the Afrotropical region. *African Entomology*, 23(2): 314-320.

IF: 0.690; Quartile Rank: 3; Area: Insect Science.

10. Description of two new species of genus *Xyalaspis* Hartig, 1843 (Hymenoptera: Figitidae: Anacharitinae) in the Neotropical region. *Dugesiana*, 22(2): 97-102.

11. Diversity of subfamily Anacharitinae (Hymenoptera: Cynipoidea: Figitidae) in China with description of a new species of *Xyalaspis* Hartig, 1843. *Journal of Asia-Pacific Entomology*, 19: 9-14.

IF: 1.080; Quartile Rank: 2; Area: Insect Science.

2017:

12. Revision of the current knowledge of genus *Aegilips* Haliday, 1835 (Hymenoptera: Figitidae: Anacharitinae) in the Afrotropical region, with description of three new species. *African Entomology*, 25(1): 62-71.

IF: 0.690; Quartile Rank: 3; Area: Insect Science.

13. Description of four new species of genus *Acanthaegilips* Ashmead, 1897 (Hymenoptera: Figitidae: Anacharitinae) from Colombia. *Neotropical Entomology*, 46(6): 649-657.

IF: 1.200; Quartile Rank: 2; Area: Insect Science.

Accepted

14. Three new species of *Anacharis* Dalman, 1823(Hymenoptera: Figitidae) with revised taxonomy and distribution records of Palaearctic and Indomalayan species. *European Journal of Taxonomy.*

IF: 0.320; Quartile Rank: 3; Area: Insect Science.

Under review

15. Revision of the Eurasian species of genus *Aegilips* Haliday, 1835 (Hymenoptera: Figitidae, Anacharitinae). *European Journal of Entomology.*

IF: 1.061; Quartile Rank: 2; Area: Insect Science.

16. Revision of the current knowledge of genus *Aegilips* Haliday, 1835 (Hymenoptera: Figitidae: Anacharitinae) in North America. *Canadian Entomologist.*

IF: 0.837; Quartile Rank: 2; Area: Insect Science.

17. Current status of the knowledge of genus *Anacharis* (Dalman, 1818) (Hymenoptera: Figitidae, Anacharitinae) in America. *Journal of Insect Science.*

IF: 0.921; Quartile Rank: 3; Area: Insect Science.

18. *Cornaegilips* Mata-Casanova & Pujade-Villar gen. nov. (Hymenoptera: Cynipoidea: Figitidae: Anacharitinae) from Andean region, with an

identification key to the genera of Anacharitinae worldwide. *Neotropical Entomology.*

IF: 0.756; Quartile Rank: 2; Area: Insect Science.

4.2. Taxonomical Revisions

4.2.1. *Acanthaegilopsis malagasy* gen. n.

Acanthaegilopsis malagasy gen. n. and sp. n. of Anacharitinae (Hymenoptera: Cynipoidea: Figitidae) from Madagascar and the Comoros

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A new genus of the subfamily Anacharitinae (Hymenoptera: Figitidae), *Acanthaegilopsis* gen. n., from Comoros and Madagascar is described. Diagnostic characters of the new genus are illustrated and discussed.

Keywords: Hymenoptera, Figitidae, Anacharitinae, *Acanthaegilopsis malagasy*, Madagascar, Comoros, new genus.

INTRODUCTION

The Anacharitinae are a subfamily of Figitidae which can be easily distinguished from the rest of the family by some shared characteristics (Ros-Farr *et al.* 2000): triangular-shaped head in frontal view, rounded and continuous pronotal plate, and small broadly overlapping mandibles. The subfamily currently includes eight described genera: *Acanthaegilips* Ashmead, 1897; *Aegilips* Haliday, 1835; *Anacharis* Dalman, 1823; *Calofigites* Kieffer, 1909; *Hexacharis* Kieffer, 1907; *Proanacharis* Kovalev, 1996; *Solenofigites* D az, 1979; and *Xyalaspis* Hartig, 1843; together comprising 74 valid species. Although some anacharitines have been cited (Ronquist 1999) as parasitoids of aphid-feeding larvae belonging to the families Hemerobiidae and Chrysopidae (Neuroptera), their biology remains widely unknown.

The Anacharitinae have a cosmopolitan distribution; however, their presence in the Afrotropical Region is poorly known (Pujade-Villar 2012), with only two recorded species: *Aegilips capensis* Kieffer, 1912 from South Africa and *Anacharis madagascariensis* Pujade-Villar, 2012 from Madagascar. In this work we describe *Acanthaegilopsis* gen. n., a new genus of Anacharitinae from the islands of Comoros and Madagascar in the Malagasy area (Afrotropical Region).

MATERIAL AND METHODS

The specimens examined in this study are from the California Academy of Sciences (CAS) and the Mus um National d'Histoire Naturelle (MNHN, Paris). They are deposited in CAS, MNHN and UB (Universitat de Barcelona).

For the description of *Acanthaegilopsis* gen. n. four specimens were studied: one male and three females. Morphological terms used are those of Richards (1977), Ronquist (1995) and Ros-Farr *et al.* (2003). All measurements are relative except for the body length. Measurements and abbreviations include: F1–F12, first and subsequent flagellomeres; POL (post-ocellar distance) is the distance between the inner margins of the posterior ocelli; OOL (ocular-ocellar distance) is the shortest distance between the inner margin of the compound eye and the outer edge of the posterior ocellus; LOL (lateral–frontal ocellar distance) is the distance between the edges of the lateral and frontal ocelli. Antennal formula includes scape, pedicel and flagellomeres length and relative width in brackets.

The images included were made in 'Serveis Cient fico-T cnics' of the University of Barcelona with a Stereoscan S-360 (Cambridge Instruments) scanning electron microscope under a low voltage (1.0 kV) and without any coating, in order to preserve the type material. The picture of the mesopleuron was taken with a Zeiss Discovery V8 compound microscope with attached INFINITYX-21C digital camera. The computer program DeltaPix View-Pro AZ was used to obtain a single in-focus image compiled from a series of 20 focal planes.

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RESULTS

New taxa

Acanthaegilopsis Pujade-Villar **gen. n.**

Type species: *Acanthaegilopsis malagasy* sp. n.

Diagnosis

Acanthaegilopsis gen. n. differs from all Anachari-

tinae genera by a coriaceous sculpture of the whole mesopleuron. *Acanthaegilopsis* gen. n. strongly resembles *Acanthaegilips* but lacks malar impression and has a quadrangular-shaped head, a short petiole and a coriaceous mesopleuron without an oblique groove. The absence of mesopleural oblique groove also differentiates it from *Solenofigites*, in addition of having a scutellar spine and a heavily sculptured mesoscutum. The presence of the scutellar spine distinguishes *Acanthaegilopsis* gen. n. from the Anacharitinae genera *Aegilips, Anacharis, Calofigites, Hexacharis, Proanacharis* and *Solenofigites*, none of them having a true scutellar spine. *Acanthaegilopsis* can be distinguished from *Xyalaspis* (the other anacharitine genera besides *Acanthaegilips* and *Acanthaegilopsis* gen. n. having a true scutellar spine) by the quadrangular-shaped head in frontal view and lack of malar impression.

Etymology. The generic name *Acanthaegilopsis* was chosen due to the similarity between the new genus and *Acanthaegilips*.

Acanthaegilopsis malagasy Pujade-Villar & Mata-Casanova **sp. n.**, Fig. 1

Diagnosis

Acanthaegilopsis malagasy sp. n. presents areolate sculpture in the notauli and medial mesoscutal furrow while coriaceous in lateral regions. The scape is longer than F1, and both F1 and F2 have the same length. Male has sparse placodeal sensilla in F3 and F4 and no modified flagellomeres. The pronotal plate is slightly projected at its apex. Lateral pits of scutellar fovea large and superficial. Propodeal carinae delimiting two large coriaceous cells. Radial cell closed.

Studied material. Holotype ♂ (deposited in MNHN) with the following labels: 'Mus um Paris' (blue label), 'Convalescence, Grande Comore, 1600–1750 msnm, 1–2.12.1982: 1 ♂ (L. Tsacas leg)' (blue label); 'Holotypus of *Acanthaegilopsis malagasy* n. gen. & n. sp., design. J.P-V 2012' (red label). Paratypes (3♀) with the following labels: 'MADAGASCAR' (blue label), 'Ranomafana' (blue label, handwritten), 'Museum Paris, 08.1980, A. Seyrig' (blue label), 'Paris' (white label, handwritten), 'Paratypus of *Acanthaegilopsis malagasy* n. gen. & n. sp., det. J.P-V & Mata-Casanova, 2013' (red label): 1♀ (deposited in MNHN); 'MADAGASCAR' (blue label), 'Ranomafana' (blue label, handwritten), 'Museum Paris, 08.1980, A. Seyrig' (blue label), 'Paris' (white label, handwritten) 'Antenna head broken and F8 lost' (white label), 'Paratypus of *Acanthaegilopsis malagasy* n. gen. & n. sp., det. J.P-V & Mata-Casanova, 2013' (red label): 1♀ (deposited in UB); 'CASENT 2004786' (white label), 'MADAGASCAR, Province d'Antananarivo 3 km 41° NE Andranomay, 11.5 km 147° SSE Anjozorobe, elev 1300 m, 5–13 Dec. 2000' (white label), '18°28'24"S 47°57'36"E, coll. Fisher, Griswold et al. California Acad, of Sciences, montane rainforest, Malaise trap, coll. Code: BLF2375' (white label), 'Acanthaegilips' (white label, handwritten), 'Paratypus of *Acanthaegilopsis malagasy* n. gen. & n. sp., det. J.P-V & Mata-Casanova, 2013' (red label): 1♀ (deposited in CAS).

Description

Length. 2.1 mm in both sexes.

Colour. Head, mesosoma and metasoma black. Mandibles yellowish brown with darker teeth. Antennae yellowish brown, scape and pedicel lighter in males. Legs including coxae yellowish brown. Veins of wings dark brown.

Head. Width of head 1.1 times its length in dorsal view and 2.2 times its height in frontal view. Face smooth, shiny and almost glabrous except for a few short hairs and piliferous punctures. Malar area smooth (Fig. 1a). Transfacial line equal to the height of the compound eye. Toruli separated by a distance equal to its diameter and bigger than the distance between the exterior margin of the toruli and the internal margin of the compound eye. Clypeus shortly defined, convex, smooth and glabrous. Occipital carina absent, postocular carina present. Compound eyes with only few short hairs. POL:OOL:LOL ratio = 8:5.5:3, being the ocelli diameter 2. Frons smooth and shiny, weakly punctuated.

Antennae. Cylindrical flagellomeres, covered with dense pubescence. Female antennal formula: 12(4), 5(4), 9(2), 9(2.5), 8(3), 7(3), 6(3), 6(3), 5.5(3), 5.5(3), 5(3), 5(3), 9(3). Male antennal formula: 11.5(4.5), 5(4), 9(3), 9(3), 9(3), 9(3), 8(3), 8(3), 7(3), 7(3), 7(3), 6.5(3), 6.5(3), 7(3). Placodeal sensilla start at F2 in females and F3 in males and are sparce in F3 and F4 in both sexes.

Mesosoma. Pronotal plate coriaceous, rounded, not incised, slightly projected at its apex (Fig. 1b). Pronotum coriaceous, with coarse areolate sculpture in lateral view. Mesoscutum 1.4 times wider than long in dorsal view. Notauli complete with transverse carinated sculpture. Median mesoscutal

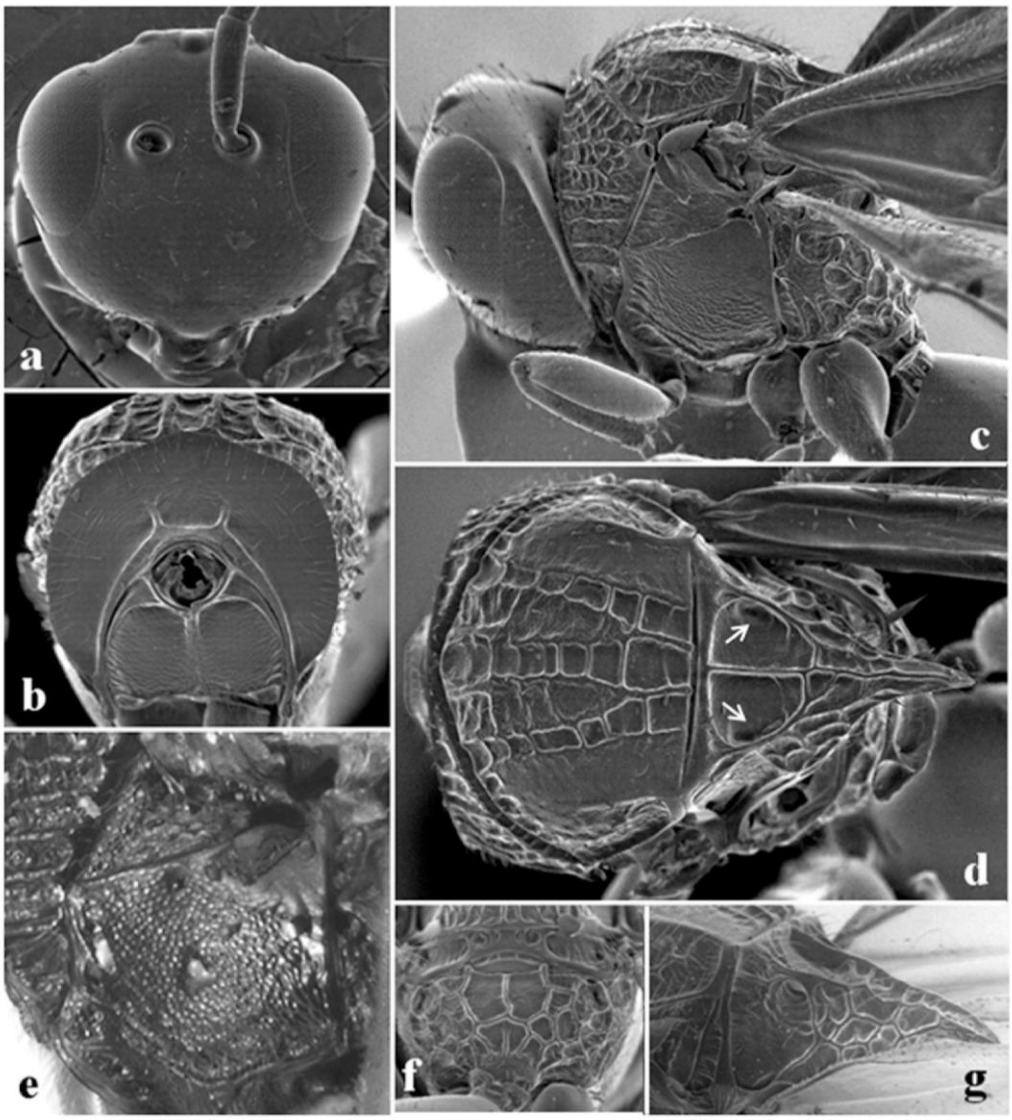


Fig. 1. *Acanthaegilopsis malagasy*; **a**, head in frontal view; **b**, pronotal plate in frontal view; **c**, head and mesosoma in lateral view; **d**, mesosoma in dorsal view (the arrow marks the lateral pits of scutellar fovea); **e**, mesopleuron in lateral view; **f**, propodeum; **g**, scutellar spine in lateral view.

furrow complete with tranverse carinae (Fig. 1d). Mesoscutum between notauli and median mesoscutal furrow carinated. Region between the external margin of the notauli and the parapsidal signum coriaceous. Parascutal sulcus present and carinated, lateral region of the mesoscutum coriaceous and slightly carinated. Scutellum length subequal to mesoscutum length (22:23). Scutellar foveae big and coriaceous, laterally and basally defined by a carina, without reaching the scutellar spine. Interfoveal line complete, reaching the end of the scutellar spine. Lateral pits of scutellar foveae large and superficial, 1.25 times longer than wide. Scutellar spine broad at base narrowing towards the apex, one-third the length of the scutellum in lateral view, clearly curved

downwards in both sexes (Fig. 1g). Mesopleuron coriaceous, glabrous and shiny, with some anterior parallel ridges (Fig. 1e). Mesopleural triangle coriaceous and slightly pubescent. Propodeum coriaceous and areolate, with two large and clearly defined cells in its upper part and a smaller cell in its lower part partially divided by a vertical carina (Fig. 1f).

Wings: Pubescent. Radial cell of forewing closed, 2.4–2.5 times longer than wide. Marginal pubescence of the wing denser at the apical third.

Metasoma. Petiole as long as wide, dorsally smooth, laterally and ventrally costate (Fig. 1d). Third abdominal tergum 2.8 longer than the fourth abdominal tergum in dorsal view. Fifth and sixth abdominal terga are not visible in dorsal view. Metasoma glabrous.

Etymology. The species was named after the region where the specimens were collected.

Biology. Unknown.

Distribution. Afrotropical; recorded from Madagascar and Comoros

DISCUSSION

Acanthaegilopsis clearly fits within the Anacharitinae. It possesses two of the three main synapomorphies of the subfamily listed above: continuous and rounded pronotal plate and broadly overlapping mandibles. Its head is more quadrangular than triangular-shaped, but this is also the case in *Proanacharis*.

Acanthaegilopsis has some shared characteristics with *Acanthaegilips*, to which it is closely related: the heavily sculptured mesoscutum, the long scutellar spine and the scutelar shape in dorsal view. It differs from *Acanthaegilips* because of its short petiole, a quadrangular head and the absence of malar impression and oblique groove in the mesopleuron. *Acanthaegilopsis* is also close to *Xyalaspis*, but differs by lacking a coriaceous malar impression – always present in *Xyalaspis* – and by having a complete median mesoscutal furrow with internal carinae. It should be noted that this character is also present in *Xyalaspis victoriensis*, but its placement within genus *Xyalaspis* is unresolved. The presence of coriaceous sculpture in the whole mesopleuron in *Acanthaegilopsis* is a unique characteristic among all anacharitines and justifies its position as a new genus.

The biology of *Acanthaegilopsis* is unknown, nevertheless according to Ronquist (1999) anacharitines parasitize larvae of Chrysopidae and Hemerobiidae. In the Afrotropical Region 180 species and 26 genera of Chrysopidae are known (H lzel & Ohm, 2002). However, the occurrence of Anacharitinae in this region is poorly understood despite the abundance of suitable hosts, mainly because the Afrotropical anacharitines have not been studied in detail. An exhaustive revision of African and Malagasy museum material and additional collecting will presumably reveal a greater number of anacharitine taxa from the region.

ACKNOWLEDGEMENTS

Thanks are due to C. Villemant (MNHN, Paris, France) and R. Zuparko (CAS, Los Angeles, U.S.A.) for the loan of the material, to P. Ros-Farr (UB) for the SEM images and her comments, and to A. Vi olas for the digital camera image.

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4.2.2. New contributions to Colombian *Acanthaegilips*

Revista Colombiana de Entomología 39 (1): 71-75 (2013)

Nuevos aportes al conocimiento de *Acanthaegilips* en Colombia (Hymenoptera: Figitidae: Anacharitinae)

New contributions to the knowledge of *Acanthaegilips* in Colombia (Hymenoptera: Figitidae: Anacharitinae)

NOEL MATA-CASANOVA[1] y JULI PUJADE-VILLAR[1]

Resumen: Se citan seis especies para el género *Acanthaegilips* en Colombia; de ellas *Acanthaegilips ashmeadi*, *A. diazi*, *A. huggerti* y *A. venezuelensis* son nuevos registros. Se describe una especie nueva: *A. palmirae* n. sp. y se cita la primera colecta de la hembra de *A. colombiensis*.

Palabras clave: Nuevas especies. Neotrópico. Suramérica.

Abstract: Six species of the genus *Acanthaegilips* in Colombia are mentioned. *Acanthaegilips ashmeadi*, *A. diazi*, *A. huggerti* and *A. venezuelensis* are mentioned for the first time in Colombia. A new species is described: *A. palmirae* n. sp. is described, and the female of *A. colombiensis* is collected for the first time.

Key words: New especies. Neotropico. South America.

Introducción

Acanthaegilips Ashmead, 1897 es unos de los ocho géneros de Figitidae incluidos en la subfamilia Anacharitinae (Restrepo-Ortiz 2010a). Los Anacharitinae se caracterizan por presentar una cabeza triangular en vista frontal, mandíbulas superpuestas y placa pronotal completamente definida por una carena continua lateral. Los Anacharitinae pueden dividirse en dos grandes grupos según la presencia o la ausencia de un surco oblicuo en la mesopleura. *Acanthaegilips* junto con *Solenofigites* forman el grupo con surco oblicuo.

El género *Acanthaegilips* contempla 14 especies de distribución neotropical (Pujade-Villar *et al.* 2009) y tiene como características: un surco malar bien definido, un surco mesopleural oblicuo y ancho, una espina escutelar verdadera acabada en punta y las fosetas escutelares no definidas basalmente, separadas por una carena interfoveal que a menudo llega hasta el ápice de la espina (Ros-Farré *et al.* 2000).

Las únicas especies citadas de *Acanthaegilips* en Colombia son *A. colombiensis* (Pujade-Villar *et al.* 2009) y *A. macropennis* (Restrepo-Ortiz *et al.* 2010b). En este estudio se citan cuatro especies más y se describe una nueva especie.

Materiales y métodos

El material para este estudio fue recolectado entre 2000-2004 gracias al Project Malaise traps "Biodiversidad Insectos de Colombia" asociado al Instituto Humbodlt, la Universidad de Kentucky y el Museo de Los Ángeles de Historia Natural; depositado en el "Instituto Alexander von Humboldt" (IAvH; Villa de Leiva, Colombia) y en la colección Pujade-Villar (UB - Universitat de Barcelona).

Se estudiaron un total de 53 ejemplares (24 machos y 29 hembras). Para su identificación se usaron las claves de Pujade-Villar *et al.* (2009). Las descripciones siguen la terminología usada por Richards (1977), Ronquist (1995) y Ros-Farré *et al.* (2003). Las medidas señaladas son relativas, excepto la longitud total. Las medidas y abreviaciones son: F1-F12, el primero y los subsiguientes flagelómeros; POL (distancia post-ocelar) es la distancia entre los márgenes internos de los dos ocelos posteriores; OOL (distancia ocular-ocelar) es la distancia entre los márgenes externos de los ocelos posteriores y el margen interno del ojo compuesto; LOL es la distancia entre el ocelo central y los ocelos laterales. La fórmula antenal incluye escapo, pedicelo y flagelómeros (la anchura relativa de cada segmento antenal está indicada entre paréntesis).

Las imágenes de SEM se realizaron en "els Serveis Científico-Tècnics" de la Universitat de Barcelona con un microscopio electrónico de barrido Stereoscan S-360 (Cambridge Instruments); obtenidas a bajo voltaje (1.0 KV) y sin ningún tipo de recubrimiento con el objeto de preservar el material tipo. En las fotografías se empleó un microscopio compuesto Zeiss Discovery.V8 con una cámara digital INFINITYX-21C. Se usó el programa DeltaPix VieO-Pro AZ para obtener una imagen de un solo plano a partir de 20 planos focales.

Resultados

Acanthaegilips ashmeadi Ros-Farré & Pujade-Villar, 2003

Diagnosis: Especie perteneciente al grupo de *Acanthaegilips* con celda radial cerrada y sin diente dorsal en la placa pronotal. Se caracteriza por presentar escudo areolado con líneas laterales conspicuas pero no elevadas; fosetas escutelares lisas y peciolo liso ligeramente carenado en la parte anterior; características que comparte con la especie cercana *A. diazi*. Se diferencia de ésta por presentar en las antenas del macho sensilias placodeales a partir de F3, pero escasas en este flagelómero y en el F4; notaulos incompletos hasta 1/2 la longitud del escudo y líneas laterales conspicuas pero no elevadas.

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Material estudiado (13♂♂ & 5♀♀): 1♂. **COLOMBIA.** 2♀♀. **Boyacá**, Santuario de Fauna y Flora Iguaque, Lagunillas. 5°25'N 73°27'O, 3380 m. 09-28-mar-2001. Reina, P. [IAvH]; 1♂. Mismos datos, 28-mar-16-abr-2001. Reina, P. [IAvH]; 1♂. Mismos datos, Cabaña Carrizal. 5°25'N 73°37'O, 2.850 m. 18-may-10-jun-2001. Reina, P. [IAvH]; 1♂. Mismos datos, Cabaña Chaina. 5°25'N 73°37'O, 2.600 m. 25-jul-09-ago-2001. Reina, P. [IAvH]; 1♂. Mismos datos, 2.600 m. 9-31-ago-2001. Reina, P. [UB]; Mismos datos, 1-26-sep-2002. Roberto, A. [UB]. 1♂. **Cauca**, Parque Nacional Natural Munchique, Sector La Romelia, Borde del Bosque. 2°38'N 76°54'O, 2640 m. 24-may-09-jun-2004. Fino, E. [UB]. **Cundinamarca**, Parque Nacional Natural Chingaza, Alto de la Bandera. 4°31'N 73°45'O 3.660 m. 25-ago-07-sep-2001. Cifuentes, L. [UB]; 1♂, 1♀. Mismos datos, La Siberia. 4°31'N 73°45'O, 3.170 m. 14-31-mar-2001. Raigoso, E. [UB]. 1♂. **Huila**, Parque Nacional Natural Cueva de los Guácharos, Cabaña Cedros 1°37'N 76°6'O, 1.950 m. 04-dic-2001. Campos, D. [UB]; 1♀. Mismos datos, Sector Cabaña Cedros. 1°37'N 76°6'O, 04-18-feb-2002. Cortés, C. [UB]. 1♂, 1♀. **Magdalena**, Parque Nacional Natural Tayrona, Pueblito. 11°20'N 74°2'O, 225 m. 29-may-01-jun-2000. Henríquez, R. [IAvH]; 2♂♂. Mismos datos, El Ramo. 10°48'N 73°39'O, 2.500 m. 29-ene-15-feb-2001. Cantillo, J. [IAvH]; 2♂♂. Mismos datos, 27-feb-14-mar-2001. Cantillo, J. [IAvH].

Distribución: Venezuela y Perú (Ros-Farré *et al.* 2003); primera cita para Colombia.

***Acanthaegilips colombiensis* Pujade-Villar & Restrepo-Ortiz, 2009**

Diagnosis: Especie que se caracteriza por presentar en el escudo estrías transversales en vez de escultura areolada. Esta característica es compartida con *A. venezuelensis*, especie cercana de la cual se diferencia porque el surco malar está bruscamente curvado, presenta una única celda media en el margen posterior del escudo entre la base de los notaulos, la carena interfoveal es incompleta y la espina escutelar está parcialmente esculturada en la parte distal.

Material estudiado (8♂♂ & 3♀♀): 1♀. **COLOMBIA. Cundinamarca**, Parque Nacional Natural Chingaza, Alto de la Bandera. 4°31'N 73°45'O, 3.660 m. 30-mar-12-abr-2001. Cifuentes, L. [IAvH]; 1♀. Mismos datos, 12-abr-04-may-2001. Cifuentes, L. [IAvH]; 1♂. Mismos datos, 14-31-may-2001. Cifuentes, L. [IAvH]; 1♂. Mismos datos, 11-27-jul-2001. Cifuentes, A. [IAvH]; 2♂♂. Mismos datos, 25-ago-07-sep-2001. Cifuentes, L. [IAvH]; 1♂. Mismos datos, 7-21-sep-2001. Raigoso, E. [IAvH]; 1♂. Mismos datos, 21-sep-04-oct-2001. Cifuentes, L. [IAvH]. 2♂♂. Mismos datos, 9-19-oct-2001. Cifuentes, L. [UB]; 1♀. Mismos datos, 27-dic-2001-11-ene-2002. Raigoso, E. [UB].

De esta especie sólo se conocían los machos (Pujade-Villar *et al.* 2009) pero en este estudio han sido colectadas, por primera vez, hembras las cuales se diferencian de los machos en los siguientes caracteres: antena alutácea oscura, patas rojizas excepto la articulación del fémur y la tibia que es alutácea, ausencia de flagelómeros abultados anteroposteriormente, fórmula antenal 11(4), 4(3), 15(2), 11(2), 9,5(2,5), 9(2,5), 7(2,5), 6,5(3), 6(3), 5(3), 5(3), 5,5(3), 11(3), sensilias placodeas presentes a partir de F2, ausencia de carena interior lateral débil en las fosetas escutelares, tercer segmento abdominal 1,1 veces la longitud del cuarto.

Distribución: Colombia, previamente citado en Pujade-Villar *et al.* 2009.

***Acanthaegilips diazi* Ros-Farré & Pujade-Villar, 2003**

Diagnosis: Especie perteneciente al grupo de *Acanthaegilips* con celda radial cerrada y sin diente dorsal en la placa pronotal. Se caracteriza por presentar escudo areolado con líneas laterales conspicuas pero no elevadas; fosetas escutelares lisas y peciolo liso ligeramente carenado en la parte anterior; características que comparte con la especie cercana *A. ashmeadi*. Se diferencia de ésta por presentar las antenas del macho sensílias placodeas a partir de F1 pero dorsalmente ausentes hasta F5, notaulos completos; escudo areolado con líneas laterales conspicuas y elevadas.

Material estudiado: 1♀. **COLOMBIA. Boyacá**, Santuario de Fauna y Flora Iguaque, Cabaña Mamarramos. 5°25'N 73°27'O, 2.855 m. 08-25-jun-2000. Reina, P. [IAvH]; 1♂. Mismos datos, Lagunillas. 5°25'N 73°27'O, 3.380 m. 28-mar-16-abr-2001. Reina, P. [IAvH].

Distribución: Argentina (Ros-Farré *et* al. 2003); primera cita para Colombia.

***Acanthaegilips huggerti* Sporrong & Ros-Farré, 2003**

Diagnosis: Especie perteneciente al grupo de *Acanthaegilips* con la celda radial abierta, surco malar fuertemente curvado y surco postocular presente; caracterizada por presentar antenas del macho con sensílias placodeales empezando a partir de F2 pero ausentes dorsalmente en este flagelómero y escasas en F3 y F4; placa pronotal con un pequeño diente dorsal; los notaulos alcanzan entre 1/3 y 1/2 la longitud del escudo; escudo en visión lateral rectilíneo; disco escutelar estrechándose abruptamente en la parte posterior; fosetas escutelares largas, carena interfoveal incompleta y sin carena longitudinal lateral; propodeo ligeramente alveolado, peciolo dorsalmente liso, lateralmente y ventralmente carenado. Especie cercana a *A. exiguus*, de la que se diferencia por la espina escutelar delgada en toda su longitud y recta en vista lateral y por tener los orificios foveales profundos.

Material estudiado (2♂♂ & 4♀♀): 2♂♂. **COLOMBIA. Boyacá**, Iguaque, Santuario de Fauna y Flora, Qda. Carrizal. 5°25'N 73°27'O, 3.350 m. 23-sep-11-oct-2000. Reina, P. [1 en IAvH, 1 en UB]; 1♀. Mismos datos, Cabaña Mamarramos. 5°25'N 73°27'O, 2.855 m. 07-21-ene-2001. Reina, P. [IAvH]; 1♀. Mismos datos, Cerro Pan de Azúcar. 5°25'N 73°27'O, 3.300 m. 12-sep-13-oct-2001. Reina, P. [UB]; 1♀. Mismos datos, Lagunillas. 5°25'N 73°27'O, 3.380 m. 09-28-mar-2001. Reina, P. [IAvH]; 1♀. Mismos datos, Lagunillas. 5°25'N 73°27'O, 3.380 m. 28-mar-16-abr-2001. Reina, P. [IAvH].

Distribución: Especie citada para Ecuador, Nicaragua (Ros-Farré *et al.* 2003) y Venezuela (Pujade-Villar *et al.* 2009); primera cita para Colombia.

***Acanthaegilips venezuelensis* Pujade-Villar & Restrepo-Ortiz, 2009**

Diagnosis: Especie caracterizada por presentar en el escudo estrías transversales en vez de escultura areolada. Esta característica es compartida con *A. colombiensis*, especie cercana de la cual se diferencia porque el surco malar está curvado suavemente, presenta dos celdas medias en el margen posterior del escudo entre la base de los notaulos, la carena interfoveal es completa y la espina escutelar no se encuentra esculturada en la parte distal.

Material estudiado (18♀♀): 2♀♀. **COLOMBIA**. **Boyacá**, Santuario de Fauna y Flora Iguaque, Cabaña Mamarramos. 5°25'N 73°27'O, 2.855 m. 21-dic-2000-07-ene-2001. Reina, P. [UB]; 3♀♀. Mismos datos, Lagunillas. 5°25'N 73°27'O, 3.380 m. 16-abr-2000-02-feb-2001. Reina, P. [IAvH]; 2♀♀. Mismos datos, 09-28-mar-2001. Reina, P. [IAvH]; 2♀♀. Mismos datos, 28-mar-16-abr-2001. Reina, P. [IAvH]; 2♀♀. Mismos datos, 02-18-may-2001. Reina, P. [IAvH]; 4♀♀. Mismos datos, 10-28-jun-2001. Reina, P. [IAvH]. 1♀. Mismos datos, 28-jun-19-jul-2001. Reina, P. [UB]. 1♀. **Cauca**, Parque Nacional Natural Gorgona, El Roble. 2°58'N 78°11'O, 130 m. 12-27-jun-2011. Torres, H. [UB]. 1♀. **Cundinamarca**, Parque Nacional Natural Chingaza, La Siberia. 4°31'N 73°45'O, 3.170 m. TM, 14-31-abr-2001. Raigoso, E. [UB].

Distribución: Venezuela (Pujade-Villar *et al.* 2009); primera cita para Colombia.

***Acanthaegilips palmirae* n. sp.**

Diagnosis: Especie morfológicamente muy parecida a *Acanthaegilips levis*, con la que comparte la celda radial cerrada,

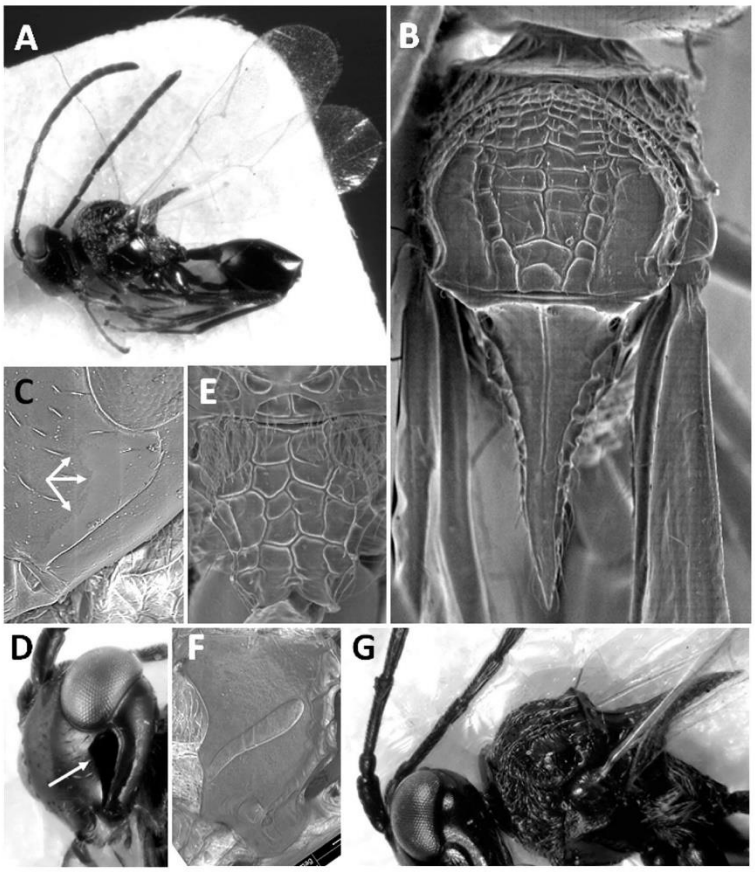


Figura 1. *Acanthaegilips palmirae* n. sp. **A.** Individuo en vista lateral. **B.** Mesosoma en vista dorsal. **C.** Detalle de la línea anterior malar. **D.** Detalle del área malar. **E.** Propodeo. **F.** Mesopleura. **G.** Vista latero-dorsal del mesosoma.

un surco malar poco curvado, la ausencia de surco postorbital y de diente en la parte más elevada de la placa pronotal. Se distingue claramente de esta espécie y del resto de especies del género por la presencia de una línea coriácea en la parte anterior del área malar.

Material estudiado: HOLOTYPUS ♀ con las siguientes etiquetas: "**COLOMBIA. Boyacá**, SFF Iguaque, Lagunillas, 5°25'N 73°27'O, 3380 m, Malaise, 28.06-19.07.2001. P. Reina leg)" (etiqueta blanca); "Holotypus of *Acanthaegilips palmirae* n. sp., design. J.P-V 2012" (etiqueta roja). (depositado en IAvH).

Descripción. Longitud: 2,6 mm.

Coloración: Cabeza, mesosoma y metasoma negros. Mandíbulas rojizas. Antena negra en los segmentos basales y alutácea oscura en los segmentos finales. Patas de color rojizo oscuro. Venas de las alas amarillentas.

Cabeza: En vista dorsal, 2,2 veces más ancha que larga; en vista frontal, 1,3 veces más ancha que alta. Cabeza lisa, brillante, margen posterior de la gena sin una línea de setas; surco postocular ausente; cara prácticamente glabra excepto por unas pocas setas esparcidas. Surco malar curvado, 0,6 veces la altura del ojo; área malar lisa delimitada por el surco malar y una línea anterior coriácea (Figs. 1C, 1D). Zona clipeal muy débilmente marcada. Diámetro de los toruli mayor que la distancia entre toruli y la distancia de los toruli al ojo. Línea transfacial igual en altura a los ojos. Ojos glabros. Relación POL:OOL:LOL = 5.5:5:2.5. Frente lisa y glabra; carena occipital ausente.

Antena: Pubescente. Flagelómeros cilíndricos, ligeramente ensanchados hacia el ápice en F1 y F2, sensílias placodeas ausentes en F1, presentes a partir de F2. Fórmula antenal de la hembra: 11(4.5), 4.5(3), 16.5(2.5), 12(2.5), 10(3), 9(3), 7(3), 6,5(3.5), 6(3.5), 6(3.5), 5(3), 5,5(3), 10.5(3.5).

Mesosoma: Carena pronotal redondeada, no proyectada dorsalmente. Placa pronotal con abundantes setas y superfície esculturada. Mesoescudo en visión lateral 1,7 veces más largo que ancho; en vista dorsal 1,4 veces más ancho que largo. Escudo fuertemente areolado entre los notaulos y en la parte anterior, coriáceo en la región comprendida entre los notaulos y las carenas laterales (Fig. 1B). Notaulos incompletos, hasta 2/3 de la longitud total del mesoescudo. Presencia de surco medio aparente. Escutelo en visión dorsal 1,6 veces la longitud del mesoescudo. Carena media del escutelo incompleta, de manera que las fosetas no están completamente definidas. Fosetas escutelares lisas. Orificios foveales redondeados y pequeños, 1,6 veces más largos que anchos. Espina escutelar ancha estrechándose gradualmente hacia el ápice; en visión lateral recta y ligeramente proyectada hacia arriba, siendo 1/2 de la longitud total del escutelo. Mesopleura alutácea y glabra (Fig. 1F), cruzada por un surco oblicuo con algunas carenas internas transversales. Triángulo mesopleural pubescente. Escultura del propodeo alveolada, sin carenas media y lateral definidas (Fig. 1E).

Alas: Celda radial abierta, 3,2 veces más larga que ancha. Vena marginal ausente; en su lugar aparece una línea de setas. Pilosidad marginal en el 1/3 apical del ala.

Metasoma: Pecíolo dos veces más largo que ancho (casi tan largo como la metacoxa), carenado lateralmente y liso en su cara dorsal. En visión dorsal, tercer segmento abdominal igual en longitud al cuarto segmento.

Derivatio nominis: En honor a Palmira Ros-Farré en reconocimiento a la labor realizada en el conocimiento del género *Acanthaegilips*.

Biología: Desconocida
Distribución: Colombia.

Discusión

Las muestras colectadas aportan nueva información sobre la distribución y diversidad del género *Acanthaegilips*. A las dos especies citadas hasta el momento para Colombia (*A. colombiensis* y *A. macropennis*) se añaden cuatro especies ya descritas colectadas por primera vez en este país (*A. ashmeadi, A. diazi, A. huggerti* y *A. venezuelensis*) y una nueva especie, *A. palmirae*. Con la descripción de esta nueva especie el número de especies de *Acanthaegilips* asciende a quince.

Las especies de *Acanthaegilips* pueden reunirse en dos grandes grupos morfológicos de acuerdo con la escultura del mesoescudo. En un grupo el escudo presenta una escultura areolada más o menos marcada, con los notaulos formados por varias areolas consecutivas, mientras que en el segundo grupo, que incluye solamente *A. colombiensis* y *A. venezuelensis,* el escudo presenta un carenado transversal y notaulos continuos. La nueva especie descrita, *Acanthaegilips palmirae*, pertenece al grupo de escudo areolado; se distingue claramente del resto de especies de este grupo por la presencia de una línea coriácea que delimita anteriormente el área malar y por la mesopleura alutácea. Otras tres especies también pertenecen al grupo con escudo areolado (*A. ashmeadi*, *A. diazi* y *A. huggerti*), mientras que las otras dos corresponden a las dos especies con el escudo carenado. De acuerdo a esta información, en Colombia encontramos bien representados ambos tipos.

Con las cinco nuevas especies, en Colombia ya han sido recolectadas cerca del 50% de las especies de *Acantahegilips*, lo que lo convierte en el segundo país en diversidad de *Acanthaegilips* luego de Venezuela. A falta de nuevos datos, parece ser que el máximo de diversidad de este género se concentra en el norte de Sudamérica. El presente estudio ha aportado nuevos datos, en lo que a la distribución geográfica de cada especie se refiere. Para *A. ashmeadi* y *A. huggerti* ha supuesto la ampliación de su área de distribución a tres y cuatro países respectivamente, mientras que para *A. diazi* y *A. venezuelensis* se amplía su área de distribución a un segundo país. Es especialmente interesante el caso de *A. diazi*, hasta ahora tan sólo citado en Tucumán, Argentina (Ros-Farré 2003; Restrepo-Ortiz 2010). Su presencia en Colombia sugiere una amplia distribución a lo largo del continente sudamericano, aunque faltarían datos, de otros países para poder confirmar esta suposición. Por último, conviene destacar que tanto *A. colombiensis* como *A. palmirae* se encuentran de momento citados únicamente para Colombia.

La descripción de la hembra de *A. colombiensis* aporta nueva información sobre esta especie. Como en los demás miembros del género las diferencias radican en: el número de artejos del flagelo (11 para la hembra y 12 para el macho), la presencia de flagelómeros con expansiones dorsolaterales

(con la excepción de *A. alienus),* la morfología del metasoma y la coloración (Ros-Farré *et al.* 2003, Pujade-Villar *et al* 2009). En el caso de *A. venezuelensis* y *A. palmirae*, todos los ejemplares encontrados son hembras, de modo que el macho de ambas especies continúa siendo desconocido.

Para algunos Anacharitinae se han citado como hospedadores las larvas depredadoras de las familias Hemerobiidae y Chrysopidae (Neuroptera) (Ronquist 1999). No obstante, la biología del género *Acanthaegilips* continúa siendo desconocida. Dada su amplia distribución en toda la región Neotropical y su posible importancia como regulador biológico de las poblaciones de otros insectos, es importante continuar con el estudio de este taxón.

Agradecimientos

Queremos expresar nuestro agradecimiento a Claudia Medina por el préstamo del material sin identificar usado en este estudio. A Amador Viñolas y Mar Ferrer-Suay (UB) por las fotografías, y a Palmira Ros-Farré (UB) por las imágenes de SEM. Este estudio ha sido financiado gracias al proyecto CGL2011-22889 del Ministerio de Ciencia e Innovación de España.

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4.2.3. Revision of American *Xyalaspis*

SYSTEMATICS

Revision of the American Species of Genus *Xyalaspis* (Hymenoptera: Figitidae: Anacharitinae)

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ABSTRACT A revision of *Xyalaspis* (Hymenoptera: Anacharitinae) in the American continent is presented. This genus is mentioned for the first time from the Neotropical region. *Xyalaspis flavipes* Ashmead, 1896 is synonymized with *Xyalaspis microstyla* Kieffer, 1907 and is found in the Neotropical region. Five new species are described: *Xyalaspis aberrans* n. sp. (from the Neotropic), *Xyalaspis alveolata* n. sp. (from the Neotropic), *Xyalaspis arapahoe* n. sp. (from the Nearctic), *Xyalaspis hirsuta* n. sp. (from both regions), and *Xyalaspis pilosa* n. sp. (from the Neotropic). Diagnostic characters of each species are illustrated and data on the biology, distribution, and mesoscutum sculpturing of the genus *Xyalaspis* are discussed. A key for differentiating the America species of *Xyalaspis* is presented.

KEY WORDS *Xyalaspis*, America, revision, new species

Xyalaspis is one of the eight genera of Figitidae that belong to the subfamily Anacharitinae. The Anacharitinae have been reported to parasitize the aphid-feeding larvae of the Hemerobiidae and Chrysopidae (Ronquist 1999). However, little is known about the biology of most of anacharitine species.

The Anacharitinae are characterized by three synapomorphies (Ros-Farré et al. 2000): a rounded and continuous pronotal plate, overlapped mandibles, and triangle-shaped head in front view. However, it should be noted that the head of *Xyalaspis* is not as clearly triangular as those of *Acanthaegilips* Ashmead, 1896, *Anacharis* Dalman, 1823, or *Hexacharis* Kieffer, 1907. *Xyalaspis* belongs to the group of Anacharitinae that lack an oblique groove in the mesopleuron but have a coriaceous malar sulcus. It can be distinguished from *Aegilips* Haliday, 1835, the other anacharitine genus with these characters, by the presence of a true scutellar spine derived from the circumscutellar carina (Restrepo-Ortiz and Pujade-Villar 2010).

Xyalaspis includes 12 Holarctic species (*Xyalaspis armata* (Giraud, 1860); *Xyalaspis atemiensis* Ashmead, 1904; *Xyalaspis flavipes* Ashmead, 1896; *Xyalaspis hyalina* Belizin, 1951; *Xyalaspis laevigata* Hartig, 1843; *Xyalaspis laevis* (Hedicke 1914); *Xyalaspis lituricis* Belizin, 1961; *Xyalaspis microstyla* Kieffer, 1907; *Xyalaspis petiolata* Kieffer, 1901; *Xyalaspis rugosa* Hartig, 1843; *Xyalaspis spinigera* (Reinhard, 1860); *Xyalaspis subulifera* (Thomson, 1862)) and one Australian species (*Xyalaspis victoriensis* New, 1979).

Only two species from this genus have been reported in the Nearctic area: *X. flavipes* and *X. microstyla*. Before this work, no *Xyalaspis* species had been identified in the Neotropical region. Here, we revise the American material belonging to *Xyalaspis*, synonymizing the two previously known species and describing five new species. In addition, we present an identification key for the American *Xyalaspis* species.

Materials and Methods

The undetermined material used in this study belongs to the Canadian National Collection of Insects (CNCI), Instituto Alexander von Humboldt (IAvH; Villa de Leiva, Colombia), and the collection Pujade-Villar (UB—Universitat de Barcelona). Two hundred and fifty-seven specimens were studied (113 males and 144 females). Morphological terminology of Richards (1977) and Ronquist (1995) is used. All measurements are relative except for the body length. Measurements and abbreviations include—F1–F12, for the first and subsequent flagellomeres; POL (postocellar distance) for the distance between the inner margins of the posterior ocelli; OOL (ocular–ocellar distance) for the shortest distance between the inner margin of the compound eye and the outer edge of the posterior ocellus; LOL (lateral–frontal ocellar distance) for the distance between the edges of the lateral and frontal ocelli. Antennal formula includes the lengths of the scape, pedicel, and flagellomeres, with the corresponding widths in parentheses.

All previously identified *Xyalaspis* types were examined before performing this investigation. In this article, we only make reference to *X. flavipes* Ashmead, 1896 and *X. microstyla* Kieffer 1907 because there is material identified as that species in the stud-

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ied locations. In addition, extensive series of undetermined material were studied.

The specimens were studied at "Serveis Científico-Tècnics de la Universitat de Barcelona" using stereomicroscopy and environmental scanning electron microscopy. A field-emission gun environmental scanning electron microscope (FEI Quanta 200 ESEM) was used for high-resolution imaging at a low voltage (10.0 KV) and without gold coating of the specimens to preserve the material.

Results

Xyalaspis flavipes Ashmead, 1896

Xyalaspis flavipes Ashmead, 1896: 183 (male)
Xyalaspis microstyla Kieffer, 1907: 151 (male) n. syn.

Diagnosis. Species with transversely carinated mesoscutum like *X. rugosus, X. subulifera,* and *X. victoriensis;* it differs from these species by having a short scutellar spine and weakly carinated sculpturing (in *X. rugosus, X. subulifera,* and *X. victoriensis* the scutellar spine is large and the mesoscutum is heavily carinated). It is also related to *X. arapahoe* n. sp. but *X. flavipes* has a shorter scutellar spine (very elongated in *X. arapahoe* n. sp.).

Type Material of *Xyalaspis flavipes*. Holotype ♂ deposited in United States National Museum (USNM) with the following labels: "*Xyalaspis flavipes* ♂ Ashmead" (white label, handwritten); "Great Falls, Md" (white label); "Type No 23285 U.S.N.M." (red label); "*Xyalaspis flavipes* Ashmead det. Mata-Casanova & J.P-V" (red label).

Type Material of *Xyalaspis microstyla*. Holotype ♂ deposited in California Academy of Sciences with the following labels: "*Xyalaspis microstyla* Kieffer" (red label, handwritten); "California Academy of Sciences, Type No. 10560" (white label); "*Xyalaspis flavipes* Ashmead det. Mata-Casanova & J.P-V" (red label).

Additional Material (54♂ & 113♀). CANADA. 1♀, Ancaster, Ontario, 24–VI–1955, O Peck leg; UNITED STATES: 11♀, Patutxent Research Station, Prince George's County, MD, pit-fall trap (PT), 6–11–VI–1983, L. Masner leg; 1♂, Myrtle Beach, SC, 13–IV–1966, E. G. Munroe leg; 1♂, McDowell County, SC, 37° N, 81° 30′ W, malaise trap (MT), VII–IX–1987, CNC Hymenoptera Team leg; 1♂, Lake Rd. Clenson Isaageena, Pickings County, SC, MT, 22–IV–1987, H. Goulet leg; 9♀, Lexington nr. L. Murray Ditch, Lexington County, SC, 20 YPT, 9–11–IV–2001, L. Masner leg; 1♂, Athens, Georgia, MT, 14–IX–1997, L. Masner leg; 14♂, 13♀, McDowell County, NC, 9–VII–17–IX–1987, Brc. Hym. Team leg; 2♀, Whiteside Mt. near Highlands, Jackson County, NC, 13–IX–1987, L. Masner leg; 2♀, Senandoah N. P., VA, 1.300 m, 2.VI–6.VII–1989: Brc. Hym. Team leg; 10♀, Big Meadow, Shenandoah Nt. Prk., VA, MT, 1,300 m, 8–VII–20–VIII–1987, BRC Hym. Team leg; 5♀, Compton Gap, Shenandoah Nt. Prk., Warren County, VA, MT, 800 m, 11–VII–23–VIII–1987, BRC Hym. Team leg; 1♀, MSU North Farm, Starkville, Oktibbeha County, MS, 6–8–X–1989, G. T. Baker leg; 26♀, Williamsville, Wayne County, MO, MT, V–1988, J. T. Becker leg; 3♂, 13♀, Williamsville, Wayne County, MO, MT, 1–19–VI–1988, J. T. Becker leg; 2♀, Williamsville, Wayne County, MO, MT, 16–VII–18–VIII–1988, J. T. Becker leg; 5♀, Williamsville, Wayne County, MO, MT, 30–VI–1988, J. T. Becker leg; 1♂, 1♀, Williamsville, Wayne County, MO, MT, 21–IX–11–XI–1988, J. T. Becker leg; 1♂, Latimer County, OK, FIT, VI–1994, K. Stephans leg; 1♀, New California, Macon County, 1,600 m, MT, without data, BRC Hymenoptera Team leg; 1♀, Nr. Portales, Rooseevelt County, 24–30–VI–1991, Devart MT, O'Hare & Jorgensen leg; MÉXICO: 1♀, San Cristóbal de Las Casas, 7,200 feet, 21–V–1969, W. R. M. Mason leg; 1♂, San Cristóbal de Las Casas, MT, 7,200 feet, 24–V–1969, W. R. M. Mason leg; 1♀, San Cristóbal de Las Casas, 7,200 feet, 1–3–VI–1969, W. R. M. Mason leg; 1♂, San Cristóbal de Las Casas, Chis, 11–VI–1969, B. V. P. leg; 1♂, San Cristóbal de Las Casas, MT, 7,200 feet, 3–7–VI–1969; GUATEMALA: 1♀, San Lorenzo, Zacapa, 12–VII–1986, 1♂, L. La Sage leg; HONDURAS: 1♀, 30 km E. Tegucigalpa, Cella Uyuez, 1,800 m, TM, 6–V–1994, H. & A. Howden leg; 3♂, 1♀, Cerro Montserrat, 1,800 m, 27–V–1994, H. & A. Howden leg; 4♂, 3♀, Cerro Montserrat, TM, 30–V–1994, H. J. Howden leg; 1♀, Cerro Uyuca, 1,800 m, TM, 30–V–30–VI–1994, H. J. Howden leg; COSTA RICA: 5♂, San Gerardo, Adove, San José, 1,500 m, 2–IX–1986, L. Masner leg; 8♂, 1♀, Finca Canadá Reserva, Monte Verde, Puntarenas, PT, 2–VIII–1–IX–1992, D. Currie leg; 1♂, Villa Mills, Cerro de la Muerte, Cartago, 3,000 m, 3–VI–1990, Hanson leg; 1♀, 6 km S Empalme, Cerro Muerte, San José, 2,600 m, 3–IV–1989, Hanson leg; 1♂, 20 km S Empalme, Cerro Muerte, San José, 2,800 m, 7–VII–1989, Hanson leg; 1♀, Zurquí de Moravia, San José, 1,600 m, III-89, Paul Hanson leg; 1♂, Zurquí de Moravia, San José, 1,600 m, VII–1990, Paul Hanson leg; PANAMÁ: 4♂, 9♀, 2 km W Cerro Punta, Chiriqui Prov., 1,700 m, 19–V–8–VI–1977, Peck & Howden leg; COLOMBIA: 1♂, 1♀, Cerro Pan de Azúcar, SFF Iguaque, Boyacá, Colombia, 5° 25′ N, 73° 27′ W, 3,300 m, TM, 02–22–VIII–2001, P. Reina leg; 1♀, El Molinillo, SFF Otún Quimbaya, Risaralda, 4° 43′ N, 75° 34′ W, 2,220 m, TM, 05–23–I–2004, G. López leg; VENEZUELA: 1♂, Yacambu N. P., Lara, 1200 m, 10–V–1981, H. Townes leg; 1♂, Córdoba, Portuguesa, 9° 25′48″ N, 69° 56′17″ W, 900 m, 12–29–XII–2008: R. Paz leg.

Length. Body: 2.9 mm. Wings: 2.7 mm. Antennae: 2.5 mm (♀); 2.8 mm (♂).

Color. Head, mesosoma, and metasoma black. Mandibles yellowish brown with darker teeth. Antennae yellowish brown, scape black. Legs yellowish brown with darker coxae. Veins of wings dark brown.

Head. Width of head is 1.2 times its height in front view and 2.5 times its length in dorsal view. Face is smooth, shiny, and pubescent with piliferous punctures. Malar sulcus coriaceous, is 0.6 times the height of the compound eye. Length of transfacial line is equal to the height of the compound eye. Diameter of the toruli is greater than both the distance between the toruli and the distance between the exterior margins of the toruli and the internal margin of the com-

pound eye. Clypeus convex, smooth, glabrous, and not well-defined. Occipital and postocular carinae are absent. Compound eyes are partially covered by scarce hairs. POL:OOL:LOL ratio in females = 7.5:5:3, with an ocellar diameter of 2.5; POL:OOL:LOL ratio in males = 7:5:2, with an ocellar diameter of 2. Frons is smooth, shiny, and weakly punctuated.

Antennae. Cylindrical flagellomeres, covered with dense pubescence. Female antennal formula: 11(4.5), 3(3.5), 12(2.5), 11(3), 10(3), 10(3), 9(3), 9(3), 7(3), 7(3), 6(3), 6(3), 9(3). Male antennal formula: 11(4.5), 3(3.5), 12(3), 11(3), 10.5(3), 10(3), 10(3), 9(3), 8(3), 8(3), 8(3), 7(3), 7(3), 9(2). Placodeal sensilla start at F2 in females but are sparse in F2 and F3; in males the placodeal sensilla start at F1 and are abundant in all flagellomeres.

Mesosoma. Pronotum heavily carinated in lateral view (Fig. 2a): some longitudinal carinae in its lower half and irregular carinae in its upper half. Mesoscutum width is 1.4 its length in dorsal view. Mesoscutum is weakly alutaceous, with transverse carinae of highly variable extension; in some cases they are extended across the full length of the mesoscutum while in others they are reduced to the base of the notauli. In addition, some carinae are very pronounced while others are only weakly sculpted (Fig. 3c). Lateral region of the mesoscutum is smooth, pubescent, and abundantly punctuated; parapsidal signum not clearly defined and parascutal sulcus present. Notauli are complete with transverse carinated sculpturing, median mesoscutal furrow is short. Scutellum heavily carinated. Scutellum length ranges from 0.7 to 0.9 times the mesoscutum length in dorsal view. Scutellar foveae are large and smooth, basally defined by a carina. Interfoveal line is incomplete, and does not reach the end of the spine. Lateral pits of the scutellar foveae are absent. Scutellar spine narrows toward the apex; projects slightly downwards in females in lateral view but it is straight in males. Mesopleuron is smooth, glabrous, and shiny, with some anterior ridges. Mesopleural triangle is smooth and pubescent. Propodeum is areolate with alutaceous sculpturing, and has a shiny central area longitudinally divided by a median carina.

Wings. Pubescent. Radial cell of forewing is closed and 2.5 times longer than it is wide. Marginal pubescence of the forewing is denser at the apical third.

Metasoma. Petiole is longer than it is wide, dorsally smooth, laterally and ventrally costate. Third abdominal tergum is 3.7 times longer than the fourth abdominal tergum in dorsal view. Fifth and sixth abdominal terga are visible in dorsal view. Metasoma is glabrous in females; third and fourth abdominal terga are laterally punctuated in males.

Biology. Unknown.

Distribution. Nearctic and Neotropical. Known in the United States: Maryland and Virginia (Ashmead 1896) and Alabama (Kieffer 1907); first citation for Ontario (Canada), North Carolina, South Carolina, Georgia, Mississippi, Missouri, Oklahoma and New Mexico (United States), México, Honduras, Guatemala, Costa Rica, Panamá, Colombia, and Venezuela.

Comments. After studying the type material of *X. flavipes* and *X. microstyla* as well several undetermined specimens from different countries of the American continent, we conclude that *X. flavipes* is a variable species, and *X. microstyla* is a synonymy of *X. flavipes*. The differences in mesocutal sculpturing mentioned in the original descriptions reflect intraspecific variability: some individuals have carinated sculpturing along the entire length of the mesoscutum while others have only a few carinae in the base of the notauli.

Xyalaspis aberrans n. sp.

Diagnosis. Species easily distinguished from other *Xyalaspis* species (including those described in this work) by its incomplete malar sulcus. Morphologically similar to *X. flavipes* but differs in that the first flagellomer is longer than the scape (F1 is shorter than the scape in *X. flavipes*).

Type material. HOLOTYPE ♂ deposited in UB with the following labels: "Canchim Mata. Malaise. 23–X–1997. Angelica leg." (white label, handwritten); "Holotype of *Xyalaspis aberrans* n. sp. desgn. N. Mata-Casanova 2012" (red label). PARATYPES (4♂ & 9♀) PANAMÁ: 1♀, Coiba, 31–IX–1996, Félix leg; 1♀, Coiba, 28–XI–1996, Félix leg; 1♀, Coiba, 5–XII–1996, Félix leg; BRAZIL: 1♂, Canchim, 5–X–1982, Angelica leg; 1♂, Faz. Canchim, Sao Carlos, Sao Paulo, 31–X–1986, Penteado-Dias leg; 1♂, Faz. Canchim, Sao Carlos, Sao Paulo, 19–VIII–1987, L. A. Joaquim leg; 1♂, Canchim Mata, 9–IX–1988, Angelica leg; 1♀, Faz. Canchim (mata), Sao Carlos, Sao Paulo, 5–X–1982, A. S. Soares leg; 1♀, Faz. Canchim, Sao Carlos, Sao Paulo, 3–X–1986, Penteado-Dias leg; 1♀, Canchim Mata, 9–IX–1988, Angelica leg; 1♀, Canchim Mata, 15–IX–1988, Angelica leg; 1♀, Canchim, 9–VIII–1989, Angelica leg; 1♀, Nova Teutonia, 27° 11′ S, 52° 23′ W, 300–500 m, VI–71: F. Plaumann leg.

Length. Body: 2.1 mm. Wings: 2.3 mm. Antennae: 2 mm (♀); 2.3 mm (♂).

Color. Head, mesosoma, and metasoma black. Mandibles yellowish brown with darker teeth. Antennae yellowish brown, scape black. Legs yellowish brown with darker coxae. Veins of wings dark brown.

Head. Width of head is 1.1 times its height in front view and 2 times its length in dorsal view. Face is smooth, shiny, and pubescent with piliferous punctures. Malar sulcus coriaceous and incomplete, its length ranging from 2/3 of the malar region to being reduced to the edge of the compound eye. Length of transfacial line is equal to the height of the compound eye. Diameter of the toruli is equal to the distance between the toruli and is larger than the distance between the exterior margins of the toruli and the internal margin of the compound eye. Clypeus convex, smooth, glabrous, and not well-defined. Occipital and postocular carinae are absent. Compound eyes are partially covered by scarce hairs. POL:OOL:LOL ratio in females = 6.5:5:3, with an ocellar diameter of 2; POL:OOL:LOL ratio in males = 6:5:3, with an ocellar

diameter of 3. Frons is smooth, shiny, and weakly punctuated.

Antennae. Cylindrical flagellomeres, covered with dense pubescence. Female antennal formula: 11(4), 4(3), 8(3), 8(3), 8(3), 8(3), 7(3), 6(3), 5(3), 5(3), 5(3), 5(3), 7(3). Male antennal formula: 11(3.5), 4(3), 9.5(3), 9(3), 8(3), 8(3), 8(3), 8(3), 8(3), 7(3), 7(3), 6(2.5), 5(2), 7(2). Placodeal sensilla start at F2 in females but are sparse in F2 and F3; in males the placodeal sensilla start at F1 and are abundant in all flagellomeres.

Mesosoma. Pronotum heavily carinated in lateral view (Fig. 2f), with some longitudinal carinae in its lower half and irregular carinated in its upper half. Mesoscutum width is 1.2 its length in dorsal view. Mesoscutum is smooth and punctuated, with transverse carinae reduced to the base of the notauli (Fig. 3b). Lateral region of the mesoscutum is smooth, pubescent, and abundantly punctuated; parapsidal signum not clearly defined and parascutal sulcus present. Notauli are complete with transverse carinated sculpturing, median mesoscutal furrow is short. Scutellum heavily carinated. Scutellum length 0.9 times the mesoscutum length in dorsal view. Scutellar foveae are large and smooth, basally defined by a carina. Interfoveal line is incomplete, and does not reach the end of the spine. Lateral pits of the scutellar foveae are absent. Scutellar spine narrows toward the apex; projects slightly downwards in both sexes in lateral view. Mesopleuron is smooth, glabrous, and shiny, with some anterior ridges. Mesopleural triangle is smooth and pubescent. Propodeum is areolate with alutaceous sculpturing, and has a shiny central area longitudinally divided by a median carina.

Wings. Pubescent. Radial cell of forewing is closed and 2.6 times longer than it is wide. Marginal pubescence of the forewing is denser at the apical third.

Metasoma. Petiole is longer than it is wide, dorsally smooth, laterally and ventrally costate. Third abdominal tergum is 3.1 times longer than the fourth abdominal tergum in dorsal view. Fifth and sixth abdominal terga are visible in dorsal view. Fourth and fifth abdominal terga laterally punctuated in both sexes.

Etymology. The specific name refers to the incomplete malar sulcus, and aberrant characteristic not present in other species of *Xyalaspis*.

Biology. Unknown.

Distribution. Neotropical. First record from Panama and Brazil.

Xyalaspis alveolata n. sp.

Diagnosis. Species easily distinguished from other *Xyalaspis* species by the presence of areolate sculpturing in the pronotum (carinated in other *Xyalaspis*) and the mesoscutum (smooth or carinated in the rest of *Xyalaspis*).

Type Material. HOLOTYPE ♀ deposited in CNCI with the following labels: "ECUADOR, Pichincha, Tinalandia. 4–14. VI. 1976." (white label); "Holotype of *Xyalaspis alveolata* n. sp. design. N. Mata-Casanova 2012" (red label).

Length. Body: 1.8 mm. Wings: 2 mm. Antennae: 2 mm (♀).

Color. Head, mesosoma, and metasoma brown. Mandibles yellowish brown with red teeth. Flagellum yellowish brown, scape and pedicel yellow. Yellow legs with darker coxae. Veins of wings yellow.

Head. Width of head is 1.1 times its height in front view and 2.6 times its length in dorsal view. Face is smooth, shiny, and pubescent with piliferous punctures. Malar sulcus coriaceous, is 0.8 times the height of the compound eye. Length of transfacial line is 1.1 times the height of the compound eye. Diameter of the toruli is equal to the distance between the toruli and the distance between the exterior margins of the toruli and the internal margin of the compound eye. Clypeus defined, convex, glabrous, and smooth with alutaceous margins. Occipital and postocular carinae are absent. Compound eyes are partially covered by scarce hairs. POL:OOL:LOL ratio in females = 6:4.5:2, with an ocellar diameter of 2. Frons is smooth, shiny, and weakly punctuated.

Antennae. Cylindrical flagellomeres, covered with dense pubescence. Female antennal formula: 19(3), 3.5(2.5), 7(2), 7(2), 6.5(2), 6(2), 6(2), 5.5(2), 5(2), 5(2), 5(2), 4(2), 6.5(2). Placodeal sensilla start at F1 in females and are abundant in all flagellomeres.

Mesosoma. Pronotum smooth and areolate, divided in cells by clearly defined carinae (Fig. 2d). Mesoscutum width is 1.2 its length in dorsal view. Mesoscutum is alutaceous, pubescent and shiny; it is divided in cells by transverse and longitudinal ridges (Fig. 3f). Lateral region of the mesoscutum is alutaceous; parapsidal signum not distinguishable and parascutal sulcus present. Notauli are complete with transverse carinated sculpturing, median mesoscutal furrow is short. Scutellum heavily carinated. Scutellum length 0.9 times the mesoscutum length in dorsal view. Scutellar foveae are short and alutaceous, basally defined by a carina. Interfoveal line is incomplete, and does not reach the end of the spine. Lateral pits of the scutellar foveae are large but superficial. Scutellar spine narrows toward the apex; projects slightly downwards in females in lateral view. Mesopleuron is smooth, glabrous, and shiny, with some anterior ridges that gradually disappear. Mesopleural triangle is slightly carinated and glabrous. Propodeum is divided in big cells; central area is alutaceous, glabrous, and shiny longitudinally divided by an incomplete median carina.

Wings. Pubescent. Radial cell of forewing is closed and 2.4 times longer than it is wide. Marginal pubescence of the forewing is denser at the apical third.

Metasoma. Petiole is longer than it is wide, dorsally smooth, laterally and ventrally costate. Third abdominal tergum is 2.9 times longer than the fourth abdominal tergum in dorsal view. Fifth and sixth abdominal terga are visible in dorsal view. Fourth to sixth abdominal terga laterally punctuated in females.

Etymology. The specific name refers to the areolate sculpturing of the pronotum and mesoscutum.

Biology. Unknown.

Distribution. Neotropical. Only recorded from Ecuador.

Xyalaspis arapahoe n. sp.

Diagnosis. Species morphologically close to *X. flavipes*, from which it can be distinguished by the fact that its scutellum is longer than the mesoscutum and by its prominent scutellar spine (in *X. flavipes* the mesoscutum is longer than the scutellum and the scutellar spine is short). In addition, its scutellar foveae are not basally defined (in *X. flavipes* the scutellar foveae are basally defined by a carina).

Type Material. HOLOTYPE ♀ deposited in CNCI with following labels: "USA, Colorado, Teller, Nr. Woodland Park, 21–28.VII.1977: 1♀ (S. Peck leg)" (white label); "Holotype of *Xyalaspis arapahoe* n. sp. design. N. Mata-Casanova 2012" (red label).

Length. Body: 3 mm. Wings: 2.8 mm. Antennae: 2.7 mm (♀).

Color. Head, mesosoma, and metasoma black. Mandibles yellowish brown with darker teeth. Antennae yellowish brown. Legs yellowish brown with darker coxae (specially the third coxa). Veins of wings dark brown.

Head. Width of head is 1.1 times its height in front view and 2.4 times its length in dorsal view. Face is smooth, shiny, and pubescent with piliferous punctures. Malar sulcus coriaceous, is 0.8 times the height of the compound eye. Length of transfacial line is 1.2 times the height of the compound eye. Diameter of the toruli is larger than the distance between the toruli and the distance between the exterior margins of the toruli and the internal margin of the compound eye. Clypeus convex, glabrous, smooth, and not well-defined. Occipital and postocular carinae are absent. Compound eyes are partially covered by scarce hairs. POL:OOL:LOL ratio in females = 8:6:3, with an ocellar diameter of 2. Frons is smooth, shiny, and weakly punctuated.

Antennae. Cylindrical flagellomeres, covered with dense pubescence. Female antennal formula: 12(4.5), 4(4), 14(3), 13(3), 11(3), 10(3), 9(3), 8(3.5), 7(3.5), 7(3.5), 6(3.5), 6(3.5), 10(3.5). Placodeal sensilla start at F2 in females but scarce until F5.

Mesosoma. Pronotum coriaceous and pubescent; heavily carinated in lateral view, with some longitudinal lower carinae and heavily irregular upper carinae (Fig. 2e). Mesoscutum width is 1.2 its length in dorsal view. Mesoscutum is alutaceous and shortly pubescent; it is carinated in all its extension, more apparently in the anterior region and the base of the notauli (Fig. 3d). Lateral region of the mesoscutum is also smooth and shortly pubescent; parapsidal signum is shortly defined and parascutal sulcus is present but not heavily excavated. Notauli are complete with transverse carinated sculpturing, median mesoscutal furrow is wider than long and internally carinated. Scutellum length is 1.1 times the mesoscutum length in dorsal view. Scutellar foveae are large and alutaceous, and not basally defined by a carinae. Interfoveal line is incomplete, and does not reach the end of the spine. Lateral pits of the scutellar foveae are longer than wide. Scutellar spine length narrows toward the apex; in females, it is 0.5 times the total length of the scutellum and is straight in lateral view. Mesopleuron is smooth, glabrous, shiny, and heavily carinated in its lower region. Mesopleural triangle is obliquely carinated and pubescent. Propodeum is coriaceous, pubescent, and areolate, with a shiny central area longitudinally divided by a median carina.

Wings. Pubescent. Radial cell of forewing is closed and 2.3 times longer than wide. Marginal pubescence of the wing denser at the apical third.

Metasoma. Petiole is longer than it is wide, dorsally smooth, laterally and ventrally costate. Third abdominal tergum is 3.8 times longer than the fourth abdominal tergum in dorsal view. Fifth and sixth abdominal terga are visible in dorsal view. Metasoma is punctuated in the anterior region of the terga from the third to the sixth abdominal tergum.

Etymology. The specific name makes reference to the Arapaho people, ancient inhabitants of the area where the specimen was collected.

Biology. Unknown.

Distribution. Nearctic. Only recorded from United States (Colorado).

Xyalaspis hirsuta n. sp.

Diagnosis. Species with transverse carinated sculpturing in the mesoscutum like *X. arapahoe*, *X. flavipes*, *X. rugosus*, *X. subulifera*, and *X. victoriensis*. It can be distinguished from these species by its densely pubescent eyes (those of *X. arapahoe*, *X. flavipes*, *X. rugosus*, *X. subulifera*, and *X. victoriensis* are almost glabrous, with only few short setae) and the presence of oblique internal ridges in the scutellar foveae (the scutellar foveae of *X. arapahoe*, *X. flavipes*, *X. rugosus*, *X. subulifera*, and *X. victoriensis* lack ridges).

Type Material. HOLOTYPE 1♂ deposited in CNCI with following labels: "PANAMA, Chiriqui, Finca la Suiza nr. Hornitos. TM. 25.V–6.VI.2000" (white label); "Holotype of *Xyalaspis hirsuta* n. sp. design. N. Mata-Casanova 2012" (red label). PARATYPES (49♂ & 16♀): CANADA: 1♂, Kouchibouguac N. P., NB, 3–VII–1977, G. A. Calderwood leg; 2♂, Kouchibouguac N. P., NB, 23–VIII–1977, G. A. Calderwood leg; 1♂, Kouchibouguac N. P., NB, 22–VII–1978, S. J. Miller leg; 1♀, Kouchibouguac N. P., NB, 1–VIII–1978, D. B. Lyons leg; 1♂, Kouchibouguac N. P., NB, 23–VIII–1978, S. J. Miller leg; 4♂, Kouchibouguac N. P., NB, 24–VIII–1978, S. J. Miller leg; 3♀, Kouchibouguac N. P., NB, 11–IX–1978, S. J. Miller; UNITED STATES: 1♀, Patutxent Research Station, Prince George's County, Maryland, MT, 15–29–VI–1986, D. B. Wash leg; 1♂, Patutxent Research Station, Prince George's County, MD, 21–29–VI–1986; 1♂, 1♀, Patutxent Research Station, Prince George's County, MD, 29–VI–5–VII–1986, D. B. Wahl leg; 1♂, Shenandoah Nt. Pk., MT, 1,300 m, 20–VIII–1987, BRC Hym. Team leg; 1♂, Williamsville, Wayne County, MO, MT, 8–31–VIII–1988, J. T. Becker; 2♂, 1♀, Williamsville, Wayne County, MO, MT, VI–1970, J. T. Becker; 2♂, Williamsville, Wayne County, MO, MT, 21–IX–20–X–1988, J. T. Becker; 1♀, Williamsville, Wayne County, MO, MT, 21–X–11–XI–1988, J. T. Becker leg; MÉXICO: 1♂, 6

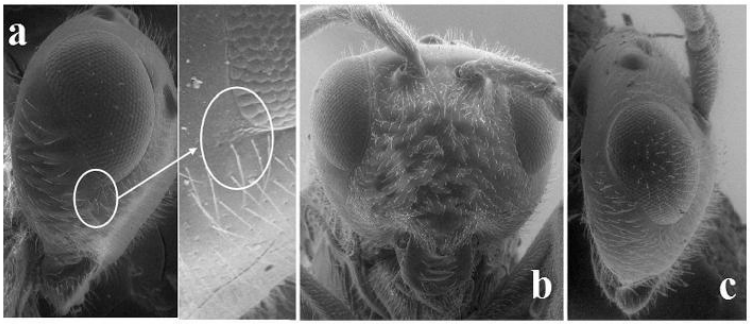


Fig. 1. (a) Head in lateral view of *X. aberrans* (malar sulcus detailed); (b) head in front view of *X. pilosa*; (c) head in lateral view of *X. hirsuta*.

min N Cuernavaca, Morelos, 7,500 feet, 15–VIII–1954, J. G. Chillot leg; 1♂, 24 min W La Ciudad, Durango, 7,000 feet, 6–VII–1964, W. R. Mason leg; 2♂, 7 min W Durango, Durango, 7,000 feet, 29–VII–1964, W. R. Mason leg; 1♂, Fortín de las Flores, Veracruz, 2,500–3,000 feet, 12–VII–1968, H. V. Weems leg; 1♂, 2♀, Yerba Buena, 20 min N Bochil, MT, Chis. 5,700 feet, 8–VI–1969; 3♂, Yerba Buena, 20 min N Bochil, MT, Chis. 5,700 feet, 24–VI–1969; San Cristóbal de las Casas, MT, Chis. 7,200 feet, 18–VI–1969; 3♂, Montebello N. P., MT, 5,000 feet, 26–VI–1969; GUATEMALA: 1♀, Finca San Antonio, Fraijanes, 1,800 m, 26–IV–1987, M. Sharkey leg; NICARAGUA: 1♂, Los Pinares, Jinotega, 29–V–1992, Maes & Pineda leg; COSTA RICA: 1♂, Alajuela, TM, 8–28–II–1970, O. Peck leg; 1♂, Cartago, 1,500 m, VIII–1980, N. L. H. Krauss leg; 1♀, Pta. Monteverde, 1,400 m, VIII–1980, N. H. L. Krauss, leg; 1♀, Peñas Blancas, Alajuela, 700 m, 18–VIII–1986, L. Masner leg; 1♀, Ciudad Colón, San José, 800 m, 3–IV–1990, L. Fournier leg; 1♀, San Antonio de Escazu, San José, 1,300 m IV–1987, W. Enerhard leg; PANAMÁ: 3♂, 15 km NW Hato del Volcán, Chiriqui, 1,200 m, 24–31–V–1977, Peck Howden leg; 1♂, Finca La Suiza nr. Hornitos, Chiriqui, TM, 25–V–6–VI–2000, H. and A. Howden leg; COLOMBIA: 1♂, 30–40 km S Cucuta, N. Sant., 2,000–3,000 m, 13–14–V–1974, J. Peck; 1♂, Cabaña Chaina, SFF Iguaque, Boyacá, 5° 25′ N, 73° 27′ W, 2,600 m, TM, 09–26–IX–2002, A. Roberto leg; 1♂, Finca Las Perlas, Mun. Fresno, Tolima, 5° 12′ N, 75° 2′ W, 1,508 m, TM, 23–26–XII–2002, T., D. and S. Arias leg; VENEZUELA: 1♂, Mosquey nr. Bocono, Trujillo, TM, 25–VIII–1–IX–1992, L. Masner leg; 3♂, Merida, 1,800 m, 4–V–1981, L. Masner leg; 1♂, Sta. Rosa, Merida, 8° 35′54″ N, 71° 8′42″ W, 2,000 m, 10–V–81, L. Masner leg; 1♂, Yacambu N. P., Lara, 1,200 m, 10–V–1981, H. Townes leg; 1♂, Yacambu N. P., Lara, 1,200 m, 13–V–1981, H. Townes leg; 2♂, 1♀, Merida, Venezuela, 1,800 m, 12–V–1981, Masner leg; 2♂, Guarico, Lara, 9° 35′ N, 69° 46′ W, 1,700 m, 23–27–IX–2008: R. Paz leg.

Length. Body: 2.8 mm. Wings: 2.9 mm. Antennae: 2.4 mm (♀); 2.7 mm (♂).

Color. Head, mesosoma, and metasoma black. Mandibles yellowish brown with darker teeth. Antennae yellowish brown. Legs yellowish brown with darker coxae. Veins of wings dark brown.

Head. Width of head is 1.2 times its height in front view and 2.5 times its length in dorsal view. Face is smooth, shiny, and pubescent with piliferous punctures. Malar sulcus coriaceous, is 0.8 times the height of the compound eye. Transfacial line is 1.3 times the height of the compound eye. Diameter of the toruli is bigger than the distance between toruli and the distance between the exterior margin of the toruli and the internal margin of the compound eye. Clypeus is convex, smooth, glabrous, and not well-defined. Occipital and postocular carinae are absent. Compound eyes are densely covered by hair (Fig. 1c). POL:OOL:LOL in both sexes = 8:8:4, with an ocellar diameter of 2. Frons is smooth and shiny, weakly punctuated.

Antennae. Cylindrical flagellomeres, covered with dense pubescence. Female antennal formula: 14(5), 5(4), 12(3), 10(3), 10(3.5), 9(3.5), 8(3.5), 7(3), 7(3), 7(3), 5(3), 4.5(3), 8(3). Male antennal formula: 10(4), 4(3.5), 10(4), 11(3.5), 10.5(3.5), 10.5(3.5), 10.5(3), 10(3), 8.5(2.5), 8(2.5), 7(2.5), 7(2.5), 7(2.5), 8(2.5). Placodeal sensilla start at F2 in females and F1 in males.

Mesosoma. Pronotum pubescent and heavily carinated by longitudinal ridges in lateral view (Fig. 2e). Mesoscutum width is 1.3 its length in dorsal view. Mesoscutum is coriaceous and pubescent; it has transverse carinae across all its length but more apparent in the anterior third, specially in females (Fig. 3e). Lateral region of the mesoscutum is alutaceous and shiny; parapsidal signum is conspicuous and parascutal sulcus is present and excavated. Notauli are complete with transverse carinated sculpturing, median mesoscutal furrow is present and extends to 1/3 of the mesoscutum total length. Scutellum length is subequal to mesoscutum length (18:19). Scutellar foveae are large and alutaceous, basally defined by a carina and internally divided by oblique ridges more apparent in females. Interfoveal line is incomplete, and does not reach the end of the spine. Lateral pits of the scutellar foveae are longer than wide. Scutellar spine narrows toward the apex; it slightly projects downwards in

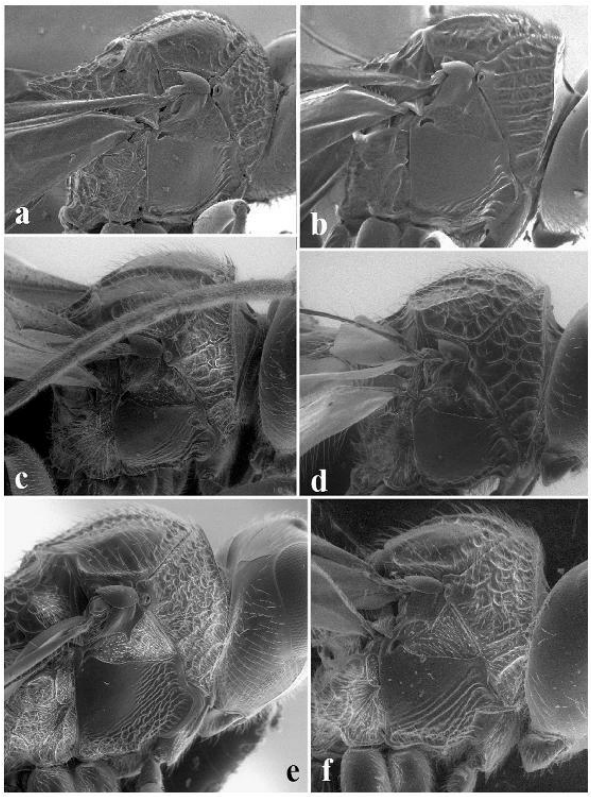


Fig. 2. Mesoscutum in lateral view of (a) *X. flavipes*, (b) *X. hirsuta*, (c) *X. pilosa*, (d) *X. alveolata*, (e) *X. arapahoe*, and (f) *X. aberrans*.

both sexes in lateral view. Mesopleuron is smooth, glabrous, and shiny; anterior and lower margins are heavily alutaceous and pubescent. Mesopleural triangle is densely pubescent. Propodeum is coriaceous, pubescent, and areolate, with a shiny central area divided by a longitudinal median carina and a transverse carina that define two larger superior cells and two shorter lower cells.

Wings. Pubescent. Radial cell of forewing is closed and 2.5 times longer than wide. Marginal pubescence of the wing denser at the apical third.

Metasoma. Petiole is longer than it is wide, dorsally smooth and laterally and ventrally costate. Third abdominal tergum is from 3.8 to 4 times longer than the fourth abdominal tergum in females and 3.4 times longer than the fourth abdominal tergum in males in dorsal view. Fifth and sixth abdominal terga are visible in dorsal view. Metasoma is punctuated in both sexes.

Etymology. The specific name makes reference to the abundant pubescence which covers the compound eyes.

Biology. Unknown.

Distribution. Nearctic and Neotropical. First record for United States (Maryland and Missouri), México, Nicaragua, Costa Rica, Panama, Colombia, and Venezuela.

Xyalaspis pilosa n. sp.

Diagnosis. Species is readily distinguished from other *Xyalaspis* because its body is covered with a dense pubescence (other species in this genus have only sparse bodily pubescence). Morphologically close to *X. atemiensis* because both have a smooth mesoscutum and complete notauli, but differs from this species by having a long scutellar spine with a median ridge (scutellar spine is short and with no median ridge in *X. atemiensis*).

Type Material. HOLOTYPE ♀ deposited in CNCI with the following labels: "VENEZUELA, Aragua Nat. Park, M. Pittier. 2,000m, Malaise, 9–10.IV.1991. L. Masner" (white label); "Holotypus of *Xyalaspis pilosa* n. sp., design. N. Mata-Casanova. 2012" (red label). PARATYPES (4♂, 3♀): VENEZUELA: 1♀, Posada el

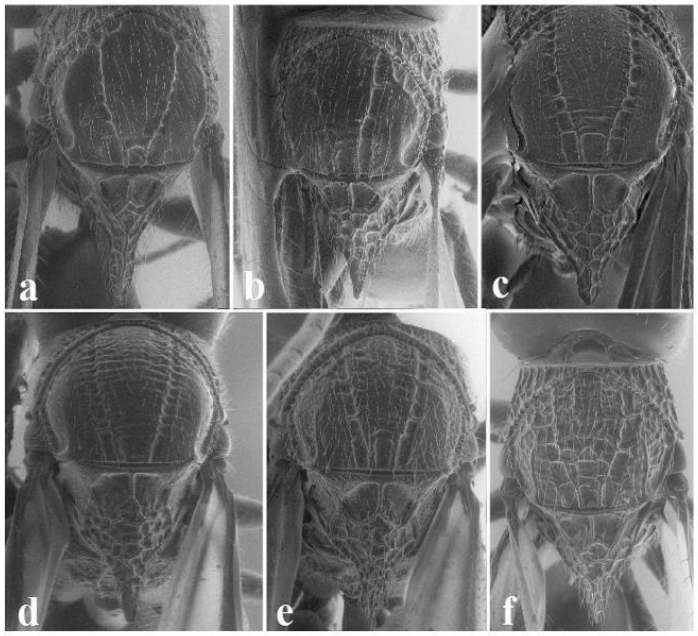


Fig. 3. Mesoscutum in dorsal view of (a) *X. pilosa*, (b) *X. aberrans*, (c) *X. flavipes*, (d) *X. arapahoe*, (e) *X. hirsuta*, and (f) *X. alveolata*.

Pozón, Curimagua, Falcón, 25–27–IV–2007; 1♀, E. E. Dr. Jaramillo (El Laurel), Miranda, 10° 21′ N, 66° 43′ W, 1,450 m, 19–26–XI–2009; 4♂, 1♀, Jabón, Lara, 9° 48′67″ N, 70° 6′50″ W, 1,302 m, 11–16–X–2008: R. Paz leg.

Length. Body: 2.6 mm. Wings: 3 mm. Antennae: 2.9 mm (♀), 2.4 mm (♂).

Color. Head, mesosoma, and metasoma black. Mandibles yellowish brown with darker teeth. Antennae brown. Legs and coxae yellowish brown. Veins of wings dark brown.

Head. Head has quadrangular shape in front view (Fig. 1b). Width of head is 1.2 times its height in front view and 2.6 times its length in dorsal view. Face is smooth, shiny, and pubescent with piliferous punctures. Malar sulcus coriaceous, is 0.5 times the height of the compound eye. The malar area is pubescent in some individuals while it is almost glabrous in others. Transfacial line is equal to the height of the compound eye. Diameter of the toruli is bigger than the distance between toruli and the distance between the exterior margin of the toruli and the internal margin of the compound eye. Clypeus is convex, smooth, glabrous, and not well-defined. Occipital and postocular carinae are absent. Compound eyes are covered by hair (Fig. 1b). POL:OOL:LOL in both sexes = 7.5:6:3, with an ocellar diameter of 3. Frons is smooth, shiny, and weakly punctuated.

Antennae. Cylindrical flagellomeres, covered with dense pubescence. Female antennal formula: 13(4), 4.5(3), 12(3.5), 10(3.5), 10(4), 10(4), 10(4), 9(4), 8.5(4), 8(3.5), 7(3.5), 7(3.5), 9(3). Male antennal formula: 11(3), 3.5(3), 9(3), 9(3), 9(3), 9(3), 8(3), 7.5(3), 7(3), 6.5(3), 6(3), 6(3), 6(3), 7(2.5). Placodeal sensilla start at F1 but are scarce in the first two flagellomeres in both sexes.

Mesosoma. Pronotal plate is coriaceous. Pronotum pubescent and laterally carinated (Fig. 2c). Mesoscutum width is 1.4 times its length in dorsal view. Mesoscutum is smooth and punctuated, covered with sparse pubescence (Fig. 3e). Lateral region of the mesoscutum is also smooth and pubescent; parapsidal signum is short and parascutal sulcus is absent. Notauli are complete with some transverse carinae, median mesoscutal furrow is short and not apparent. Scutellum length is equal to the mesoscutum length. Scutellar foveae are large and smooth, basally defined by a carina. Interfoveal line is incomplete, not reaching the end of the spine. Lateral pits of the scutellar foveae are longer than wide. Scutellar spine is longitudinally divided by a median ridge which extends from the base of the scutellar foveae to the end of the spine (Fig. 3a). Scutellar spine narrows toward the apex; it is slightly projected downwards in females in lateral view. Mesopleuron is glabrous and smooth except for some short carinae in its lower region. Mesopleural triangle is alutaceous and pubescent. Propodeum is alutaceous and densely pubescent, with a shiny central area divided by a longitudinal median carina and a transverse

carina that define two larger superior cells and two shorter lower cells.

Wings. Pubescent. Radial cell of the forewing is closed and 2.5 times longer than wide. Marginal pubescence of the wing denser in its apical third.

Metasoma. Petiole is longer than it is wide, dorsally smooth, laterally and ventrally costate. Third abdominal tergum is 2.4 times longer than the fourth abdominal tergum in dorsal view. Fifth, sixth, and seventh abdominal terga are visible in dorsal view. Metasoma is punctuated in both sexes.

Etymology. The specific name refers to the abundant pubescence which covers the whole body of the specimen.

Biology. Unknown.

Distribution. Neotropical. Only recorded from Venezuela.

Comments. The pubescence in the malar area and the tibia is highly variable in density, from covering both areas in the holotype to being almost glabrous in the female paratype from Jabón. The pubescence is also variable in coloration: in the holotype is brown, while in the paratypes is hyaline.

Discussion

Before this study, *Xyalaspis* was believed to comprise 13 species: 10 from the Palearctic region (*X. armata*, *X. atemiensis*, *X. hyalina*, *X. laevigata*, *X. laevis*, *X. lituricis*, *X. petiolata*, *X. rugosa*, *X. spinigera*, and *X. subulifera*), one from Australia (*X. victoriensis*), and two from the Nearctic region (*X. flavipes* and *X. microstyla*). The number of species included in the genus thus increases to 17 after the synonymization of *X. flavipes* and *X. microstyla* and the description of five new species. Based on our findings, *Xyalaspis* includes a single Nearctic species (*X. arapahoe*); three from the Neotropical area (*X. aberrans*, *X. alveolata*, and *X. pilosa*); and two that are found in both regions (*X. flavipes* and *X. hirsuta*).

To investigate the morphological differences between the sexes in this genus, males and females of *X. aberrans*, *X. flavipes*, and *X. hirsuta* were examined. We conclude that variability is only present in the characters related with sexual dimorphism (the aspect of metasoma, the number of flagellomeres, and the disposition of the placodeal sensilla in the antennae) and in the ocellar ratio in *X. flavipes*. The species are thus morphologically constant.

After examining all of the available *Xyalaspis* types and an extensive series of undetermined material from different institutions, we conclude that this genus exhibits pronounced interspecific variability in mesoscutal sculpturing, ranging from a smooth mesoscutum in some cases to heavily carinated sculpturing in others. A similarly high degree of variability was apparent among the species examined in this work: *X. pilosa* (Fig. 3a) has a smooth mesoscutum with no sculpturing beyond the internal transverse carina of the notauli; *X. aberrans* (Fig. 3b) has a weakly carinated sculpturing reduced only to the base of the notauli; *X. flavipes* (Fig. 3c) a highly variable carinated sculpturing that ranges from the base of the notauli in some individuals and extends over the full length of the mesoscutal surface in others; *X. arapahoe* (Fig. 3d) exhibits extensive carination across the entire mesoscutum like some *X. flavipes* specimens; *X. hirsuta* (Fig. 3e) exhibits a heavily impressed carinated sculpturing; and in *X. alveolata* (Fig. 3f) the heavy carination defines an areolate sculpturing. The sculpturing of the mesoscutum is therefore an important character for differentiating between the various species of this genus. The American species of *Xyalaspis* can be separated according to the following characters:

1. Malar sulcus incomplete (Fig. 1a) . . . . *X. aberrans*
– Malar sulcus complete (Fig. 2e, 1b) 2
2. Mesoscutum smooth (Fig. 3a); long scutellar spine longitudinally divided by a median ridge (Fig. 3a); quadrangular-shaped head in front view (Fig. 1b); body covered by abundant pubescence (Fig. 2c) . . . . . *X. pilosa*
– Mesoscutum carinated; scutellar spine variable in length, but never presents median ridge; triangular-shaped head in front view; body covered by sparse pubescence 3
3. Mesoscutum alutaceous with weak transverse carinated sculpturing variable in extension (Fig. 3c, 3d), parascutal sulcus weakly excavated (Fig. 2a, 2b) 4
– Mesoscutum heavily carinated (Fig. 3e, 3f), parascutal sulcus apparent (Fig. 2b, 2d) 5
4. Short scutellar spine, scutellar foveae basally defined by a carina (Fig. 3c) . . . . . *X. flavipes*
– Long scutellar spine, scutellar foveae not basally defined (Fig. 3d) . . . . . *X. arapahoe*
5. Mesoscutum transversely carinated; long median mesoscutal furrow (Fig. 3e); pronotum laterally carinated by longitudinal ridges (Fig. 2b); eyes densely pubescent (Fig. 1c). . . . . *X. hirsuta*
– Mesoscutum areolate; median mesoscutal furrow not apparent (Fig. 3f); pronotum carinated and divided in large cells (Fig. 2d); eyes glabrous. . . . . *X. alveolata*

Although little is known about the biology of most *Xyalaspis* species, New (1979) and Fergusson (1986) suggest that their hosts are the aphid-feeding larvae of Hemerobiidae (Neuroptera). The biodiversity of *Xyalaspis* in the American continent may be greater than is currently recognized because of the wide range of potentially suitable hosts. For example, at least 70 species of Hemerobiidae have been cited in the Neotropical region (Nakahara 1965).

With regards to the distribution of the species mentioned in this study, the available data indicate that *X. flavipes*, previously only known in the southeastern United States, actually ranges from the eastern Canada to Venezuela. *X. hirsuta* has a similar distribution, ranging from the Atlantic coast of Canada to Venezuela. Less information is available regarding the distributions of the other four species described in this work, because of the small number of collected spec-

imens: *X. aberrans* has been found in Panama and Brazil, *X. alveolata* have only been collected from Ecuador, *X. pilosa* from Venezuela, and *X. arapahoe* from the western United States (Colorado). It is very likely that as more surveys are conducted, the extent of these species' known distributions will increase significantly.

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4.2.4. First host records for *Acanthaegilips*

FIRST HOST RECORD FOR *ACANTHAEGILIPS* (HYMENOPTERA: FIGITIDAE: ANACHARITINAE) AND DESCRIPTION OF A NEW SPECIES FROM VENEZUELA

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ABSTRACT

A new *Acanthaegilips* species from Venezuela is described, i.e., *Acanthaegilips notiobiellus* **sp. nov.** Diagnostic characters of the new species and data about its biology, distribution and morphological variability are presented. We report here the first known host of *Acanthaegilips* as *Notiobiella cixiiformis* (Gerstaecker, 1888) (Neuroptera: Hemerobiidae).

Key words: *Acanthaegilips*, biology, new species, *Notiobiella*, Venezuela

RESUMEN

En el presente trabajo, se describe una nueva especie de *Acanthaegilips* de Venezuela. Se dan los caracteres diagn sticos de sta as como datos sobre su biolog a, rea de distribuci n y variabilidad morfol gica. Adicionalmente, se cita el primer hospedador conocido de *Acanthaegilips*: *Notiobiella cixiiformis* (Gerstaecker, 1888).

Palabras clave: *Acanthaegilips*, biolog a, nueva especie, *Notiobiella*, Venezuela

Anacharitinae is a subfamily of Figitidae (Hymenoptera: Cynipoidea) defined by 3 synapomorphies (Ros-Farr et al. 2000): rounded and continuous pronotal plate, mandibles broadly overlapping and triangular-shaped head in frontal view. The subfamily currently includes 9 described genera (Mata-Casanova & Pujade-Villar 2013a): *Acanthaegilips* Ashmead, 1897; *Acanthaegilopsis* Pujade-Villar, 2013; *Aegilips* Haliday, 1835; *Anacharis* Dalman, 1823; *Calofigites* Kieffer, 1909; *Hexacharis* Kieffer, 1907; *Proanacharis* Kovalev, 1996; *Solenofigites* D az, 1979; and *Xyalaspis* Hartig, 1843.

Acanthaegilips includes 15 species (Mata-Casanova & Pujade-Villar, 2013b), and all of them are present in the Neotropical region. It possesses a true scutellar spine derived from the circumscutellar carina. It can be distinguishable from *Acantahaegilopsis* and *Xyalaspis* – the other Anacharitinae genera with a true scutellar spine - by the presence of an oblique groove in the mesopleuron and a non-coriaceous malar furrow (Ros-Farr et al. 2000). The biology of most of the anacharitines remains unknown, although the aphid-feeding larvae of Hemerobidae (Neuroptera) have been described as the hosts of *Solenofigites lautus* D az, 1979 (D az 1979), *Anacharis australiensis* Ashmead, 1901 and *Xyalaspis victoriensis* (New 1979), *Anacharis immunis* (Walker, 1835) (Kyerich 1984), *Aegilips atricornis* Fergusson, 1985, *A. nitidula* (Dalman, 1823), *Anacharis eucharioides* (Dalman, 1818) and *Xyalaspis petiolata* Kieffer, 1901 (Fergusson 1986), and *Anacharis melanoneura* Ashmead, 1887 (Cave & Miller 1987). In the case of *Acanthaegilips*, no hosts have been recorded prior to this study.

In this study, *Acanthaegilips notiobiellus* **sp. nov.** from Venezuela is described, and *Notiobiella cixiiformis* (Gerstaecker, 1888) (Neuroptera: Hemerobiidae) is here recorded for the first time as the first known host of *Acanthaegilips*.

Material and Methods

The specimens and material examined in this study are from the Entomological Museum Jos Manuel Osorio (MJMO-UCOB), Universidad Centroccidental "Lisandro Alvarado" (Barquisimento, Lara, Venezuela). Six undetermined specimens were studied: 2 males and 4 females.

Morphological terms used are taken from Richards (1977), Ronquist (1995) and Ros-Farr et al. (2003). For the determination of the specimens we used the keys of Ros-Farr et al. (2003). All measurements are relative except for the body length. Measurements and abbreviations include: F1–F12, first and subsequent flagellomeres; POL, post-ocellar distance, which is the distance between the inner margins of the posterior ocelli; OOL, ocular-ocellar distance, which is the shortest distance between the inner margin of the compound eye and the outer edge of the posterior ocellus; LOL, lateral–frontal ocellar distance, which is the distance between the edges of the lateral and frontal ocelli. Antennal formula includes scape, pedicel and flagellomeres length and relative width in brackets.

The images of *Acanthaegilips notiobiellus* **sp. nov.** included herein were made in 'Serveis Cient fico-T cnics' of the University of Barcelona with a FEI Quanta 200 ESEM scanning electron microscope under at a low voltage (10.0 kV), while the images of *A. occultus* were made with a Stereoscan S-360 (Cambridge Instruments) scanning electron microscope under a low voltage (1.0 kV). In order to preserve the type material none of the specimens were coated.

Results

Acanthaegilips notiobiellus Mata-Casanova & Pujade-Villar **sp. nov.** (Fig. 1)

Material Examined

HOLOTYPE ♂ deposited in UB with the following labels: "El Cercado, Lara, Venezuela, 10° 7' N, 69° 14' W, 500 m, 20.II.2012, E. Arcaya leg" (white label), "Larva de *Notiobiella rubrostigma* (= *N. cixiiformis*) en *Cedrela odorata,* 20.II.2012 " (white label), "Holotype of *Acanthaegilips notiobiellus* **n. sp**. design. N. Mata-Casanova & J. P-V, 2013" (red label). Paratypes: (1♂ & 4♀; 1♂ & 3♀deposited in UB, 1♀ in MJMO): "El Cercado, Lara, Venezuela, 10° 7' N, 69° 14' W, 500 m, 20.II.2012, E. Arcaya leg".

Additional Material

Four ♀♀ deposited in MJMO: "El Cercado, Lara, Venezuela, 10° 7' N, 69° 14' W, 500 m, 20.II.2012, E. Arcaya leg".

Description

Length. Body: 2.3 mm. Wing: 2 mm. Antenna: 2 mm (♂), 1.8 mm (♀).

Coloration. Head, mesosoma and metasoma black. Antennae yellowish brown, the scape and pedicel being lighter and the last 4 flagellomeres dark brown. Mandibles yellowish brown with darker teeth. Front, middle legs and coxae yellowish brown; hind legs and coxae brown.

Head. Head glabrous except for a line of hairs that runs along gena behind the postocular furrow; malar furrow very weak and slightly curved (Fig. 1A). Lateral carina absent, occipital carina strong. Malar space 0.6 times the height of the compound eye. Transfacial line 1.1 times the height of the compound eye. Diam of the toruli equal to the distance between the toruli and the compound eye and shorter than the distance between the toruli. Compound eyes glabrous. POL:OOL:LOL ratio is 6:5:2 (in males) and 5:4:2 (in females); the diameter of the ocelli is 2.5 in both sexes.

Antennae. Cylindrical flagellomeres, without pubescence. Male antennae without dorsolaterally expanded flagellomeres (Fig. 1C). Male antennal formula: 7(3), 2.5(2.5), 9(2.5), 8(2.5), 7(2.5), 7(2.5), 7(2.5), 7(2.5), 7(2.5), 6(2.5), 6(2.5), 6(2.5), 5(2.5), 8(2). Female antennal formula: 9(3), 3(2.5), 7(2), 6(2), 6(2), 6(2), 5(2.5), 5(2.5), 4.5(2.5), 4(2.5), 4(2.5), 4(2.5), 8(2.5). Placodeal sensilla starting on F1 in males and F2 in females.

Mesosoma. Lateral pronotal carinae projecting dorsomedially forming a much raised pronotal crest (Fig. 1D). Anterior pronotal plate with a few scattered hairs near dorsolateral margins and weakly transversely carinate. Pronotum alutaceous and densely pubescent, lateral surface with areolate sculpture, more apparent in the anterior margin (Fig. 1D). Mesoscutum with areolate sculpture, 1.2 times wider than long in dorsal view (Fig. 1F). Median mesoscutal impression from ¼ to ⅓ of the total length of the mesoscutum. Notauli complete. Line of hairs on the anterior and lateral margins of the scutum absent. Scutellum in dorsal view of the same length as that of the mesoscutum. Scutellar foveae in anterior part with 2 or 3 internal short longitudinal carinae dividing the anterior area of each fovea, scutellar foveae smooth with few irregular sculpture near its posterior margin (Fig. 1F). Lateral pit of the scutellar foveae absent. Scutellar spine broad, narrowing abruptly before apex. Scutellar disc in lateral view steeply sloping to base of scutellar spine, which is directed upwards at base and later straight. Mesopleural impression rather narrow, weakly curved in the apical part and with few coarse transverse carinae. Mesopleural triangle sparsely pubescent with some oblique carinae. Propodeum with areolate sculpture, lateral and median propodeal carinae present, transversely

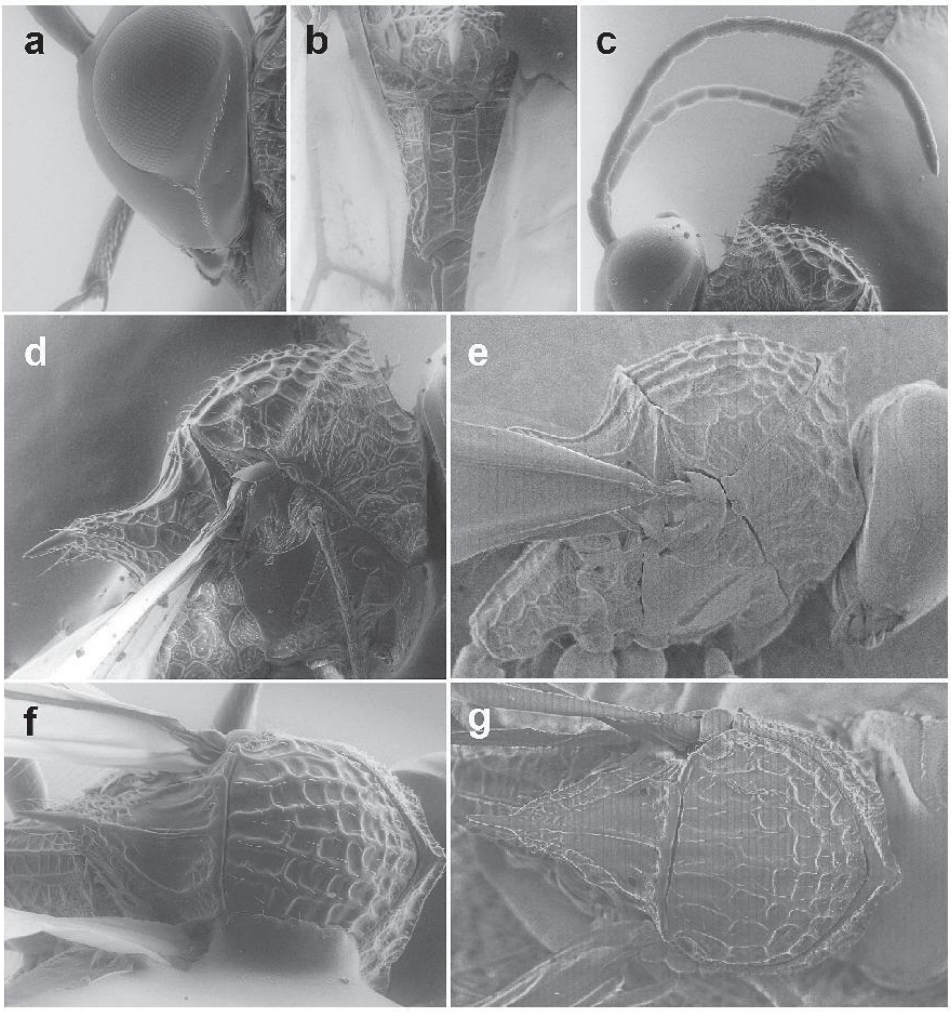


Fig. 1. *Acanthaegilips notiobiellus*: malar area in lateral view (a); propodeum (b), and male antennae (c); mesosoma in lateral view of: (d) *A. notiobiellus* and (e) *A. occultus*. Mesosoma in dorsal view of: (f) *A. notiobiellus* and (g) *A. occultus*.

carinated in the region comprised between the lateral carinae (Fig. 1B).

Wings. Pubescent. Radial cell of the forewing open, 2.7 times longer than wide. R1 practically non-existent. Marginal pubescence of the wing denser at the apical third.

Metasoma. Petiole as long as wide. Petiole dorsally smooth, laterally and ventrally costate. Third abdominal tergum dorsally 1.2 times the length of the fourth tergum. Fifth and sixth abdominal terga not visible from dorsal view.

Etymology

The specific name comes from the name of its host genus, *Notiobiella*.

Biology

The specimens were obtained from cocoons made by 20 field-collected early instars of *Notiobiella cixiiformis* (Gerstaecker, 1888) (Hemerobiidae: Neuroptera) that were predating on psyllid nymphs on

Cedrela odorata L. (Sapindales: Meliaceae). Only 10 of the larvae reached the adult stage.

Distribution

Neotropical. Recorded only from Venezuela.

Diagnosis.

The new species is morphologically close to *A. occultus* Ros-Farr & Pujade-Villar, 2003, from which it differs by having a longer median mesoscutal furrow, straighter last third of the scutellar spine, lacking lateral pits, having 2 or 3 longitudinal carinae in the scutellar foveae and a densely pubescent pronotum (median mesoscutal furrow shorter, scutellar spine curved downwards, lateral pits present and only 1 longitudinal carinae dividing the scutellar foveae (Fig. 1F) and pronotum not so pubescent (Fig. 1E) in *A. occultus*).

Discussion

The genus *Acanthaegilips* is divided in 2 easily distinguishable morphological groups (Pujade-Villar et al. 2009): the first group only includes *A. colombiensis* and *A. venezuelensis,* both of which have carinate sculpture on the mesoscutum; the second group comprises the rest of the species of *Acanthaegilips* and it is characterized by the presence of areolate sculpture on the mesoscutum. The newly described species is located within the second group and is morphologically similar to *A. occultus*; the differences have been mentioned in the diagnosis.

The differences between the male and the female of *A. notiobiellus* **sp. nov.** are only present in those characters related to sexual dimorphism, i.e., aspect of metasoma, number of flagellomeres and the disposition of the placodeal sensilla in the antennae. This is the case in most known anacharitines, except the Indian species, *Xyalaspis dimorphica* (Mata-Casanova et al. in press).

According to several authors (D az 1979; New 1979; Kierych 1984; Fergusson 1986; Ronquist 1999) Anacharitinae attack aphid-feeding larvae of Chrysopidae and Hemerobiidae (Neuroptera). Nevertheless, no host of *Acanthaegilips* was mentioned before this study. The studied material was collected from cocoons of the brown lacewing, *Notiobiella cixiiformis*. This corresponds with the previous knowledge of the Anacharitinae biology. Despite *Notiobiella* being present in regions were anacharitines have been cited (Banks 1932), this is the first time that an anacharitine is described as attacking this genus.

Acknowledgments

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4.2.5. Revision of Asian *Xyalaspis*

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Revision of the Asian species of genus *Xyalaspis* Hartig, 1843 (Hymenoptera: Figitidae: Anacharitinae)

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ABSTRACT

A revision of genus *Xyalaspis* (Hymenoptera: Anacharitinae) in Asia is given. *Xyalaspis lituricis* Belizin, 1965 is synonymized with *Xyalaspis hyalina* Belizin, 1951. Four new species are described: *Xyalaspis esbelta* n. sp., *Xyalaspis dimorphica* n. sp., *Xyalaspis orientalis* n. sp., and *Xyalaspis siamensis* n. sp. Diagnostic characters are illustrated and data about biology, distribution and morphological variability of the studied species are discussed. A key to the Asian species of this genus is included.

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Introduction

The Anacharitinae is a subfamily of Figitidae defined by three synapomorphies (Ros-Farré et al., 2000): rounded and continuous pronotal plate, mandibles broadly overlapping and triangular-shaped head in frontal view (although it is more quadrangular-shaped in genus *Proanacharis* and in some species of *Aegilips* and *Xyalaspis*). The subfamily currently includes nine described genera (Mata-Casanova and Pujade-Villar, 2013): *Acanthaegilips* Ashmead, 1897; *Acanthaegilopsis* Pujade-Villar, 2013; *Aegilips* Haliday, 1835; *Anacharis* Dalman, 1823; *Calofigites* Kieffer, 1909; *Hexacharis* Kieffer, 1907; *Proanacharis* Kovalev, 1996; *Solenofigites* Díaz, 1979; and *Xyalaspis* Hartig, 1843. Although some species have been described as parasitoids of aphid-feeding larvae of Neuroptera, the Anacharitinae biology remains widely unknown.

Genus *Xyalaspis* is defined by the presence of scutellar spine derived from the circumscutelar carinae (Restrepo-Ortiz and Pujade-Villar, 2010). This character is also present in *Acanthaegilips* and *Acanthaegilopsis*, but it differs by having a coriaceous malar sulcus (not coriaceous in *Acanthaegilips* and absent in *Acanthaegilopsis*) and by not having neither a mesopleural oblique groove (present in *Acanthaegilips*) nor a completely coriaceous mesopleuron (present in *Acanthaegilopsis*).

The biology of genus *Xyalaspis* in Asia is still poorly known, with only three described species: *Xyalaspis atemiensis* Ashmead, 1904 from Japan, *Xyalaspis hyalina* Belizin, 1951 from Tadjikistan and Kazakhstan and *Xyalaspis lituricis* Belizin, 1965 from Kazakhstan. In this study, we focus on genus *Xyalaspis* in this region, synonymizing *X. lituricis* with *X. hyalina* and describing four new species.

Material and methods

The specimens examined in this study are deposited in the NMNH (Smithsonian Institution, Washington DC, USA), the ZIN (Zoological Institute of the Russian Academy of Sciences, Saint Petersburg, Russia), the BMNH (British Museum of Natural History, London, England), the CNCI (Canadian National Collection of Insects, Ottawa, Canada) and UB (Universitat de Barcelona, Spain). Twenty undetermined specimens were studied: 14 males and 6 females. Morphological terms used are those of Richards (1977), Ronquist (1995) and Ros-Farré et al. (2003). All measurements are relative except for the body length. Measurements and abbreviations include: F1–F12, first and subsequent flagellomeres; POL (post-ocellar distance) is the distance between the inner margins of the posterior ocelli; OOL (ocular–ocellar distance) is the shortest distance between the inner margin of the compound eye and the outer edge of the posterior ocellus; LOL (lateral–frontal ocellar distance) is the distance between the edges of the lateral and frontal ocelli. Antennal formula includes scape, pedicel and flagellomeres length and relative width in brackets.

The images included were made in 'Serveis Científico-Tècnics' of the University of Barcelona with a FEI Quanta 200 ESEM scanning electron microscope under a low voltage (10.0 kV) and without any coating, in order to preserve the type material.

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Taxonomic accounts

Subfamily Anacharitinae
Genus *Xyalaspis* Hartig, 1843
Conaspicera Hedicke, 1914 (Synonymized by Hedicke, 1930)
Type species: *Xyalaspis laevigata* Hartig, 1843.

X atemiensis Ashmead, 1904 (Figs. 1a, 2f)

Diagnosis. Species is similar to *X. pilosa* Mata-Casanova & Pujade-Villar, 2013 because of its robust appearance and the smooth mesoscutum with clearly defined and transversally carinated notauli, but it differs from the latter by having short scutellar spine and petiole, triangular shaped head and lacking dense pubescence covering the whole body (in *X. pilosa* long scutellar spine, petiole longer than wide, quadrangular shaped head and body covered by a dense pubescence).

Type material. Lectotypus ♀ deposited in NMNH with the following labels: "Atami" (white label); "Japan, Kobele" (white label); "Type No. 1126, USNM" (red label); "*X. atemiensis* ♀ Ashmead" (white label, handwritten); "Lectotypus *X. atemiensis* ♀ Ashmead, 1904, desig. N. Mata-Casanova, 2012" (red label); "*X. atemiensis* (Ashmead) ♀, det. N. Mata-Casanova, 2012" (white label)".

Redescription

Length. Body: 3 mm. Antennae: 2.6 mm in females. Wings: 2.9 mm.

Coloration. Head, mesosoma and metasoma black. Mandibles yellowish brown with darker teeth. Antennae yellowish brown with the first segment partially black. Legs including yellowish brown with darker coxae. Veins of wings yellowish.

Head. Width of the head 1.3 times its height in front view and 2.4 times its length in dorsal view; quadrangular-shaped in front view. Face smooth, shiny and pubescent, with abundant piliferous points. Malar sulcus coriaceous, 0.8 times the height of the compound eye. Transfacial line 1.3 times the height of the compound eye. Diameter of the toruli equal to the distance between them and bigger than the distance from the external edge of the toruli to the internal edge of the compound eye. Clypeus shortly defined: smooth, glabrous and shortly convex. Occipital and postocular carinae absent. Compound eyes almost glabrous except for a few short setae. POL:OOL:LOL ratio = 8.5:6:3.5, being the ocelli diameter 3. Frons smooth, shiny and shortly pubescent with some piliferous points.

Antennae. Cylindrical flagellomeres covered with pubescence. Female antennal formula: 113(5), 5(4), 11.5(3), 12(3), 10(3), 10(3.5), 8(3.5), 8(4), 7(4), 6(4), 6(4), 6.5(4), and 10.5(4). Placodeal sensilla absent in F1 and F2 in the females.

Mesosoma. Pronotum coriaceous, heavily carinated in lateral view (Fig. 2f). Mesoscutum width 1.2 times its length in dorsal view. Mesoscutum smooth with strong punctuation; weakly alutaceous at the base of the notauli but not forming carinae. Notauli complete with transverse carinated sculpture; absence of median mesoscutal furrow (Fig. 1a). Lateral region of the mesoscutum smooth and punctuated; parapsidal signum weakly apparent; parascutal sulcus only present in the anterior region of the mesoscutum, disappearing at the back. Scutellum length 0.8 times the length of the mesoscutum in dorsal view. Scutellum alutaceous and heavily areolate. Scutellar foveae big and alutaceous, basally defined by a carina. Interfoveal line complete. Lateral pits of the scutellar foveae absent. Scutellum narrowing towards the apex; scutellar spine only slightly projected and distinguishable from the scutellum, ending in blunt end (Fig. 1a). Scutellar spine one-third of the scutellum total length; straight in lateral view. Mesopleuron smooth, glabrous and shiny, with only few short ridges in the anterior edge; mesopleural triangle alutaceous and glabrous. Propodeum alutaceous and shiny, divided in large cells; central area composed by two clearly defined large superior cells divided by a longitudinal carina and three smaller lower cells.

Wings. Pubescent. Radial cell of forewing closed, 2.6 longer than wide. Marginal pubescence of the wing denser at the apical third.

Metasoma. Petiole wider than long and carinated. Third abdominal tergum 2.3 times longer than the fourth tergum in dorsal view. Fifth and sixth abdominal terga visible in dorsal view Metasoma smooth and glabrous.

Biology. Unknown.

Distribution. Eastern Palearctic region. Only known from Japan.

X. hyalina Belizin, 1951 (Figs. 1c, 2d)

X. lituricis Belizin, 1965 n. syn.

Diagnosis. Species close to *X. laevigata* Hartig, 1843, but with the notauli disappearing in the anterior third of the mesoscutum and without clearly defined scutellar spine (notauli weak but complete and scutellar spine always clearly distinguishable in *X. laevigata*).

Type material of X. hyalina. Holotype ♂ deposited in ZIN with the following labels: "Kondara, 20.IX, Tadzhik SSR, 1945, V. Gussakovskij" (white label, handwritten, in Russian); "Holotypus *Xyalaspis hyalinus* ♂, V. Belizin det" (red label, handwritten), "*Xyalaspis hyalinus*, V. Belizin, Kovalev det 1996" (white label).

Type material of X. lituricis. Holotype ♂ deposited in ZIN with the following labels: "03. Zharkoly, Akmolinskaya Region, V. Tobias 8.VIII.57" (white label, handwritten, in Russian); "Holotypus *Xyalaspis hyalinus* ♂, V. Belizin det" (red label, handwritten), "*Xyalaspis hyalinus*, V. Belizin, Kovalev det 1996" (white label).

Description

Length. Body: 2.8 mm. Wings: 2.6 mm. Antennae: 3.2 mm (♂).

Coloration. Head, mesosoma and metasoma black. Mandibles yellowish brown with darker teeth. Antennae yellowish brown. Legs yellowish brown with darker coxae. Veins of wings yellow.

Head. Width of the head 1.2 times its height in front view and 1.7 times its length in dorsal view. Face smooth, shiny and pubescent, with abundant piliferous points. Malar sulcus coriaceous, 0.5 times the height of the compound eye. Transfacial line subequal (12:11) to the height of the compound eye. Diameter of the toruli equal to the distance between them and bigger than the distance from the external edge of the toruli to the internal edge of the compound eye. Clypeus shortly defined; smooth, glabrous and shortly convex. Occipital and postocular carinae absent. Compound eyes completely glabrous. In males, POL:OOL:LOL ratio = 6:4:2.5, being the ocelli diameter 2. Frons smooth, shiny and shortly pubescent with some punctuations.

Antennae. Cylindrical flagellomeres, covered with pubescence. Male antennal formula: 25(11), 9.5(9.5), 25(8), 25.5(8.5), 26(8.5), 24.5(8.5), 26(8), 26(8), 25(8), 25(7.5), 25(7), 23(7), 23(7), and 28(6). Placodeal sensilla in females start at F1 in males.

Mesosoma. Pronotum carinated in its lower side and smooth in its upper side (Fig. 2d). Mesoscutum width 1.3 times its length in dorsal view. Mesoscutum smooth, pubescent and punctuated, with alutaceous sculpture in the base of the notauli. Notauli weakly excavated and not internally carinated, disappeared in the anterior third of the mesoscutum and being substituted by weak carinated sculpture; median mesoscutal furrow weakly excavated (Fig. 1c). Parapsidal signum and parascutal sulcus absent. Scutellum length 0.8 times the length of the mesoscutum in dorsal view. Scutellar foveae smooth, basally defined by a carina, presence of an oblique internal carina. Interfoveal line complete. Lateral pits of the scutellar foveae apparent. Scutellar spine narrowing towards the end and not spiky (Fig. 1c); slightly projected upwards in lateral view. Mesopleuron smooth, shiny and glabrous, basally carinated. Mesopleural triangle smooth and pubescent. Propodeum heavily areolate and pubescent; central area divided by a longitudinal median carina and a several transverse carinae which define eight cells.

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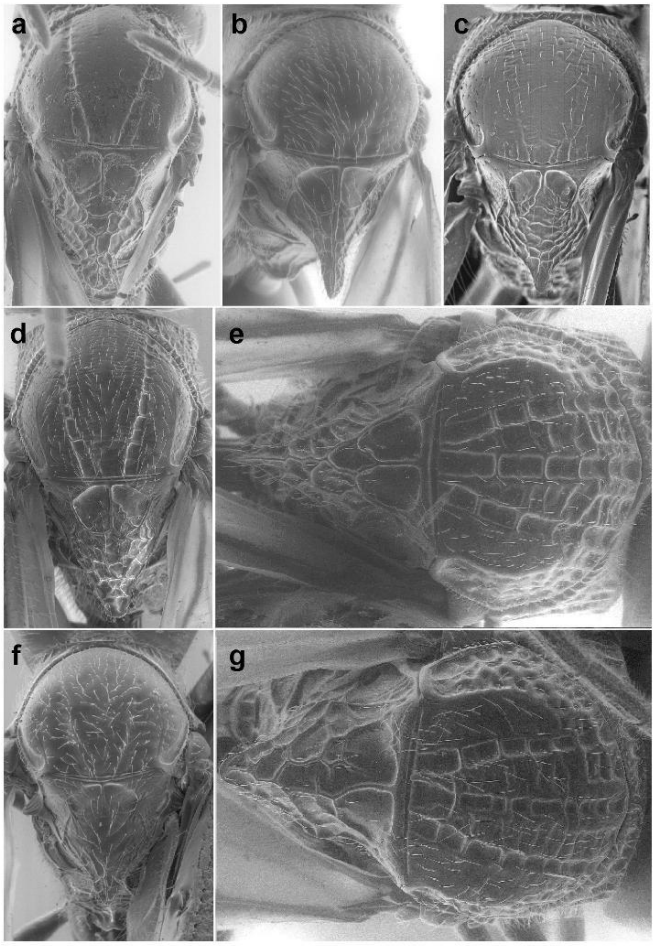


Fig. 1. Mesoscutum in dorsal view of: (a) *Xyalaspis ateniensis*, (b) *Xyalaspis esbelta*, (c) *Xyalaspis hyalina*, (d) *Xyalaspis orientalis*, (e) *Xyalaspis dimorphica* female, (f) *Xyalaspis siamensis* and (G) *X. dimorphica* male.

Wings. Pubescent. Radial cell of the forewing closed, 2.4 times longer than wide. Marginal pubescence of the wing denser in its apical third.

Metasoma. Petiole as long as wide, dorsally smooth and laterally and ventrally carinated. Third abdominal tergum 3.6 times longer than the fourth abdominal tergum in dorsal view. Fifth and sixth abdominal terga are visible in dorsal view. Metasoma smooth and glabrous.

Biology. Unknown.

Distribution. Palearctic region. Known from Russia, Kazakhstan, Tajikistan (Belizin, 1951), Armenia, Kazakhstan (Belizin, 1965), and Cyprus (Mata-Casanova et al., in press).

Comments. After examining the type material of *X. hyalina* and *X. lituricis* as well as undetermined material from Cyprus (Mata-Casanova et al., in press), we concluded that *X. lituricis* is a new synonymy of *X. hyalina*. In the original descriptions no differences between both species are mentioned, and no differences were found when we examined the material.

Xyalaspis dimorphica Mata-Casanova & Pujade-Villar n. sp.
(Figs. 1e, g, 2a, b, 3a)

Diagnosis. Species with heavily carinated mesoscutum and complete median mesoscutal furrow, make it very close to *X. victoriensis* New, 1979, from which it differs by having large scutellar foveae, less areolate scutellum and strong sexual dimorphism in the length and shape of the scutellar spine (small scutellar foveae, heavily areolate scutellum and scutellar spine without differences in both sexes in *X. victoriensis*).

Type material. Holotype 1♀ deposited in BNHM with the following labels: "24 km. S. Palghat, Nelliampathy, Kerala, INDIA, 2-3.X.1979, J. S.

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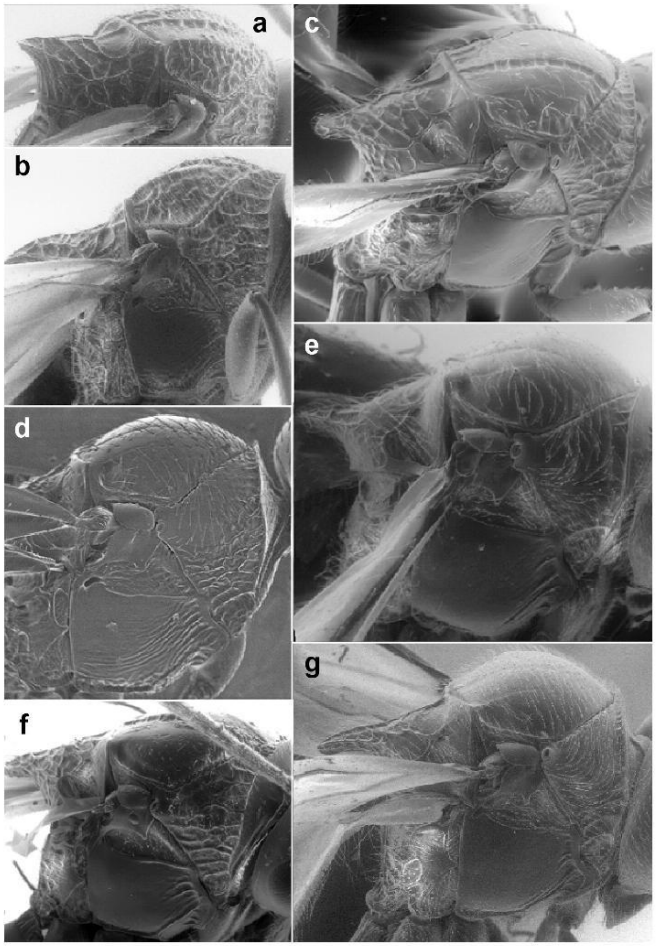


Fig. 2. Scutellar spine of *Xyalaspis dimorphica* male (b); mesoscutum in lateral view of: (b) *X. dimorphica*, (c) *Xyalaspis orientalis*, (d) *Xyalaspis hyalinus*, (e) *Xyalaspis siamensis*, (f) *Xyalaspis atemiensis*, and (G) *Xyalaspis esbelta*.

Noyes leg" (white label); "Holotype of *X. dimorphica* n. sp. design. N. Mata-Casanova & J. P-V, 2013" (red label). Paratypes: (4♂ & 2♀ deposited in BMNH): "Shembaganur, T. Nadu, INDIA, X.1979: 4♂, J. S. Noyes". "24 km. S. Palghat, Nelliampathy, Kerala, INDIA, 2-3.X.1979: 1♀, J. S. Noyes leg". "Mudigere, Karnataka, INDIA, 26.X-4.XI.1979: 1♀, J. S. Noyes leg".

Description

Length. Body: 2.6 mm. Antennae: 2.1 mm in females; 2.4 mm in males. Wings: 2.3 mm.

Coloration. Head, mesosoma and metasoma black. Mandibles yellowish brown with darker teeth. Antennae yellowish brown with darker last flagellomeres. Legs yellowish brown with darker third coxae. Veins of wings yellowish.

Head. Head quadrangular-shaped in frontal view (Fig. 3a). Width of the head 1.2 times its height in front view and 1.9 times its length in dorsal view. Face smooth, shiny and pubescent, with abundant piliferous points. Malar sulcus coriaceous, 0.7 times the height of the compound eye. Transfacial line 1.4 times the height of the compound eye. Diameter of the toruli smaller than the distance between them and equal to the distance from the external edge of the toruli to the internal edge of the compound eye. Clypeus shortly defined; smooth, glabrous and shortly convex. Occipital and postocular carinae absent. Compound entirely glabrous. Ocelli situated near the rear edge of the frons. POL:OOL:LOL ratio = 7:5.5:3, being the ocelli diameter 2. Frons smooth, shiny and shortly pubescent with some piliferous points.

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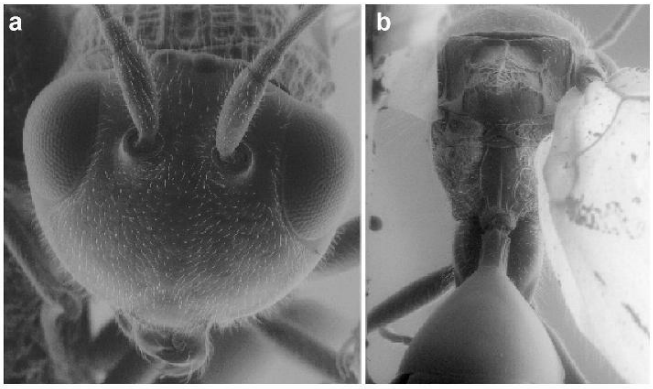


Fig. 3. (a) Head in frontal view of *Xyalaspis dimorphica*; (b) propodeum of *Xyalaspis esbelta*.

Antennae. Cylindrical flagellomeres covered with pubescence. Female antennal formula: 10(3), 4(2.5), 9(2), 8(2), 8(2), 7(2), 6(2), 6(2), 5(2.5), 5(2.5), 5(2.5), 4(2.5), and 9(2.5). Male antennal formula: 10(4), 4(3), 10(3), 8(3), 7.5(3), 8(3), 8(3), 7(3), 7(2.5), 7(2.5), 6(2.5), 6.5(2.5), 6(2.5), and 7(2). Placodeal sensilla starting at F1 but scarce in the first two flagellomeres in both sexes.

Mesosoma. Pronotal plate alutaceous. Pronotum alutaceous and laterally carinated. Mesoscutum width 1.3 times its length in dorsal view. Mesoscutum coriaceous and transversally carinated. Notauli complete with transverse carinated sculpture; median mesoscutal furrow complete with transverse carinae (Figs. 1e, g). Region between the external edge of the notauli and the parascutal sulcus carinated and weakly coriaceous. Parapsidal signum present, parascutal sulcus coriaceous and internally carinated. In dorsal view, scutellum length 0.9 times the length of the mesoscutum in females (Fig. 1e) and 0.8 times in males (Fig. 1g). Scutellum heavily areolate. Scutellar foveae big and alutaceous, basally defined by a carina. Interfoveal line complete. Lateral pits of the scutellar foveae absent. Scutellar spine narrowing towards the apex; in lateral view almost half of the scutellum total length and curved downwards in females (Fig. 2b), and one-third of the scutellum total length and straight in males (Fig. 2a). Mesopleuron smooth, glabrous and shiny, with oblique carinae in the lower region which became alutaceous sculpture; mesopleural triangle weakly coriaceous and glabrous with some oblique carinae in its anterior region. Propodeum alutaceous and shiny; central area divided by a longitudinal carinate which delimitates two large superior cells and two smaller lower cells.

Wings. Pubescent. Radial cell of forewing closed, 2.3 longer than wide. Marginal pubescence of the wing denser at the apical third.

Metasoma. Petiole longer than wide, dorsally smooth and laterally and ventrally carinated. Third abdominal tergum 3.9 times longer than the fourth tergum in dorsal view. Fifth and sixth abdominal terga visible in dorsal view. Metasoma smooth and glabrous; abdominal terga punctuated near the previous terga from the fourth abdominal terga to the last.

Derivatio nominis. The species name refers to the strong sexual dimorphism shown in the scutellar spine.

Biology. Unknown.

Distribution. Indomalayan region. Only known from India.

Comments. The scutellar spine heavily varies between sexes, being shorter and blunter in males and longer and more acute in females. Despite never having seen this difference in the shape and length of the scutellar spine in any other *Xyalaspis* species, we have not seen any other significant differences in sculpture and body measurements between sexes, so we concluded it is an intraspecific variability due to sexual dimorphism.

Xyalaspis esbelta Mata-Casanova & Pujade-Villar n. sp. (Figs. 1b, 2g, 3b)

Diagnosis. Species having smooth mesoscutum like *X. armata* (Giraud, 1860), *X. atemiensis* and *X. pilosa* are easily distinguishable from them because of the weakly defined notauli (clearly excavated in *X. atemiensis* and *X. pilosus*) and the interfoveal line reaching the end of the scutellar spine (interfoveal line not reaching the end of then scutellar spine in *X. armata* and *X. pilosa*). They are very similar to *Xyalaspis siamensis*, from which it differs by having a longer scutellar spine with an elongated interfoveal line.

Type material. Holotype ♂ deposited in CNCI with the following labels: "Tochigi Yaita, JAPAN, MT, 22.VIII-8.IX.1989. K. Konishi leg" (white label). "Holotype of *X. esbelta* n. sp. desgn. N. Mata-Casanova & J. P-V, 2013" (red label). Paratypes (1♀ deposited in BMNH, 1♂ & 1♀ deposited in UB) "Tehuache, Sun Moolake, Nanton Hsien, TAIWAN, 900 m, 6.VI.1990: 1♂ (H. Heraty leg)". "Manali, Himachal Pradesh, INDIA, 10.X.1979: 1♀ (Bouček leg)". "70 km SW Chiang Mai, Doi Ithamon Nat. Park, THAILAND, 1260 m, 31.I-7.II.1989: 1♀ (T. V. R. Hormin leg)".

Description

Length. Body: 2.4 mm. Antennae: 2.8 mm in males, 2.4 mm in females. Wings: 2.6 mm.

Coloration. Head, mesosoma and metasoma black. Mandibles yellowish brown with darker teeth. Antennae yellowish brown. Legs including yellowish brown with darker coxae. Veins of wings yellowish.

Head. Width of the head 1.1 times its height in front view and 1.9 times its length in dorsal view; quadrangular-shaped in front view. Face smooth, shiny and pubescent, with abundant piliferous points. Malar sulcus coriaceous, 0.8 times the height of the compound eye. Transfacial line 1.2 times the height of the compound eye. Diameter of the toruli bigger than the distance between them and the distance from the external edge of the toruli to the internal edge of the compound eye. Clypeus weakly defined; smooth, glabrous and shortly convex. Occipital and postocular carinae absent. Compound eyes almost glabrous except for a few short setae. POL:OOL:LOL ratio in males =

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6:6:2, being the ocelli diameter 3; POL:OOL:LOL ratio in females = 5:5:2, being the ocelli diameter 2. Frons smooth, shiny and shortly pubescent with some piliferous points.

Antennae. Cylindrical flagellomeres covered with pubescence. Male antennal formula: 9(4), 3.5(3), 11(3), 11(3), 10.5(3), 10.5(3), 10(3), 9.5(3), 9(3), 8(3), 7.5(3), 7.5(3), 6(3), and 9(2.5). Female antennal formula: 9(3), 4(3), 12(2), 11(2), 10.5(2), 9(2), 8(2), 7(2.5), 7(3), 6(3), 5(3), 5(3), and 9 (3). Placodeal sensilla start at F1, becoming abundant from F4 and being sparse in all flagellomeres in females.

Mesosoma. Pronotum smooth and pubescent, heavily punctuated in its upper half and carinated in its lower half (Fig. 2g). Mesoscutum smooth, densely pubescent with high presence of piliferous points. Notauli shortly defined and may be absent; median mesoscutal furrow short and weakly excavated (Fig. 1b). Parapsidal signum absent and parascutal sulcus weakly defined. Mesoscutum 1.2 times wider than long in dorsal view. Scutellum carinated, the same length as the mesoscutum in dorsal view. Scutellar foveae big and smooth basally delimited by a carina; interfoveal line complete and elongated to the end of the scutellar spine (Fig. 1b). Lateral pits of the scutellar foveae not deeply excavated. Scutellar spine narrowing towards the apex (Fig. 1b), represents half of scutellum total length and is slightly inclined downwards in lateral view. Mesopleuron smooth, glabrous and shiny, weakly carinated in its lower half. Mesopleural triangle carinated and shortly pubescent. Propodeum glabrous, shiny and weakly coriaceous, partially divided by a longitudinal median carina truncated in the anterior region of the propodeum (Fig. 3b).

Wings. Pubescent. Radial cell of the forewing closed, 3 times longer than wide. Marginal pubescence of the wing denser at the apical third.

Metasoma. Petiole length 2 times its width, laterally and ventrally carinated. Third abdominal tergum 3.5 times longer than the fourth abdominal tergum; fifth and sixth abdominal terga dorsally visible. Metasoma smooth and glabrous; abdominal terga punctuated near the previous terga from the fourth abdominal terga to the last.

D. nominis. The species name makes reference to its slender constitution.

Biology. Unknown.

Distribution. Eastern Palearctic and Indomalayan regions. Known from Japan, Taiwan, India and Thailand.

Xyalaspis orientalis Mata-Casanova & Pujade-Villar n. sp. (Figs. 1d, 2c)

Diagnosis. Species similar to *X. flavipes* Ashmead, 1896 in the shape of the mesoscutum and the scutellum, but differs from it by having a coriaceous pronotum, a shortly apparent median mesoscutal furrow, triangular scutellar spine not clearly distinct from the scutellum (smooth pronotum, median mesoscutal furrow excavated and apparent and scutellar spine clearly defined respect from the scutellum in *X. flavipes*).

Type material. Holotype 1♂ deposited in CNCI with the following labels: "Dozankei, Sapporo, Hokkaido, JAPAN, 350 m, MT, 20-31.VII.1989: K. Maeto & M Sharkey leg" (white label); "Holotype of *X. orientalis* n. sp. design. N. Mata-Casanova & J. P-V, 2013" (red label). Paratypes (2♂ & 1♀ deposited in CNCI, 2♂ deposited in UB): "Dozankei, Sapporo, Hokkaido, JAPAN, 350 m, MT, 20-31.VII.1989: 4♂, K. Maeto & M Sharkey leg". "Tochigi Yaita, JAPAN, 28.VII-11.VIII.1989: 1♂, K. Konishi". "Mt. Sudo San, SOUTH KOREA, 400 m, 23.VIII.1990: 1♀, K. Tinagashi leg".

Description

Length. Body: 2.8 mm. Antennae: 0.5 mm in females (from the scape to F1); 2.6 mm in males. Wings: 2.8 mm.

Coloration. Head, mesosoma and metasoma black. Mandibles yellowish brown with darker teeth. Antennae yellowish brown. Legs yellowish brown with darker coxae. Veins of wings yellowish.

Head. Width of the head 1.2 times its height in front view and 2.2 times its length in dorsal view; quadrangular-shaped in front view. Face smooth, shiny and pubescent, with abundant piliferous points. Malar sulcus coriaceous, 0.8 times the height of the compound eye. Transfacial line 1.3 times the height of the compound eye. Diameter of the toruli bigger than the distance between them and the distance from the external edge of the toruli to the internal edge of the compound eye. Clypeus shortly defined; smooth, glabrous and shortly convex. Occipital and postocular carinae absent. Compound eyes almost glabrous except for a few short setae. POL:OOL:LOL ratio = 7:5.5:2.5, being the ocelli diameter 3. Frons smooth, shiny and shortly pubescent with some piliferous points.

Antennae. Cylindrical flagellomeres covered with pubescence. Female antennal formula: 10(3.5), 3.5(3), and 9(3) (F2–F11 missing). Male antennal formula: 10(4), 3.5(3), 12(3.5), 10(4), 10(4), 10(3.5), 9(3), 9(3), 9(3), 8.5(3), 8.5(3), 8(3), 7.5(2.5), and 10.5(2). Placodeal sensilla absent in F1 in the females, starting at F1 in the males.

Mesosoma. Pronotal plate smooth. Pronotum coriaceous laterally carinated (Fig. 2c). Mesoscutum width 1.2 times its length in dorsal view. Mesoscutum smooth with heavy punctuation; tranverse carinae highly variable in range, from being only present at the base of the notauli to all mesoscutum length (Fig. 1d). Notauli complete with transverse carinated sculpture; median mesoscutal furrow short and weakly excavated. Lateral region of the mesoscutum smooth and punctuated, parapsidal signum and parascutal sulcus present but weakly sculptured. Scutellum length 0.9 times the length of the mesoscutum in dorsal view. Scutellum coriaceous and heavily areolate. Scutellar foveae big and smooth, not basally defined by a carina. Interfoveal line complete. Lateral pits of the scutellar foveae big but weakly excavated. Scutellum narrowing towards the apex; scutellar spine not clearly distinguishable from the scutellum (Fig. 1d), one-quarter of the scutellum total length; straight in lateral view. Mesopleuron smooth, glabrous and shiny, with oblique carinae in the lower region which became alutaceous sculpture; mesopleural triangle alutaceous, carinated and glabrous. Propodeum alutaceous and shiny, divided by a longitudinal carinate which delimitates two large superior cells and two smaller lower cells.

Wings. Pubescent. Radial cell of forewing closed, 2.8 times longer than wide. Marginal pubescence of the wing denser at the apical third.

Metasoma. Petiole longer than wide and carinated. Third abdominal tergum 3.4 times longer than the fourth tergum in dorsal view. Fifth and sixth abdominal terga visible in dorsal view. Metasoma smooth and glabrous; abdominal terga punctuated near the previous terga from the fourth abdominal terga to the last.

D. nominis. The species name refers to the Far East, where the specimens were collected.

Biology. Unknown.

Distribution. Eastern Palearctic region. Known from Japan and South Korea.

X. siamensis Mata-Casanova & Pujade-Villar n. sp. (Figs. 1f, 2e)

Diagnosis. Species very similar to *X. esbelta.* It differs from the latter by having scutellum shorter than the mesoscutum, scutellar spine with incomplete interfoveal line and the scape longer than the first flagellomere in females (scutellum length equal to mesoscutum length, spine interfoveal line reaching the end of the scutellar spine and first flagellomere longer than the scape in *X. esbelta*).

Type material. Holotype ♀ deposited in CNCI with the following labels: "70 km SW Doi Inthamon Nat. Park, Chiang Mai, THAILAND, 2500 m MT, 6-12.V.1990: B. V. Brown leg" (white label). "Holotype of *Xyalaspis siamensis* n. sp. desgn. N. Mata-Casanova & J. P-V, 2013" (red label).

Description

Length. Body: 2.6 mm. Antennae: 2.4 mm (from scape to F9). Wings: 2.9 mm.

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Coloration. Head, mesosoma and metasoma black. Mandibles yellowish brown with darker teeth. Antennae yellowish brown. Legs including yellowish brown with darker coxae. Veins of wings yellowish.

Head. Width of the head 1.3 times its height in front view and 1.7 times its length in dorsal view. Face smooth, shiny and pubescent, with abundant piliferous points. Malar sulcus coriaceous, 0.9 times the height of the compound eye. Transfacial line 1.2 times the height of the compound eye. Diameter of the toruli bigger than the distance between them and the distance from the external edge of the toruli to the internal edge of the compound eye. Clypeus weakly defined; smooth, glabrous and shortly convex. Occipital and postocular carinae absent. Compound eyes almost glabrous except for a few short setae. POL:OOL:LOL ratio in males = 5:5:2.5, being the ocelli diameter 2. Frons smooth, shiny and shortly pubescent with some piliferous points.

Antennae. Cylindrical flagellomeres covered with pubescence. Female antennal formula: 12(3.5), 4(3), 11(2), 9.5(2), 8(2), 8(2), 7(2), 7(2.5), 7(2.5), 6(3), and 6(3), (F10 and F11 missing). Placodeal sensilla start at F3 and abundant from F5 in females.

Mesosoma. Pronotum smooth and pubescent, heavily punctuated in its upper half and carinated in its lower half (Fig. 2e). Mesoscutum smooth, with abundant piliferous points in its anterior region and weakly alutaceous in the region near the base of the notauli (Fig. 1f). Notauli complete but shortly defined; median mesoscutal furrow short and weakly excavated. Parapsidal signum absent and parascutal sulcus weakly defined. Mesoscutum 1.2 times wider than long in dorsal view. Scutellum carinated at the edges and smooth in the dorsal region, 0.75 times the mesoscutum length. Scutellar foveae big and smooth not basally delimited by a carina; interfoveal line incomplete. Lateral pits of the scutellar foveae not deeply excavated. Scutellar spine narrowing towards the apex, ending in blunt end (Fig. 1f), represents one-third of scutellum total length, straight in lateral view. Mesopleuron smooth, glabrous and shiny, weakly carinated in its lower half. Mesopleural triangle carinated and shortly pubescent. Propodeum glabrous, shiny and weakly coriaceous, partially divided by a longitudinal median carina.

Wings. Pubescent. Radial cell of the forewing closed, 2.8 times longer than wide. Marginal pubescence of the wing denser at the apical third.

Metasoma. Petiole length two times its width, laterally and ventrally carinated. Third abdominal tergum 3 times longer than the fourth abdominal tergum; fifth and sixth abdominal terga dorsally visible. Metasoma smooth and glabrous; abdominal terga punctuated near the previous terga from the fourth abdominal terga to the last.

D. nominis. The species name derives from the ancient denomination of Thailand, where the species was found.

Biology. Unknown.

Distribution. Indomalayan region;only known from Thailand.

Discussion

Prior to this study, the genus *Xyalaspis* included 15 species worldwide (Mata-Casanova et al., in press), with only two of them present in Asia: *X. atemiensis* and *X. lituricis*. After studying the type of material of the previously known Asian *Xyalaspis* species and the undetermined material assigned to genus *Xyalaspis* collected in Asia, we have extended the knowledge of this genus. *X. lituricis* is synonymized with *X. hyalina* and four new species are described: *X. esbelta* n. sp., *X. dimorphica* n. sp., *X. orientalis* n. sp., and *X. siamensis* n. sp. With these new species, the number of species of genus *Xyalaspis* grows up to 19. The Palearctic region comprises 9 species; the Indomalayan region, where *Xyalaspis* hadn't been cited before, includes 2 species; *X. esbelta*, is present in both regions.

As previously known, the sculpture of the mesoscutum is highly variable within genus *Xyalaspis*, from being completely smooth to areolate. In the case of the Asian species, both extremes of the series are present. In *X. esbelta*, the mesoscutum is completely smooth, with the notauli being only weakly excavated or have disappeared (Fig. 1b); *X. siamensis* has weakly excavated notauli and smooth mesoscutum except for slightly alutaceous at the base of the notauli (Fig. 1 f); *X. atemiensis* has almost completely smooth mesoscutum, but the notauli are complete, deeply excavated and transversely carinated (Fig. 1a); on the other hand, *X. hyalina* presents a smooth mesoscutum with incomplete notauli but light carinated sculpture at the base and the edges of the notauli (Fig. 1c); *X. orientalis* presents carinated sculpture in the mesoscutum highly variable in extension (Fig. 1d); finally, *X. dimorphica* presents highly alutaceous mesoscutum, heavy transverse carinated sculpture with deeply excavated notauli and complete median mesoscutal furrow both transversely carinated (Figs. 1e, g). It is interesting to mention the presence of complete median mesoscutal furrow in *X. dimorphica*, a character only previously known from *X. victoriensis* from Australia and *Acanthaegilopsis malagasy* Pujade-Villar & Mata-Casanova, 2013 from Madagascar and Comoros.

The scutellar spine is another important character used in separating *Xyalaspis* species. We can distinguish between two groups: those with the scutellar spine not distinguishable from the scutellum and those with clearly defined scutellar spine. The first group includes *X. orientalis* and *X. siamensis*, and present variability: *X. orientalis* has also non-sharp scutellar spine, but in this case is longer (Fig. 1d); *X. siamensis* scutellar spine is also long, but unlike the other species commented, it is slightly pointed (Figs. 1 f, 2e). The second group includes *X. atemiensis*, *X. esbelta*, *X. hyalina* and *X. dimorphica*, and the shape and length of the scutellar spine is more variable: *X. atemiensis* scutellar spine is slightly differentiated from the rest of the scutellum and it is short and blunt (Fig. 1a); *X. hyalina* has also slightly differentiated scutellar spine but not as blunt as in *X. atemiensis* (Fig. 1c); *X. esbelta* scutellar spine is acute, wide and strong (Fig. 1b) and straight in lateral view (Fig. 2g); in the case of *X. dimorphica* the scutellar spine presents strong sexual dimorphism, being shorter and straight in lateral view in males (Fig. 2a) and longer and slightly curved downwards in females (Fig. 2b).

When studying morphological variability between sexes both males and females of *X. dimorphica*, *X. esbelta* and *X. orientalis* have been examined. In *X. esbelta* and *X. orientalis* only the characters related with sexual dimorphism (aspect of metasoma, number of flagellomeres and the disposition of the placodeal sensilla in the antennae) are present; in *X. dimorphica*, however, the scutellar spine heavily varies between both sexes as we previously mentioned. It is important to note that this variation in the scutellar spine due to sexual dimorphism has not yet been seen in any other *Xyalaspis* species.

Regarding the distribution of the species mentioned in this study, the obtained data for the Palearctic species indicate that *X. hyalina* is the most widespread, ranging from Cyprus in the west to Tajikistan in the east, with most citations occurring in Central Asia; *X. orientalis* distribution includes Japan and South Korea, while *X. atemiensis* distribution is reduced to Japan. For the Indomalayan species, *X. dimorphica* distribution is reduced to Southern India while *X. siamensis* is only known from Thailand. *X. esbelta* has a broad distribution in the Asian continent and specially the Far East, being collected in Japan, Taiwan, Thailand and India.

The biology of most *Xyalaspis* species remains unknown. Although New (1979) and Fergusson (1986) mention *X. victoriensis* and *X. petiolata* Kieffer, 1901, respectively, attacking the aphid-feeding larvae of Hemerobiidae (Neuroptera). In the case of the Asian species their hosts are unknown. The Hemerobiidae are abundant in the Palaearctic region, with 170 known species (Makarkin, 1995). Although most of the known species belong to the European continent, the family is also notably present in Asia; for example, only in the Russian Far East 10 species of *Hemerobius* Linnaeus, 1758 are known to occur (Makarkin and Montserrat, 2007), so the Asian *Xyalaspis* has enough potential hosts.

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Key to the Asian species of the genus *Xyalaspis*

1. Median mesoscutal furrow complete (Figs. 1e, g). ..... *X. dimorphica*
   Median mesoscutal furrow incomplete or absent. 2
2. Clearly defined and transversally carinated notauli (Figs. 1a, d). 3
   Notauli weakly defined or absent, never carinated (Figs. 1b, c, f). 4
3. Mesoscutum completely smooth (Fig. 1a). ..... *X. atemiensis*
   Mesoscutum with transverse carinated sculpture variable in range (Fig. 1d). ..... *X. orientalis*
4. Mesoscutum completely smooth, scutellar spine acute and spiked, clearly defined from the rest of the scutellum, interfoveal line of the scutellum reaching the end of the scutellar spine (Fig. 1b)..... *X. esbelta*
   Mesoscutum sculptured (alutaceous or weakly carinated at the base of the notauli), scutellar spine shortly pointed, not clearly defined from the rest of the scutellum, interfoveal line never reaching the end of the scutellar spine. 5
5. Mesoscutum slightly alutaceous at the base of the notauli, without any carinated sculpture (Fig. 1f). ..... *X. siamensis*
   Mesoscutum carinated at the base and the edges of the notauli (Fig. 1c). ..... *X. hyalina.*

Acknowledgments

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4.2.6. New Afrotropical Anacharitinae

Description of two new species of Anacharitinae (Hymenoptera: Figitidae) from the Afrotropical Region

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An revision of current knowledge on subfamily Anacharitinae for the Afrotropical Region is given. Two new species are described: *Acanthaegilopsis hemicoriaceus* Mata-Casanova & Pujade-Villar sp. n. and *Xyalaspis subsaharica* Mata-Casanova & Pujade-Villar sp. n. Diagnostic characters are illustrated and data about biology, distribution and morphological variability are discussed.

Key words: Afrotropical Region, Anacharitinae, new species, taxonomy.

INTRODUCTION

Anacharitinae is a subfamily of Figitidae characterized by the presence of three main synapomorphies (Ros-Farr *et al.* 2000): rounded and continuous pronotal plate, broadly overlapping mandibles and triangular-shaped head in frontal view (although it is more quadrangular-shaped in genus *Proanacharis* and *Acanthaegilopsis* and in some species of *Xyalaspis*). The subfamily currently includes nine described genera (Mata-Casanova & Pujade-Villar 2013): *Acanthaegilips* Ashmead, 1897; *Acanthaegilopsis* Pujade-Villar, 2013; *Aegilips* Haliday, 1835; *Anacharis* Dalman, 1823; *Calofigites* Kieffer, 1909; *Hexacharis* Kieffer, 1907; *Proanacharis* Kovalev, 1996; *Solenofigites* D az, 1979; and *Xyalaspis* Hartig, 1843. Although some species have been described as parasitoids of aphid-feeding larvae of Neuroptera (Ronquist 1999), the biology of most species remains unknown.

The Anacharitinae genera can be roughly divided into those having a circumscutellar carina bordering the scutellum and those whose circumscutellar carina has evolved becoming a projecting scutellar spine (Restrepo-Ortiz & Pujade-Villar 2010). *Xyalaspis* and *Acanthaegilopsis* are included in the second group alongside *Acanthaegilips*. *Acanthaegilips* can be easily distinguished from the other two genera by the presence of an oblique groove in the mesopleuron and a much longer scutellar spine. *Acanthaegilopsis* and *Xyalaspis* are morphologically close, except for differences regarding the sculpture of the mesopleuron and the malar area: while *Acanthaegilopsis* has a coriaceous mesopleuron and no malar impression, *Xyalaspis* has a smooth mesopleuron and a coriaceous malar sulcus (Mata-Casanova & Pujade-Villar 2013).

The number of Anacharitinae known from the Afrotropical Region is low. The other Figitidae subfamilies Eucoilinae and Charipinae have an extensive record (Frontal-Cazalla *et al.* 2002; Paretas-Mart nez *et al.* 2009; Ferrer-Suay *et al.* 2013) and the Aspicerinae genus *Prosaspicera* is well documented in this region (Ros-Farr & Pujade-Villar 2006) whereas the Anacharitinae had been represented only by one species of *Aegilips* for a long time. Suitable Neuroptera hosts for the anacharitines are also abundant (Mansell 1986; H lzel & Ohm 2002), so it seems more likely that the cause of the scarce anacharitine register is the few studies done in the region rather than some biological reasons. Supporting this idea is the fact that recent works (Pujade-Villar 2012; Mata-Casanova & Pujade-Villar 2013) have notably augmented the number of Afrotropical anacharitines. In this work, two new species are added to the Afrotropical species diversity: *Acanthaegilopsis hemicoriaceus* Mata-Casanova & Pujade-Villar sp. n. and *Xyalaspis subsaharica* Mata-Casanova & Pujade-Villar sp. n., increasing the number of Anacharitinae from three to five and recording both genera from mainland Africa for the first time. Taxonomic and biogeographical considerations are discussed.

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MATERIAL AND METHODS

The specimens examined in this study are preserved in the Natural History Museum (BMNH), London, the Canadian National Collection of Insects (CNCI), Ottawa, and the Department of Animal Biology, University of Barcelona (UB).

For the description of *X. subsaharica* Mata-Casanova & Pujade-Villar sp. n. four specimens were studied, all of them females; for *A. hemicoriaceus* Mata-Casanova & Pujade-Villar sp. n. three specimens were studied, two females and one male. Morphological terms used are those of Richards (1977), Ronquist (1995) and Ros-Farr *et al.* (2003). All measurements are relative except for the body length. Measurements and abbreviations include: F1–F12, first and subsequent flagellomeres; POL (post-ocellar distance) is the distance between the inner margins of the posterior ocelli; OOL (ocular-ocellar distance) is the shortest distance between the inner margin of the compound eye and the outer edge of the posterior ocellus; LOL (lateral–frontal ocellar distance) is the distance between the edges of the lateral and frontal ocelli. Antennal formula includes scape, pedicel and flagellomeres length and relative width in brackets.

The images were produced by the Serveis Cient fico-T cnics of the University of Barcelona. A field-emission gun environmental scanning electron microscope (FEI Quanta 200 ESEM) was used for high-resolution imaging, under a low voltage (12.0 kV) and without gold-coating of the specimens in order to preserve the material.

RESULTS/TAXONOMY

Acanthaegilopsis hemicoriaceus Mata-Casanova & Pujade-Villar **sp. n.**, Fig. 1

Type material. Holotype ♀ (deposited in BMNH) with the following labels: 'UGANDA, Kawanda, XII.1947, T.H.C. Taylor leg" (white label), 'Holotype of *Acanthaegilopsis hemicoriaceous* n. sp., design. Mata-Casanova & Pujade-Villar, 2013" (red label). Paratypes (1♂, 1♀, deposited in BMNH) with the following labels: 'RHODESIA, Salisbury, Chishawasha, VIII.1978, A. Watsham' (white label), 'Paratype of *Acanthaegilopsis hemicoriaceous* n. sp., design. Mata-Casanova & Pujade-Villar, 2013' (red label): 1♂; 'RHODESIA, Chishawasha, IX.1978, A. Watsham' (white label), 'Paratype of *Acanthaegilopsis hemicoriaceous* n. sp., design. Mata-Casanova & Pujade-Villar, 2013' (red label): 1♀.

Diagnosis. Unlike *A. malagasy* Mata-Casanova & Pujade-Villar, 2013, *A. hemicoriaceus* Mata-Casanova & Pujade-Villar sp n. does not have a median carina dividing the scutellar spine and has the rear portion of its mesopleuron smooth thus not being entirely coriaceous (median carina present and mesopleuron entirely coriaceous in *A. malagasy*).

Description

Length. Body: 2.3 mm. Wings: 2.1 mm. Antenna: 2.1 mm (male, from scape to F10), 2.2 (female).

Colouration. Head and mesosoma black, metasoma dark brown. Mandibles yellow with red teeth. Antennae yellow. Legs and coxae yellow. Veins of wing yellowish but barely coloured, hyaline wings.

Head. Sub-square shape in front view (Fig. 1f). Width of head 1.3 times its height in front view and 2.2 times its length in dorsal view. Face smooth and shiny with abundant piliferous punctures, covered by short setae uniformly distributed. Malar sulcus absent (Fig. 1f). Transfacial line 1.2 times the height of the compound eye. Diameter of the toruli equal to the distance between toruli and shorter than the distance between the external margin of the toruli and the internal margin of the compound eye. Clypeus only slightly convex, smooth and glabrous. Occipital and postocular carina absent. Compound eyes almost glabrous except for a few short setae. POL:OOL:LOL ratio in females = 8:6:4, being the ocelli diameter 2; POL:OOL:LOL ratio in males = 7:4:4, being the ocelli diameter 3. Frons smooth and shiny, with few short setae more abundant behind the ocelli.

Antennae. Cylindrical flagellomeres, covered with pubescence. Female antennal formula: 10(3), 4(2.5), 8(1.5), 7(2), 7(2), 6.5(2), 6(2), 5(2), 5(2), 5(2), 5(2.5), 5(2.5), 7(2.5). Male antennal formula (F11 and F12 lost): 11(3), 4(2.5), 7(2.5), 7(2.5), 7(2.5), 6(2.5), 6(2), 6(2), 6(2), 5(2), 5(2). Placodeal sensilla start at F2 in females but numerous only from F3 onwards; in males, starting at F1 but scarce until F5.

Mesosoma. Pronotal plate coriaceous (Fig. 1d). Pronotum from rough alutaceous to coriaceous; surface completely carinated in lateral view and almost glabrous except for few uniformly scattered short setae (Fig. 1a). Width of the mesoscutum

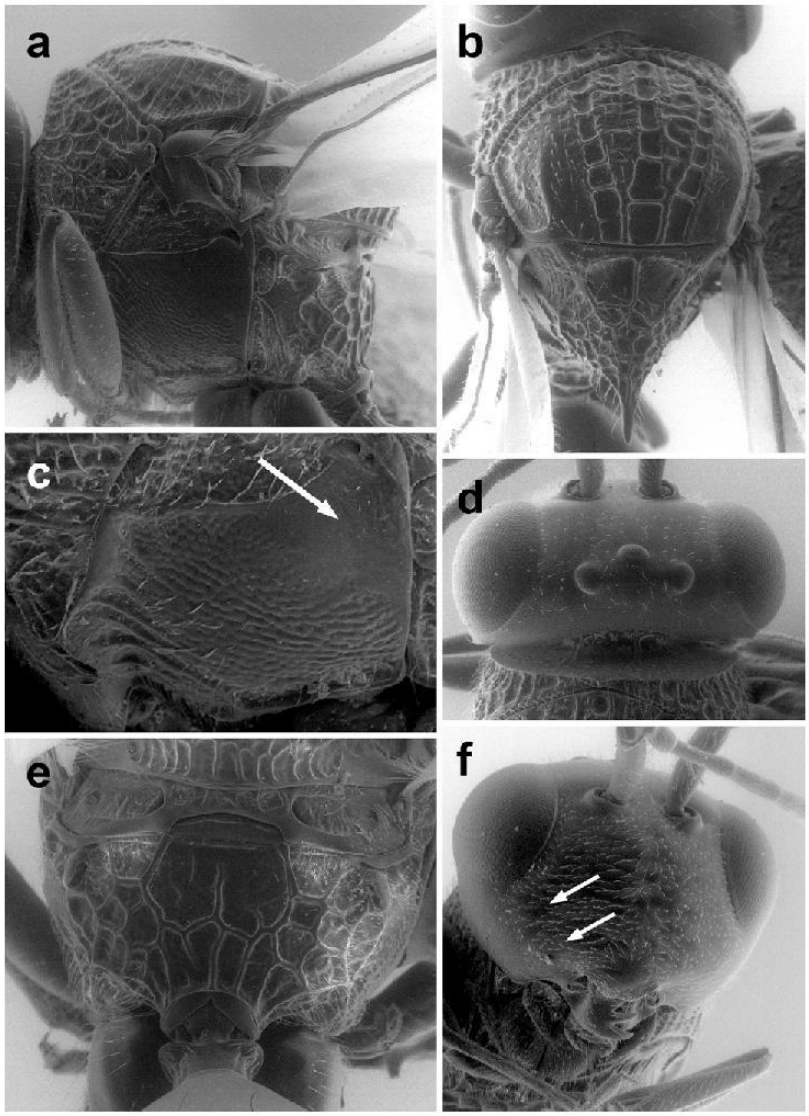


Fig. 1. *Acanthaegilopsis hemicoriaceous*; **a**, mesosoma in lateral view; **b**, mesosoma in dorsal view; **c**, mesopleuron; **d**, head in dorsal view; **e**, propodeum; **f**, head.

1.4 times its length in dorsal view. Mesoscutum slightly coriaceous, transversely carinated in all its extension in the region between the notauli; complete and internally carinated notauli, median mesoscutal furrow complete – reaching the pronotum – and internally carinated (Fig. 1b). Parapsidal signum clearly defined; parascutal sulcus excavated and internally carinated, divided into cells. Lateral region of the mesoscutum also coriaceous, with short but abundant setae.

Scutellum alutaceous and areolate; its length subequal to mesoscutum length (53:55) in dorsal view. Scutellar foveae heavily alutaceous and basally defined by a carina; lateral pits of the scutellar foveae present but superficial, hardly noticeable. Interfoveal line complete. Scutellum narrowing towards the base of the scutellar spine. Scutellar spine thin and spiked in dorsal view, straight in lateral view; about one-third of the scutellum entire length. Coriaceous sculpture in the mesopleuron variably extended across its lower and anterior region; smooth in the rear part, glabrous and shiny (Fig. 1c). Mesopleural triangle roughly alutaceous, glabrous and shiny. Propodeal troughs coriaceous and glabrous (Fig. 1e). Propodeum coriaceous and glabrous; one upper large cell partially divided by an incomplete median carina and four lower cells (Fig. 1e).

Wings. Pubescent. Radial cell of forewing closed, 2.3 times longer than wide. Marginal pubescence of the wing denser at the apical third.

Metasoma. Petiole as long as wide, dorsally smooth and heavily carinated in the lateral and ventral regions. Third abdominal tergum 2.5 times longer than the fourth in dorsal view. Fifth, sixth and seventh abdominal terga are visible in dorsal view. Metasoma glabrous; without any punctures.

Etymology. The specific name refers to the sculpture of the mesopleuron, coriaceous in its lower and anterior region while smooth in its rear one.

Biology. Unknown.

Distribution. Afrotropical. Recorded from Uganda and Zimbabwe.

Xyalaspis subsaharica Mata-Casanova & Pujade-Villar **sp. n.**, Fig. 2

Type material. Holotype ♀ (deposited in CNCI) with the following labels: 'UGANDA: Masindi district, Budongo Forest nr donjo, 19–30.VI.1995, T. H. Warner' (white label), 'Holotype of *Xyalaspis subsaharica* n. sp., design. Mata-Casanova & Pujade-Villar, 2013' (red label). Paratypes (2♀ deposited in BMNH, 1♀ deposited in UB) with the following labels: 'NIGERIA: Ogoja, 1.I.1971, J.T. Meler leg.' (white label), 'Paratype of *Xyalaspis subsaharica* n. sp., design. Mata-Casanova & Pujade-Villar, 2013' (red label): 1♀. 'NIGERIA: Ogoja, 1.IV.1971, J.T. Meler leg.' (white label), 'Paratype of *Xyalaspis subsaharica* n. sp., design. Mata-Casanova & Pujade-Villar, 2013' (red label): 1♀. 'UGANDA: Masindi district, Budongo Forest nr donjo, 19–30.VI.1995, T.H. Warner' (white label), 'Paratype of *Xyalaspis subsaharica* n. sp., design. Mata-Casanova & Pujade-Villar, 2013' (red label): 1♀.

Diagnosis. *X. subsaharica* sp. n. belongs to the group of *Xyalaspis* with complete median mesoscutal furrow like *X. dimorphica* Mata-Casanova & Pujade-Villar, 2013 and *X. victoriensis* New, 1979. Morphologically very close to *X. dimorphica*, except for having the petiole as long as wide, smaller scutellar foveae not basally defined and shorter scutellar spine (in *X. dimorphica*, petiole is longer than wide, scutellar foveae are big and basally defined by a carinae and the scutellar spine length is about one-half of the total length of scutellum).

Description

Length. Body: 2.4 mm. Wings: 2.1 mm. Antenna: 1.7 mm (female).

Colouration. Head and mesosoma black, metasoma dark brown. Mandibles yellowish brown with darker teeth. Antennae yellow. Legs and coxae yellowish, darker tarsi. Veins of wing yellowish but barely coloured, hyaline wings.

Head. Sub-square shape in front view (Fig. 2c). Width of head 1.4 times its height in front view and 2.2 times its length in dorsal view. Face smooth and shiny with abundant piliferous punctures, covered by short setae uniformly distributed (Fig. 2c). Malar sulcus coriaceous 0.7 times the height of the compound eye. Transfacial line 1.1 times the height of the compound eye. Diameter of the toruli bigger than the distance between toruli and the distance between the external margin of the toruli and the internal margin of the compound eye. Clypeus shortly defined, convex, smooth and glabrous. Occipital and postocular carina absent. Compound eyes with only few short setae. POL:OOL:LOL ratio in females = 25:15:7, being the ocelli diameter 14. Frons smooth and shiny, with short setae uniformly distributed on its surface (Fig. 2b).

Antennae. Cylindrical flagellomeres, covered with pubescence. Female antennal formula: 29(10), 10(7), 23(6), 19(6), 15(6), 15(6.5), 13(6.5), 12(6), 11(6), 11(6.5), 10(7), 11(8), 20(9). Placodeal sensilla in females start at F4 but scarce in F4 and F5, numerous only from F6 onwards.

Mesosoma. Pronotal plate alutaceous and covered by short pubescence. Pronotum alutaceous and completely carinated in lateral view; covered by short sparse pubescence (Fig. 2a). Mesoscutum width 1.2 times its length in dorsal view. Meso-

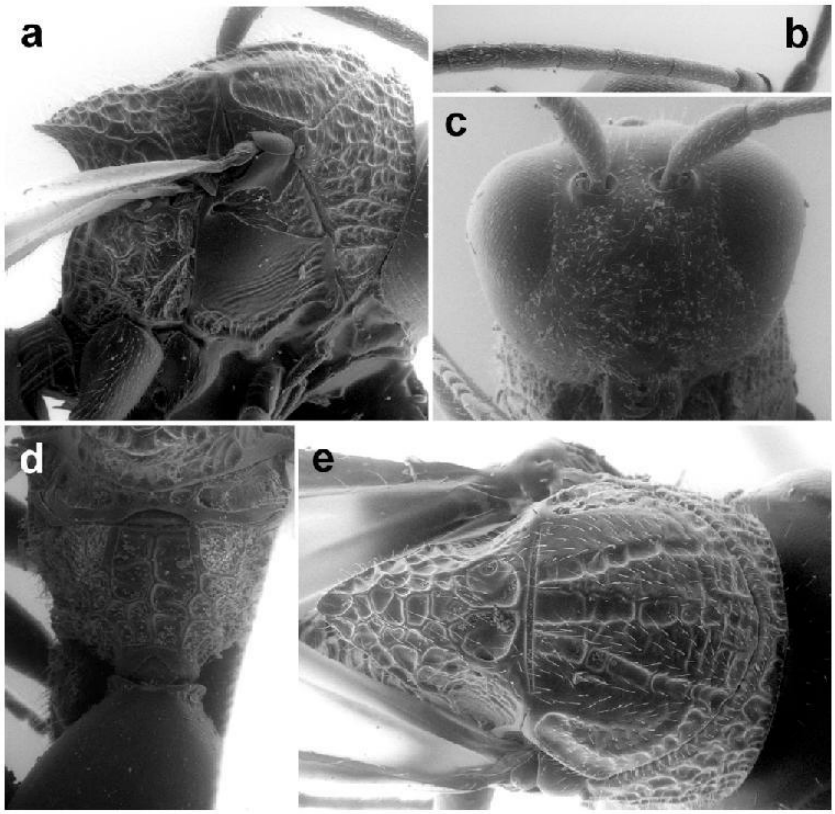


Fig. 2. *Xyalaspis subsaharica*; **a**, mesosoma in lateral view; **b**, detail of the first flagellomeres; **c**, head in front view; **d**, propodeum; **e**, mesosoma in dorsal view.

scutum alutaceous, transversely carinated in the region between the notauli; complete and internally carinated notauli, median mesoscutal furrow also complete – reaching the pronotum – and internally carinated (Fig. 2e). Parapsidal signum clearly defined; parascutal sulcus excavated and internally carinated, divided in cells. Lateral region of the mesoscutum smooth to slightly alutaceous, with piliferous punctures and sparsely distributed short pubescence. Scutellum alutaceous and areolate; its length 0.8 times the length of the mesoscutum in dorsal view. Scutellar foveae alutaceous, basally defined by a weak carina (Fig. 2e); lateral pits of the scutellar foveae absent. Interfoveal line complete. Scutellum narrowing towards the end of the scutellar spine; in lateral view, projecting slightly downwards but forming a raised tooth at the apex (Fig. 2a). Scutellar spine short and massive, being about one-quarter of the scutellum entire length. Mesopleuron smooth, glabrous and shiny, obliquely carinated in its anterior half (Fig. 2a). Mesopleural triangle smooth and shiny, covered with hyaline setae. Propodeum coriaceous and pubescent; central area divided into two large cells by a median longitudinal carina and transversely divided by some weaker carinae (Fig. 2d).

Wings. Pubescent. Radial cell of forewing closed, 2.4 times longer than wide. Marginal pubescence of the wing denser at the apical third.

Metasoma. Petiole as long as wide, dorsally smooth or only slightly carinated while heavily carinated in the lateral and ventral regions. Third abdominal tergum 1.9 times longer than the fourth

in dorsal view. Fifth, sixth and seventh abdominal terga are visible in dorsal view. Metasoma glabrous; without any punctures.

Etymology. The specific epithet refers to sub-Saharan Africa, the geographical region comprising Uganda and Nigeria, the countries where the type material was collected.

Biology. Unknown.

Distribution. Afrotropical. Recorded from Uganda and Nigeria.

DISCUSSION

Before this study was conducted, the genus *Acanthaegilopsis* comprised of only one species, *A. malagasy*, from Madagascar and Comoros. The new species has been cited for Zimbabwe and Uganda, extending the genus range to the African mainland. On the other hand, *Xyalaspis* was widely known previous to the present work: the genus included 18 species from all continents except for Africa and Antarctica (Mata-Casanova *et al.* 2013a). The discovery of *X. subsaharica* Mata-Casanova & Pujade-Villar sp. n. increases the number of species to 19 (making it closer to *Aegilips* and *Anacharis*, the most abundant Anacharitinae genera) and extends the distribution area of *Xyalaspis* to the Afrotropical Region. The presence of both species in Uganda and specimens of *X. subsaharica* Mata-Casanova & Pujade-Villar sp. n. in Nigeria extends the range of the subfamily from southern Africa (where the previously known anacharitines were restricted) to Equatorial Africa.

The presence of a complete median mesoscutal furrow was formerly considered a difference between the two genera (Mata-Casanova & Pujade-Villar, 2013). The revision of *X. victoriensis* type material and the discovery of *X. dimorphica* Mata-Casanova & Pujade-Villar, 2013 and *X. subsaharica* Mata-Casanova & Pujade-Villar sp. n. has shown this character also to be present in the genus *Xyalaspis*, making it an unsuitable character for distinguishing between the two genera. A quadrangular head was also mentioned as a character present in *Acanthaegilopsis* and only shared with *Proanacharis*. This, however, has seen to be incorrect, as some species of *Xyalaspis* also present a quadrangular head (Mata-Casanova *et al*. 2014a; Mata-Casanova *et al.* 2014b).

Both genera appear to be closely related morphologically. According to previous studies (Ros-Farr *et al.* 2000; Buffington *et al.* 2012), the genus *Xyalaspis* is close to *Aegilips.* Both share a short and wrinkled petiole and lack a mesopleural groove. These characters are also present in *Acanthaegilopsis*, so the three genera form a morphologically distinguishable group. The most apparent differences previously cited between them lies in the sculpture of the mesopleuron and the malar area. *Acanthaegilopsis* has a coriaceous mesopleuron and lacks sculpture in the malar area; on the other hand, *Xyalaspis* has no coriaceous microsculpture in the mesopleuron while having a coriaceous malar sulcus. However, it should be noted that despite the coriaceous malar sulcus being a defining character of genus *Xyalaspis,* one Neotropical species, *X. aberrans,* has an incomplete malar sulcus which in some cases is reduced to the base of the compound eye and almost unnoticeable (Mata-Casanova *et al*. 2014b). So, the only character exclusive to *Acanthaegilopsis* is the coriaceous mesopleuron. In the case of *Xyalaspis,* the mesopleuron is smooth and covered with ridges of variable extension but never coriaceous.

The biology of Afrotropical Anacharitinae remains unknown. Although there have been cited some Chrysopidae and Hemerobiidae as hosts of *Acanthaegilips, Anacharis, Aegilips, Calofigites, Solenofigites* and *Xyalaspis* species (D az 1979; New 1979; Kierych 1984; Fergusson 1986; Mata-Casanova *et al.* 2014c), none of them belongs to the Afrotropical Region. More research should be done in order to unveil the biology of the Afrotropical Anacharitinae.

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4.2.7. Revision of Western Palaearctic *Xyalaspis*

Revision of the genus *Xyalaspis* Hartig, 1843 (Hymenoptera: Figitidae: Anacharitinae) in the Western Palaearctic

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ABSTRACT
A revision of *Xyalaspis* Hartig, 1843 (Hymenoptera: Anacharitinae) in the Western Palaearctic region is given. *Xyalaspis spinigera* Reinhard, 1860 and *Xyalaspis subulifera* (Thomson, 1862) are synonymized with *Xyalaspis laevigata* Hartig, 1843 and *Xyalaspis rugosa* Hartig, 1843 respectively, and their distribution areas are extended. A new species *Xyalaspis pseudolaevigata* n. sp. is described from France. One species previously assigned to the genus *Xyalaspis, X. laevis* (Hedicke, 1914), is transferred to *Aegilips* Haliday, 1835. Diagnostic characters are illustrated and data about biology, distribution and morphological variability of the studied species are presented and discussed. A key to differentiate the Western Palaearctic species of *Xyalaspis* is included.

KEY WORDS
Western Palaearctic,
revision,
new synonym,
new combination,
new species.

RÉSUMÉ

Révision du genre Xyalaspis *Hartig, 1843 (Hymenoptera: Figitidae: Anacharitinae) dans le Paléarctique occidental.*

Le genre *Xyalaspis* Hartig, 1843 (Hymenoptera: Anacharitinae) est révisé pour le Paléarctique occidental. *Xyalaspis spinigera* Reinhard, 1860 et *Xyalaspis subulifera* (Thomson, 1862) sont mis en synonymie avec *Xyalaspis laevigata* Hartig, 1843 et *Xyalaspis rugosa* Hartig, 1843 respectivement, et l'aire de distribution de ces espèces est étendue. Une nouvelle espèce est décrite pour la France : *Xyalaspis pseudolaevigata* n. sp. *Xyalaspis laevis* (Hedicke, 1914), est transféré au genre *Aegilips* Haliday, 1835. Les caractéristiques diagnostiques plus importantes sont illustrées. Des données sur la biologie, la distribution et la variabilité morphologique des espèces sont discutées. Une clé pour différencier les espèces ouest paléarctiques est rédigée.

MOTS CLÉS
Paléarctique occidental, révision, nouvelle synonymie, combinaison nouvelle, espèce nouvelle.

INTRODUCTION

Xyalaspis Hartig, 1843 is one of the nine genera of Figitidae Thomson, 1862 included in the subfamily Anacharitinae Thomson, 1862 (Mata-Casanova & Pujade-Villar 2013). This subfamily is easily distinguishable from the rest of the Figitidae by three synapomorphies (Ros-Farré *et al.* 2000): a rounded and continuous pronotal plate, broadly overlapping mandibles and a triangular-shaped head in front view, although in *Proanacharis* Kovalev, 1996 and some *Aegilips* Haliday, 1835 and *Xyalaspis* it is more quadrangular. The genus *Xyalaspis* is close to the genus *Aegilips*, both having a coriaceous malar sulcus and lacking an oblique groove in the mesopleuron. The character used to separate the two genera is the presence in *Xyalaspis* of a true scutellar spine derived from the circumscutellar carina (Restrepo-Ortiz & Pujade-Villar 2010).

Xyalaspis presents a subcosmopolitan distribution, being present on all continents except for Africa and Antarctica. The genus currently includes 17 species (Mata-Casanova *et al.*, 2014): ten Palaearctic, three Neotropical, one Nearctic, two species each in the Nearctic and Neotropical regions and one in the Australian region (Mata-Casanova *et al.* 2014a). Eight species have been cited from the Western Palaearctic: *Xyalaspis armata* (Giraud, 1860), *X. hyalina* Belizin, 1951, *X. laevigata* Hartig, 1843, *X. laevis* (Hedicke, 1914), *X. petiolata* Kieffer, 1901, *X. rugosa* Hartig, 1843, *X. spinigera* (Reinhard, 1860) and *X. subulifera* (Thomson, 1862).

The only revision of Palaearctic Anacharitinae including the genus *Xyalaspis* was undertaken by Dalla-Torre & Kieffer (1910). Belizin (1951) studied the Russian species, citing *X. armata* and describing a new species, *X. hyalina*. Fergusson (1986) reviewed the British species and described the biology of *X. petiolata* attacking the aphid-feeding larvae of *Hemerobius* sp. and *Wesmaelius subnebulosus* (Neuroptera: Hemerobiidae). Recently Ros-Farré & Pujade-Villar (2011) transferred *Omalaspis laevis* Hedicke, 1914 to the genus *Xyalaspis*. All the original descriptions are very short, the characters mentioned are not homogeneous and some important characters are not taken into account; for these reasons, a revision of the type material was needed for the precise differentiation of these species.

This study focuses on the Western Palaearctic *Xyalaspis* species and is part of a worldwide review of the genus *Xyalaspis*. The genus has already been revised for the American continent (Mata-Casanova *et al.* 2014a), and also species of the Eastern Palaearctic, Indomalayan and Australian areas have been revised (Mata-Casanova *et al.* 2014b). In this study *X. spinigera* is synonymized with *X. laevigata* and *X. subulifera* with *X. rugosa*. Moreover, *X. laevis* is transferred to genus *Aegilips*, and a new species, *X. pseudolaevigata* Mata-Casanova & Pujade-Villar, n. sp. is described. In order to summarize this information, an identification key for the Palaearctic *Xyalaspis* species is presented.

Abreviations

Anatomy

F1-F12	First and subsequent flagellomeres;
LOL	Lateral-frontal ocellar distance (distance between the edges of the lateral and frontal ocelli);
OOL	Ocular-ocellar distance (shortest distance between the inner margin of the compound eye and the outer edge of the posterior ocellus);
POL	Post-ocellar distance (distance between the inner margins of the posterior ocelli);
T1-T7	Metasomal tergites 1 to 7.

Depositories

CNC	Canadian National Collection of Insects, Arachnids and Nematodes, Ottawa, Canada;
MNHN	Muséum national d'Histoire naturelle, Paris, France;
NHM	The Natural History Museum, London, UK;
UB	Universitat de Barcelona, Barcelona, Spain;
ZIN	Zoological Institute of the Russian Academy of Sciences, Saint Petersburg, Russia;
ZSM	Zoologische Staatssammlung München, Munich, Germany.

MATERIAL AND METHODS

The material identified in this study belongs to the CNC, the MNHN and the NHM; it has been deposited in the institutions mentioned above and in UB. The material provided by the MNHN was collected with Malaise traps in the Mercantour National Park in the Mediterranean Alps (France) during the

ATBI Mercantour project; detailed information on the sample code (given in brackets for each specimen), the corresponding trap geographic coordinates and the main vegetation present at sampling site is given in Deharveng *et al.* (2015, this volume). In total, 58 specimens were studied, comprising 48 males and 10 females. All *Xyalaspis* types have been examined, but in this study we only make reference to the type material of the Palaearctic species of the genus: *X. armata*, *X. hyalinus*, *X. laevis*, *X. laevigata*, *X. petiolata*, *X. rugosa* and *X. spinigera*. Species are treated in alphabetical order.

Morphological terms used are from Richards (1977) and Ronquist (1995). All measurements are relative except for the body length. Antennal formula includes scape, pedicel and flagellomere length and relative width in brackets.

The specimens were studied at the "Serveis Científico-Tècnics de la Universitat de Barcelona" using stereomicroscopy and environmental scanning electron microscopy. A field-emission gun environmental scanning electron microscope (FEI Quanta 200 ESEM) was used for high-resolution imaging without gold-coating of the specimens in order to preserve the material.

SYSTEMATICS

Family FIGITIDAE Thomson, 1862
Subfamily ANACHARITINAE Thomson, 1862
Genus *Xyalaspis* Hartig, 1843

Xyalaspis armata (Giraud, 1860)
(Figs 1A; 2A; 4A)

Aegilips armatus Giraud, 1860: 173 (female).

Xyalaspis armata – Kieffer 1901: 161.

TYPE MATERIAL. — **Holotype**. ♀ with the following labels: "Holotype" (red label); "Muséum Paris, coll. Giraud 1877" (white label); "Holotype of *Aegilips armatus* Giraud, det. N. D. M. Ferguson, 1981" (white label); "*Xyalaspis armatus* (Giraud)♀, Kieffer, 1901, det. N. Mata-Casanova, 2012" (white label). (Deposited in MNHN).

BIOLOGY. — Unknown.

DISTRIBUTION. — Palaearctic. Known from Sweden, Britain (Kieffer 1901); Germany, Austria (Dalla Torre & Kieffer 1910); Russia (Belizin 1951); Ireland (Ferguson 1986); Spain (Ros-Farré & Pujade-Villar 1997).

DIAGNOSIS. — Species with completely smooth mesoscutum similar to *X. atemiensis* Ashmead, 1904 and *X. pilosa* Mata-Casanova, 2013, from which it differs by the lack of internal carinae in the mesoscutum (notauli internally carinated in *X. atemiensis* and *X. pilosa*).

REDESCRIPTION (FEMALE ONLY)

Length

Body 3.1 mm. Wings 3.1 mm. Antennae 2.8 mm.

Coloration

Head, mesosoma and metasoma black. Mandibles yellowish brown with darker teeth. Antennae yellowish-brown. Legs yellowish brown with darker coxae. Wing venation yellow.

Head

Width of head 2 × its height in front view and 1.3 × its length in dorsal view. Face smooth, shiny and pubescent, with abundant piliferous punctures. Malar sulcus present, coriaceous, 0.7 × height of compound eye. Transfacial line 1.2 × height of compound eye. Diameter of toruli larger than inter-toruli distance and that of torulus to compound eye. Clypeus short; smooth, glabrous and convex. Occipital and postocular carinae absent. Compound eyes almost glabrous except for a few short setae. POL:OOL:LOL ratio = 8:6:3, ocelli diameter 2. Frons smooth, shiny and shortly pubescent with some punctures.

Antennae

Flagellomeres cylindrical and hairy. Antennal formula: 12(5), 4.5(4), 11.5(3), 12(3), 10.5(3.5), 10(3.5), 9.5(4), 9(4), 8(4), 6(4), 6(4), 6(4), 12(4). Placodeal sensilla start at F2.

Mesosoma

Pronotum carinated in its lower part and smooth in the upper part (Fig. 2A). Mesoscutum 1.2 × wider than long in dorsal view. Mesoscutum smooth and shiny, almost glabrous except for few scarce setae and punctures. Notauli complete but weak, without internal transverse ridges (Fig. 1A); median mesoscutal furrow short and weakly impressed. Parapsidal signum and parascutal sulcus absent. Scutellum as long as mesoscutum in dorsal view. Scutellar foveae alutaceous, basally defined by a carina. Interfoveal line complete. Lateral pits of scutellar foveae weakly excavated. Scutellar spine with parallel sides and ending in a spike; nearly one-half of mesoscutellum length and slightly projecting upwards in lateral view. Mesopleuron smooth, shiny and glabrous, with weak basal transverse carinae. Mesopleural triangle smooth and pubescent. Propodeum heavily areolate; central area delimited by two longitudinal carinae and internally divided by some incomplete and weak internal carinae.

Wings

Pubescent. Radial cell of forewing closed, 2.2 × longer than wide. Marginal pubescence of forewing denser in apical third.

Metasoma

Petiole wider than long, carinated on all sides (Fig. 4A). Third abdominal tergum 2.2 × longer than fourth abdominal tergum in dorsal view. T5 and T6 visible in dorsal view. Anterior margin of T4-T7 punctuate.

Xyalaspis hyalina Belizin, 1951
(Figs 1B; 2C)

Xyalaspis hyalina Belizin, 1951: 574 (male).

TYPE MATERIAL. — **Holotype.**♂ with the following labels: "Kondara, 20.IX, Tadzhik SSR, 1945, V. Gussakovskij" (white label, handwritten, in Cyrillic); "Holotypus *Xyalaspis hyalinus* ♂, V. Belizin det" (red label, handwritten), "*Xyalaspis hyalinus,* V. Belizin, Kovalev det 1996" (white label). (Deposited in ZIN).

OTHER MATERIAL EXAMINED. — Cyprus: Pera Pedri Krios R, 10.IX.1937, G. A. Mavromoustakis, B. M. 1987-808, 1♂ (NHM).

BIOLOGY. — Unknown.

DISTRIBUTION. — Palaearctic. Known from Russia, Kazakhstan, Tajikistan (Belizin 1951), Armenia (Belizin 1961), first record from Cyprus.

DIAGNOSIS. — Species close to *X. laevigata*, but it can be distinguished by the presence of incomplete notauli, scutellar spine slightly projected upwards in lateral view and antennae longer than the body (notauli weakly impressed in *X. laevigata* but complete, scutellar spine straight in lateral view and antennae shorter than the body).

REDESCRIPTION (MALE ONLY)

Length

Body 2.8 mm. Wings 2.6 mm. Antennae 3.2 mm.

Coloration

Head, mesosoma and metasoma black. Mandibles yellowish-brown with darker teeth. Antennae yellowish-brown. Legs yellowish-brown with darker coxae. Wing venation yellow.

Head

Width of head 1.2 × its height in front view and 1.8 its length in dorsal view. Face smooth, shiny and pubescent, with abundant piliferous punctures. Malar sulcus present, coriaceous, 0.5 × height of compound eye. Transfacial line subequal to height of compound eye. Diameter of toruli equal to inter-toruli distance and larger than torulus to compound eye distance. Clypeus not apparent; smooth, glabrous and convex. Occipital and postocular carinae absents. Compound eyes completely glabrous. POL:OOL:LOL ratio = 6:4:2.5, ocelli diameter 2. Frons smooth, shiny and shortly pubescent with some punctae.

Antennae

Flagellomeres cylindrical and hairy. Antennal formula: 25(11), 9.5(9.5), 25(8), 25.5(8.5), 26(8.5), 24.5(8.5), 26(8), 26(8), 25(8), 25(7.5), 25(7), 23(7), 23(7), 28(6). Placodeal sensilla start at F1.

Mesosoma

Pronotum carinated in its lower part and smooth on its upper side (Fig. 2C). Mesoscutum 1.2 × wider than long in dorsal view. Mesoscutum smooth, pubescent and punctate, with alutaceous sculpture at base of notauli. Notauli weakly impressed and lacking internal carinae, being replaced by weak carinated sculpture at anterior third of the mesoscutum (Fig. 1B); median mesoscutal furrow weakly impressed. Parapsidal signum and parascutal sulcus absent. Scutellum 0.8 as long as mesoscutum in dorsal view. Scutellar foveae smooth, basally defined by a carina and including an oblique internal carina. Interfoveal line complete. Lateral pits of scutellar foveae distinct. Scutellar spine narrowing apically; slightly projected upwards in lateral view. Mesopleuron smooth, shiny and glabrous, basally carinated. Mesopleural triangle smooth and pubescent. Propodeum heavily areolate and pubescent; central area divided by a longitudinal median carina and a several transverse carinae defining eight cells.

Wings

Pubescent. Radial cell of the forewing closed, 2.4 × longer than wide. Marginal pubescence of forewing denser in its apical third.

Metasoma

Petiole as long as wide, dorsally smooth and laterally and ventrally carinated. T3 3.6 × longer than T4 in dorsal view. T5 and T6 are visible in dorsal view. Metasoma smooth and glabrous.

Xyalaspis laevigata Hartig, 1843
(Figs 1C; 2B; 3C, D)

Xyalaspis laevigatus Hartig, 1843: 417 (male).

Aegilips spinigera Reinhard, 1860: 221 (male).

Xyalaspis laevigata – Förster 1869: 361.

Xyalaspis spinigera – Kieffer 1901: 161.

TYPE MATERIAL. — **Holotype.**♂ with the following labels: "*Xyalaspis laevigatus*" (white label, handwritten); "Weld, 1931" (red label, handwritten); "Holotype ♀ *Xyalaspis laevigatus* Hartig, 1843" (red label); "*Xyalaspis laevigata* Htg. C. Restrepo-Ortiz det. 2012" (white label). Deposited in ZSM.
Lectotype.♂ with the following labels: "Type" (red label); "Coll. H.Rhd." (white label); "Zool. Mus. Berlin" (white label) "Lectotypus *Aegilips spinigera*♂ Reinhard, 1860, desig. N. Mata-Casanova, 2012" (red label); "*Xyalaspis spinigera* (Reinhard)♂ Kieffer, 1901, det. N. Mata-Casanova, 2012" (white label). Deposited in Museum für Naturkunde.

OTHER MATERIAL EXAMINED. — **Spain.** 6 km Nerja (Costa del Sol), Málaga, 200 m, 6.VI.1988, coll. L. Masner, 1♂ (CNC). Montán, Castellón, 10.VIII.1988, coll. J. Selfa, 2♂ (UB). Lafortunada, Huesca, 4.VII.1995, coll. J. Pujade-Villar, 1♂ (UB).
Andorra. Santa Coloma, Malaise trap, IX.1992, coll. J. Pujade-Villar, 1♀ (UB).
France. Mt. Ventoux, Vaucluse, 1700 m, 27.VIII.1988, coll. Bouček, 1♀ (BMNH). Vallon de Sestrière, Saint-Dalmas-le-Selvage, Alpes-Maritimes, Malaise trap, 1421 m, 22.IX-7.X.2009 (M09-SES1400-T7-M2), 1♀ (MNHN); same locality, Malaise trap, 1437 m, 19.VIII-22.IX.2009 (M09-SES1400-T6-M1), 1♀ (MNHN); same locality, same trap, 22.IX-7.X.2009 (M09-SES1400-T6-M1), 1♂ (MNHN); same locality, Malaise trap, 1966 m, 23.VII-07.VIII.2009 (M09-SES2000-T4-M1), 1♀ (MNHN). Col de Salèse, Valdeblore, Alpes-Maritimes, Malaise trap, 2032 m, 24.VII-13.VIII.2009 (M09-BOR2000-M2-T4), 2♂ (MNHN); same locality, same trap, 27.VIII-18.IX.2009 (M09-BOR2000-M2-T6), 2♂ (MNHN).
Germany. Scheffau, Bayern, 800 m, 24.VII.1958, coll. D. Townes, 1♂ (CNC). Schliersee, Bayern, 1100 m, 28.VII.1958, coll. D. Townes, 1♂ (CNC).
Norway. Buolamalia, Detsika, Alta, 24.VI-16.VII.1996, coll. Lars Ove Hansen, 1♂ (CNC).
Romania. Kiruly Valley, Hargita, Co., 15.VIII.2000, coll. Zoltán Ács, 1♂ (CNC).
Iran. Gajert, Tehran, 23.VI.1978, coll. J. T. Huber, 1♂ (CNC).

BIOLOGY. — Unknown.

DISTRIBUTION. — Palaearctic. Known from Austria (Hartig 1843); first records for Spain, Andorra, France, Romania, Norway and Iran.

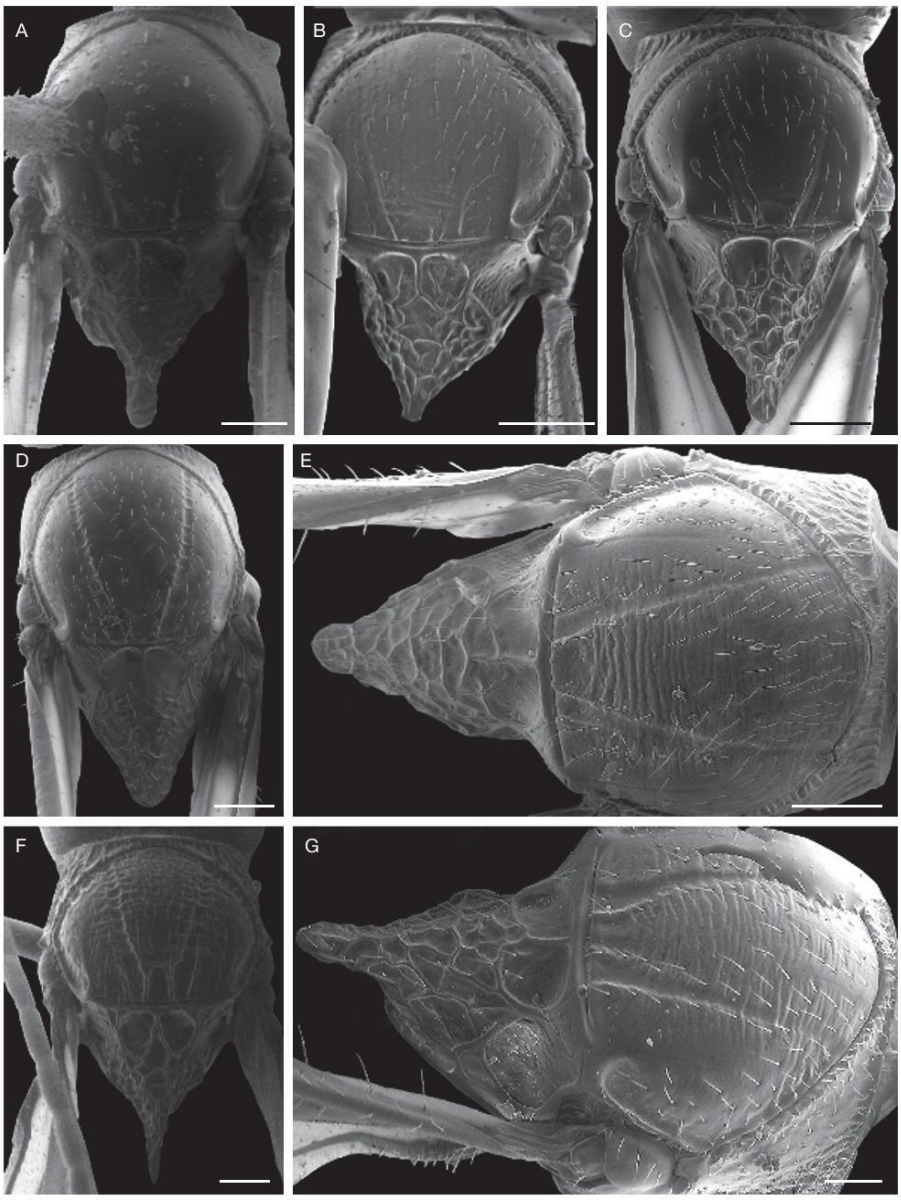


FIG. 1. — Mesoscutum in dorsal view of: **A**, *Xyalaspis armata* (Giraud, 1860); **B**, *Xyalaspis hyalina* Belizin, 1951; **C**, *Xyalaspis laevigata* Hartig, 1843; **D**, *Xyalaspis petiolata* Kieffer, 1901; **E**, **G**, *Xyalaspis pseudolaevigata* Mata-Casanova & Pujade-Villar, n. sp.; **F**, *Xyalaspis rugosa* Hartig, 1843. Scale bars: A-D, F, 200 µm; E, G, 100 µm.

DIAGNOSIS. — Species having a weak carinated sculpture at the base of notauli like *Xyalaspis hyalina*; it can be distinguished by the presence of complete notauli and having antennae shorter than the body (complete notauli and antennae longer than the body in *X. hyalina*).

REDESCRIPTION

Length

Body: 2.9 mm. Wings: 2.7 mm. Antennae: 2.8 mm (♂), 2.6 mm (♀).

Coloration

Head, mesosoma and metasoma black. Mandibles yellowish-brown with darker teeth. Antennae yellowish-brown. Legs yellowish-brown with darker coxae. Wing venation yellow.

Head

Width of head 1.3 × height in front view and 2 its length in dorsal view. Face smooth, shiny and pubescent, with abundant piliferous punctures. Malar sulcus present, coriaceous, 0.6 × height of compound eye. Transfacial line 1.2 × height of the compound eye. Diameter of toruli larger than inter-toruli distance and torulus to compound eye distance. Clypeus not apparent; smooth, glabrous and convex. Occipital and postocular carinae absents. Compound eyes almost glabrous except for several short setae concentrated in central eye. In females, POL:OOL:LOL ratio = 7:6:2.5, ocelli diameter 2; in males, POL:OOL:LOL ratio = 7:4:3, ocelli diameter 3.5. Frons smooth, shiny and shortly pubescent with some punctures.

Antennae

Flagellomeres cylindrical and hairy. Male antennal formula (type material only has from scape to F4, but other specimens with complete antennae have been used to complete the antennal formula): 10(3.5), 4(3.5), 10(3), 10(3), 10(3), 9(3), 9(3), 9(3), 8(3), 8(3), 7(3), 7(3), 6(3), 9(3). Female antennal formula: 11(3.5), 4(3), 10(2.5), 11(3), 9.5(3), 9.5(3), 8(3), 7.5(3), 7(3), 5(3), 5(3), 5(3), 9(3). Placodeal sensilla start at F2 in females and at F1 in males.

Mesosoma

Pronotum carinated in its lower part and on its margins but alutaceous in its upper part (Fig. 2B). Mesoscutum 1.2 wider than long in dorsal view. Mesoscutum smooth, pubescent and punctate, with alutaceous sculpture at base of notauli (Figs 1C; 3C), mesoscutum almost entirely carinated in some specimens (Fig. 3D). Notauli complete but weakly impressed, fading at anterior mesoscutum, not internally carinated; median mesoscutal furrow weakly impressed. Parapsidal signum and parascutal sulcus absent. Scutellum length subequal to mesoscutum length (22:23) in dorsal view. Scutellar foveae smooth, basally defined by a carina, an oblique internal carina present in some specimens. Interfoveal line complete. Lateral pits of scutellar foveae weakly impressed. Scutellum narrowing at base of scutellar spine; scutellar spine with parallel sides, projected from scutellum and straight in lateral view; between one-quarter to one-third of entire scutellum length. Mesopleuron smooth, shiny and glabrous, with basal transverse carinae. Mesopleural triangle smooth and pubescent. Propodeum heavily areolate and pubescent; central area divided by a longitudinal median carina and a transverse carina which define two small, lower cells and two larger upper cells crossed by weaker transverse ridges.

Wings

Radial cell of forewing closed, 2.7 longer than wide. Marginal pubescence of forewing denser in its apical third.

Metasoma

Petiole longer than wide, ventrally and laterally carinated and dorsally smooth. T3 2.5 × longer than T4 in dorsal view. T5 and T6 visible in dorsal view. Anterior margin of T4-T7 punctate.

REMARKS

Although Hartig's (1843) original description mentions the holotype as being a female, it has 14 antennal segments and the metasomal shape of a male, so we concluded that Hartig was in error and the holotype of *X. laevigata* is a male.

Xyalaspis petiolata Kieffer, 1901
(Figs 1D; 2E; 3A, B; 4B)

Xyalaspis petiolata Kieffer, 1901: 161 (male).

TYPE MATERIAL. — **Lectotype.**♂ with the following labels: "*Aegilips subulifera* JH" (white label, handwritten), "*Subulifera* JH" (white label, handwritten), "*Xyalaspis petiolata* Kieffer, det. R. B. Benson 1940" (white label), "Lectotype *Xyalaspis petiolata* det N. D. M. Fergusson, 1981" (white label), "*Xyalaspis petiolata* Kieffer, 1901, ♂, det. J. P-V 2012" (white label). (Deposited in NHM).

OTHER MATERIAL EXAMINED. — **UK**. Glenasmole,, IX.1937, coll. A. W. Stelfox, 1♂ (NHM). Glenn Cova, 11-30.VI.1939, coll. I. E. & R. B. Benson, 1♂ (NHM). Waverley, 7.X.1952, H. W. Daltry, M. W. R de V, Graham, coll. 1♀ (NHM). New Forest, 5.IX.1958, H. W. Daltry, M. W. R de V, Graham coll. 1♂ (NHM). New Forest, 18.IX.1958, H. W. Daltry, M. W. R de V, Graham coll. 1♂ (NHM). SW Lough Rea, 30.V.1960, H. W. Daltry, M. W. R de V, Graham coll. 1♂ (NHM). Beinn Eighe Forest, 30.V.1961, coll. R. B. Benson, 1♂ (NHM). Kinlochewe, 1-8. VI.1961, coll. R. B. Benson, 1♂ (NHM). Shieldaig, 7.VI.1961, coll. R. B. Benson, 1♀ (NHM). Esher Common, Surrey, 30.V.70, coll. Bouček, 1♂ (NHM). Craswall, Hereford, 23-24.VI.73, 1♀ (NHM). Abbots Moss, 6.II.1974, M. R. Shaw, 1♂ (NHM). Abbots Moss, 3.X.1974, coll. M. R. Shaw, 1♂ (NHM). Burnham Beeches, Buckinhamshire, 3.VIII.75, Bouček, 1♀ (NHM). Northants, Spratton, In Malaise trap, VIII.1975, coll. I. & P. Gauld, 2♂ (NHM) Fife Tentsmuir Nat, 16.VII.1977, coll. Noyes, Rogers & Huddleston, 1♂ (NHM). Angus Airlie Castle, 19.VII.1977, coll. Noyes, Rogers & Huddleston, 2♂ (NHM). Barton Mills, Suffolk, 7.IX.1977, coll. J. S. Noyes, 1♀ (NHM).
Ireland. Manor Kilbride, 19.VII.1950, coll. A. W. Stelfox, 1♂ (NHM).
France. Col de Salèse, Valdeblore, Alpes-Maritimes, 2058 m, Malaise trap, 18.IX-05.X.2009 (M09-BOR2000-M1-T7), 1♀ (MNHN).
Sweden. Höör distr., 16.VI.1938, coll. D. M. S. P. & J. F. P., B. M., 1♂ (NHM). Röstanga, 4.VII.1938, coll. D. M. S. P. & J. F. P., B. M., 1♂ (NHM). Fjellfota sjö, 7.VIII.1938, coll. D. M. S. P. & J. F. P., 2♂ (NHM).

BIOLOGY. — Known to attack *Hemerobius* sp. and *Wesmaleius subnebulosus* (Neuroptera: Hemerobiidae) (Ferguson 1986).

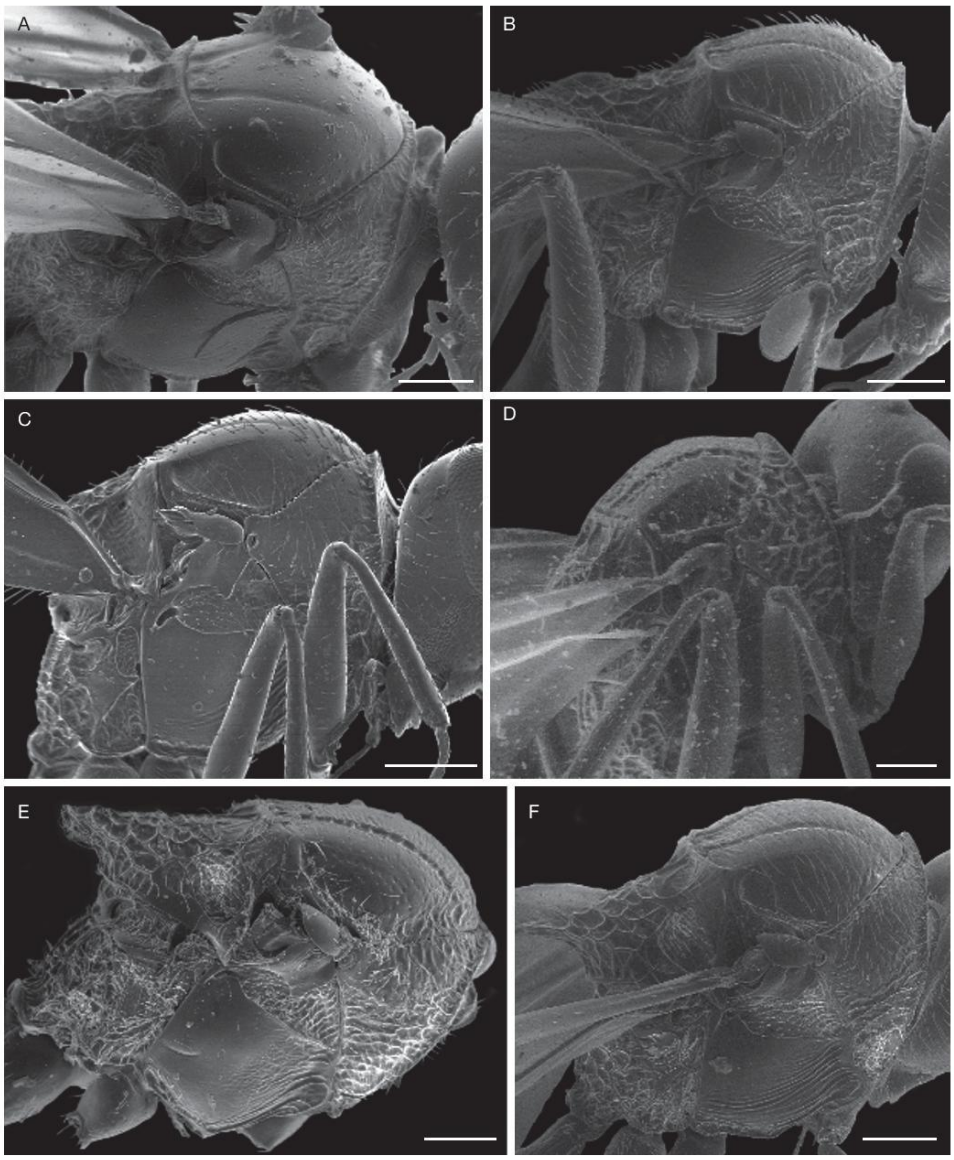


FIG. 2. — Mesosoma in lateral view of: **A**, *Xyalaspis armata* (Giraud, 1860); **B**, *Xyalaspis laevigata* Hartig, 1843; **C**, *Xyalaspis hyalina* Belizin, 1951; **D**, *Xyalaspis rugosa* Hartig, 1843; **E**, *Xyalaspis petiolata* Kieffer, 1901; **F**, *Xyalaspis pseudolaevigata* n. sp. Scale bars: 200 µm.

DISTRIBUTION. — Palaearctic. Known from Britain (Cameron 1883; Kieffer 1901) and Ireland (Ferguson 1986); first records from France and Sweden.

DIAGNOSIS. — Species belonging to the group of *Xyalaspis* having a weak carinated sculpture on the mesoscutum like *X. arapahoe* Mata-Casanova & Pujade-Villar, 2014, *X. flavipes* Ashmead, 1896 and *X rugosus*, but clearly different from these species and all other *Xyalaspis* species in having scutellar spine rounded in dorsal view and an elongated mesoscutum (scutellar spine highly variable in length but always spike-ended and mesoscutum wider than long other *Xyalaspis* species).

REDESCRIPTION

Length

Body 3.3 mm. Wings 2.9 mm. Antennae 2.9 mm (♂), 2.6 mm (♀).

Coloration

Head, mesosoma and metasoma black. Mandibles yellowish-brown with darker teeth. Antennae dark yellowish-brown. Legs yellowish-brown with darker coxae. Wing venation dark brown.

Head

Width of head 1.2 × its height in front view and 2 its length in dorsal view. Face smooth, shiny and pubescent, with abundant piliferous punctae. Malar sulcus present, coriaceous, 0.7 × height of compound eye. Transfacial line 1.2 × height of compound eye. Diameter of toruli larger than inter-toruli distance and torulus to compound eye distance. Clypeus short; smooth, glabrous and convex. Occipital and postocular carinae absent. Compound eyes almost glabrous except for a few short setae. In females, POL:OOL:LOL ratio = 7:5:3, ocelli diameter 3; in males, POL:OOL:LOL ratio = 7.5:5:3, ocelli diameter 3.5. Frons smooth, shiny and shortly pubescent with some punctae.

Antennae

Flagellomeres cylindrical and hairy. Male antennal formula (type material only has F1 to F10, but other specimens with complete antennae have been used to complete the antennal formula): 9(3.5), 4(3.5), 10(3.5), 11(3.5), 11(3.5), 10(3.5), 10(3), 10(3), 9(3), 8(3), 8(3), 7.5(2.5), 7(2.5), 9(2.5). Female antennal formula: 11(4.5), 4(3.5), 12(2.5), 10.5(3), 9.5(3), 8.5(3), 8(3), 7(3), 7(3.5), 6.5(3.5), 6(3.5), 5.5(3.5), 9.5(3.5). Placodeal sensilla in start at F3 females and at F1 in males; they are abundant in males but scarce in females.

Mesosoma

Pronotum alutaceous and laterally carinated (Fig. 2E). Mesoscutum 0.9 wider than long in dorsal view (Figs 1D; 3A, B). Mesoscutum sculpture highly variable between notauli: from smooth with slightly coriaceous and carinated sculpture at base of notauli (Fig. 3A) to completely alutaceous and carinated except for central mesoscutum (Fig. 3B). Notauli complete with transverse carinated sculpture; median mesoscutal furrow apparent. Region between external edge of notauli and margins of mesoscutum smooth and punctate. Parapsidal signum and parascutal sulcus present but weak. Scutellum 0.8 × mesoscutum length in dorsal view. Scutellum coriaceous and heavily areolate. Scutellar foveae alutaceous, weakly defined by a basal carina. Interfoveal line complete. Lateral pits of scutellar foveae absent. Scutellar spine one-quarter of entire length of scutellum; rounded in dorsal view (Figs 1D; 3A, B) and straight in lateral view. Mesopleuron smooth, glabrous and shiny, lower transverse carinae becoming alutaceous as they reach the posterior mesopleuron; mesopleural triangle smooth with vertical carinae. Propodeum coriaceous, heavily areolate and pubescent; central area divided by a central longitudinal carina and several transverse carinae which define eight coriaceous cells.

Wings

Radial cell of forewing closed, 2.2 longer than wide. Marginal pubescence of forewing denser in apical third.

Metasoma

Petiole longer than wide, carinated on all sides (Fig. 4B). Third abdominal tergum 2.2 × longer than the fourth abdominal tergum in dorsal view. T5 and T6 in dorsal view. Metasoma smooth and glabrous; anterior margin of T4-T7 punctuate.

REMARKS

Cameron (1883) misidentified the collected British material and placed it under the designation *Aegilips subulifera*. Kieffer found that those specimens belong to a different species and described them as *Xyalaspis petiolata* (Ferguson 1986). Regarding their morphological variability, most of the studied specimens present an alutaceous strip in the back of the internal edge of the compound eye, but this strip is variable in extension and can be absent in some specimens, hence it has been discarded for the recognition of the species.

Xyalaspis pseudolaevigata

Mata-Casanova & Pujade-Villar, n. sp.

(Figs 1E, G; 2F)

TYPE MATERIAL. — **Holotype.**♂ with the following labels: "Le Boréon (France, Valdeblore), 1549 m, Malaise trap, 24.VII-13.VIII.2009: 1♂" (white label), "*Xyalaspis pseudolaevigata* Mata-Casanova & Pujade-Villar n. sp., design Mata-Casanova-2013" (red label). Deposited in MNHN. Sample code (M09-BOR1400-M2-T4). **Paratypes.** (14♂): Htes. Alp. Brunissard, 19.7.90, coll. Bouček, 1♂ (BMNH). Vallon de Sestrière, Saint-Dalmas-le-Selvage, 1966 m, Malaise trap, 23.VII-07.VIII.2009 (M09-SES2000-M1-T4), 3♂ (MNHN); same locality, same trap, 07-19.VIII.2009 (M09-SES2000-M1-T4), 2♂ (MNHN). Col de Salèse, Valdeblore, Malaise trap, 2032 m, 24.VII-13.VIII.2009 (M09-BOR2000-M2-T4), 1♂ (MNHN); same locality, same trap, 13-27.VIII.2009 (M09-BOR2000-M2-T5), 4♂ (MNHN); same locality, Malaise trap, 2058 m, 13-27.VIII.2009 (M09-BOR2000-M1-T5), 2♂ (MNHN). Le Boréon, Valdeblore, 1540 m, Malaise trap, 13-27.VIII.2009 (M09-BOR1400-M1-T5), 1♂ (MNHN).

ETYMOLOGY. — The specific epithet makes reference to the close resemblance to *X. laevigata*.

BIOLOGY. — Unknown.

DISTRIBUTION. — Palaearctic. Only recorded from France.

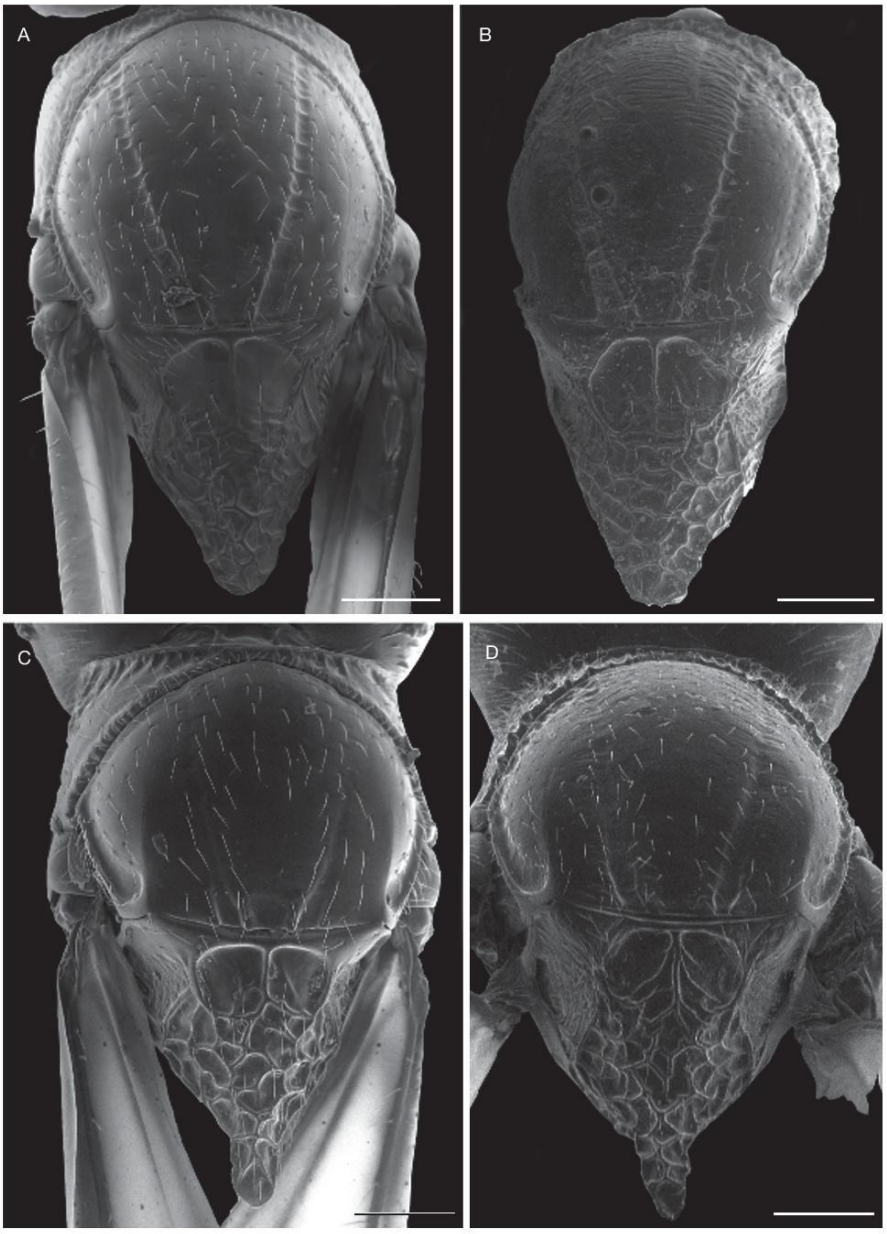


FIG. 3. — Mesoscutum sculpture variability in: **A**, **B**, *Xyalaspis petiolata* Kieffer, 1901; **C**, **D** *Xyalaspis laevigata* Hartig, 1843. Scale bars: 200 µm.

DIAGNOSIS. — Species morphologically close to *X. laevigata*, but differs in having mesoscutum heavily carinated along its entire length and internally carinated notauli (only slightly carinated, notauli nearly disappearing in the anterior region of the mesoscutum and not internally carinated in *X. laevigata*),and darker coloration with brownish to black legs and antennae and smoked wing (legs and antennae yellowish and wings hyaline in *X. laevigata*).

DESCRIPTION

Length

Body 2.5 mm. Wings 2.6 mm. Antenna 2.8 mm (♂).

Coloration

Head, mesosoma and metasoma black. Mandibles yellowish-brown with darker teeth. Antennae dark brown to black. Legs black, except yellowish at joint between femur and tibia. Wing venation dark brown, wing membrane smoked.

Head

Width of head 1.3 × its height in front view and 2.1 its length in dorsal view. Face smooth, shiny and pubescent, with abundant piliferous punctae. Malar sulcus present, coriaceous, 0.6 × height of compound eye. Transfacial line 1.1 × height of compound eye. Diameter of toruli equal to inter-toruli distance and larger than torulus to compound eye distance. Clypeus short; smooth, glabrous and convex. Occipital and postocular carinae absent. Compound eyes almost glabrous except for a few short setae. In females, POL:OOL:LOL ratio = 5.5:4:2, ocelli diameter 2. Frons smooth, shiny and shortly pubescent with some punctae.

Antennae

Flagellomeres cylindrical and hairy. Male antennal formula: 8.5(4), 3.5(3.5), 9(3), 10(3), 9(3), 9(3), 8(3), 9(3), 8.5(3), 8(3), 7.5(3), 7.5(2.5), 7(2.5), 9.5(2.5). Placodeal sensilla start at F1 in males and abundant in all flagellomeres.

Mesosoma

Pronotal plate alutaceous. Pronotum alutaceous and carinated in lateral view, with weaker sculpture in its upper part (Fig. 2F). Mesoscutum 1.3 wider than long in dorsal view. Mesoscutum alutaceous, transversely carinated along its entire length (Fig. 1E, G); notauli complete and internally carinated, median mesoscutal furrow short.. Parapsidal signum present but not clearly distinguishable; parascutal sulcus weakly impressed. Scutellum coriaceous and heavily carinated. Scutellum length equal to mesoscutum length in dorsal view. Scutellar foveae large and smooth, basally defined by a carina. Interfoveal line complete. Lateral pits of scutellar foveae large but weakly impressed, not distinct. Scutellum narrowing towards base of scutellar spine; scutellar spine parallel sided, projecting downwards in males in lateral view, length of spine about one-third of the scutellum entire length. Mesopleuron carinated, glabrous and shiny, smooth only in its upper third. Mesopleural triangle coriaceous and glabrous, with oblique carinae. Propodeum coriaceous, divided into quadrangular cells delimited by carinae in its central region; cells becoming smaller in the lower propodeum.

Wings

Pubescent. Radial cell of forewing closed, 2.6 longer than wide. Marginal pubescence of forewing denser in apical third.

Metasoma

Petiole coriaceous and longer than wide. Third abdominal tergum 2.8 × longer than fourth abdominal tergum in dorsal view. T5-T7 abdominal terga are visible in dorsal view. Metasoma glabrous; anterior margin of T4-T7 punctate.

Xyalaspis rugosa Hartig, 1843
(Figs 1F; 2D)

Xyalaspis rugosus Hartig, 1843: 417 (female).

Aegilips subulifera Thomson, 1862: 412 (male) n. syn.

Xyalaspis subulifera – Kieffer 1901: 161.

TYPE MATERIAL. — **Holotype.**♀ with the following labels: "*Xyalaspis rugosus*" (white label, handwritten); "Holotype, *Xyalaspis rugosus* ♀, Hartig, 1843, det. J. P-V 2009" (red label). (Deposited in ZSM).
Lectotype.♂ with the following labels: "*Subulifera*" (white label, handwritten); "Typ" (red label); "Lectotypus *Aegilips subulifera*♂ Thomson, 1862, desig. N. Mata-Casanova, 2012" (red label); "*Xyalaspis subulifera* (Thomson)♂ Kieffer, 1901, det. N. Mata-Casanova, 2012" (white label). (Deposited in Lund University).

OTHER MATERIAL EXAMINED. — **France.** Vallon de Saint-Dalmas, Saint-Dalmas-le-Selvage, Alpes-Maritimes, Malaise trap, 1421 m, 10-23.VII.2009 (M09-SES1400-M2-T3), 1♂ (MNHN).
Switzerland. Santa Maria, Müstairtal, 1400 m, 27.VI.1960, coll. J. E. & R. B. Benson, 1♂ (NHM).

BIOLOGY. — Unknown.

DISTRIBUTION. — Palaearctic. Known from Sweden (Thomson 1862); Austria (Kieffer 1898); Norway (Hedicke 1930), Netherlands (Evenhuis 1965); first records for France and Switzerland.

DIAGNOSIS. — Species belonging to the group of *Xyalaspis* having a transversely carinated mesoscutum (*X. aberrans* Mata-Casanova & Pujade-Villar, 2014, *X. alveolata* Mata-Casanova & Pujade-Villar, 2014, *X. arapahoe, X. flavipes, X. hirsuta* Mata-Casanova & Pujade-Villar, 2014, and *X. victoriensis* New, 1979 (X. victoriensis); it can be distinguished from all these species except *X. arapahoe* by the presence of a long scutellar spine. It differs from *X. arapahoe* in presentin a median mesoscutal furrow, lateral pits and basal carina of scutellar foveae (all absent in *X. arapahoe*).

REDESCRIPTION

Length

Body 2.7 mm. Wings 2.8 mm. Antennae 1.95 mm (♀, F6 to F11 absent), 2.8 mm (♂).

Coloration

Head, mesosoma and metasoma black. Mandibles yellowish brown with darker teeth. Antennae yellowish-brown. Legs yellowish-brown with darker coxae. Wing venation yellow.

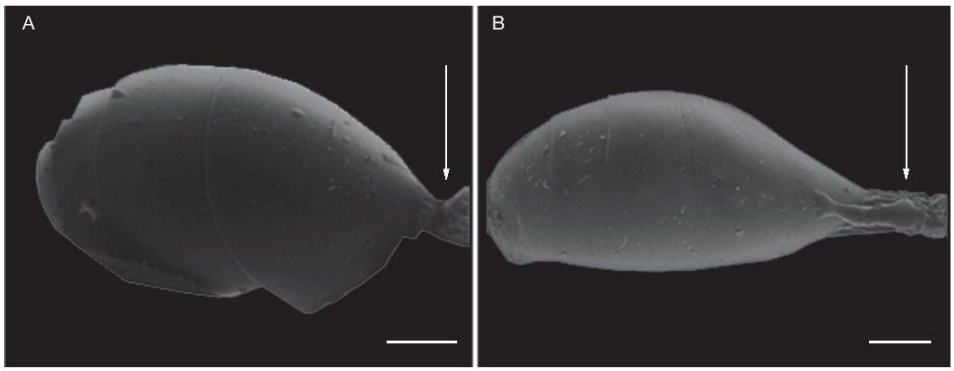


FIG. 4. — Metasoma of: **A**, *Xyalaspis armata* (Giraud, 1860); **B**, *Xyalaspis petiol*ata Kieffer, 1901; arrows marking the petiole. Scale bars: 200 µm.

Head
Width of head 1.3 × its height in front view and 2.5 × its length in dorsal view. Face smooth, shiny and pubescent, with abundant piliferous punctures. Malar sulcus present, coriaceous, 0.8 × height of compound eye. Transfacial line 1.2 × height of compound eye. Diameter of toruli larger than inter-toruli distance and torulus to compound eye distance. Clypeus short; smooth, glabrous and convex. Occipital and postocular carinae absent. Compound eyes almost glabrous except for few short setae. In females, POL:OOL:LOL ratio = 7:5:3, ocelli diameter 2; in males, POL:OOL:LOL ratio = 7.5:6.5:3, ocelli diameter 3. Frons smooth, shiny and shortly pubescent with some punctae.

Antennae
Flagellomeres cylindrical and hairy. Female antennal formula (flagellomeres absent from F6 onwards): 11.5(4.5), 4.5(3.5), 11(2.5), 13(3), 11(3), 12(3), 10(3), 9(3). Male antennal formula: 9(3.5), 4(3.5), 10(3.5), 11(3.5), 11(3.5), 10(3.5), 10(3), 10(3), 9(3), 8(3), 8(3), 7.5(2.5), 7(2.5), 9(2.5). Placodeal sensilla start at F3 in females and at F1 in males.

Mesosoma
Pronotum alutaceous, heavily sculptured with irregular ridges (Fig. 2D). Mesoscutum 1.3 wider than long in dorsal view. Mesoscutum transversely carinated over its entire length, carinae weaker in the central region (Fig. 1F). Notauli complete with transverse carinated sculpture; median mesoscutal furrow short and weakly impressed. Lateral region of mesoscutum smooth and punctate, parapsidal signum and parascutal sulcus present and distinct. Scutellum as long as mesoscutum in dorsal view. Scutellum coriaceous and heavily areolate. Scutellar foveae large and smooth, basally defined by a carina. Interfoveal line complete. Lateral pits of the scutellar foveae large and distinct. Scutellum narrowing towards base of scutellar spine; scutellar spine parallel sided and clearly projecting from scutellum (Fig. 1F), nearly half as long as scutellum; straight in lateral view. Mesopleuron smooth, glabrous and shiny in its upper half and heavily carinated in its lower half; mesopleural triangle large, alutaceous and glabrous. Propodeum alutaceous, central area delimited by two slightly curved carinae and divided by an irregular longitudinal carinae and several transverse carinae.

Wings
Radial cell of forewing closed, 2.4 longer than wide. Marginal pubescence of forewing denser inapical third.

Metasoma
Petiole longer than wide, carinated and alutaceous on all sides. Third abdominal tergum 3.7 × longer than fourth abdominal tergum in dorsal view. T5 and T6 abdominal terga visible in dorsal view. Metasoma smooth and glabrous; anterior margin of T4-T7 punctate.

REMARKS
After examining the type material of both species and undetermined material, we conclude that *X. subulifera* is a junior synonymy of *X. rugosa*. Both present same carinated sculpture of the mesoscutum and a long, clearly projected scutellar spine.

DISCUSSION

Hedicke (1914) described *Omalaspis laevis* from Féchain, France. This species was transferred to the genus *Xyalaspis* by Ros-Farré & Pujade-Villar (2011). After examining the type material (1♂ deposited in MNHN) we concluded that this species belongs to *Aegilips*. It therefore becomes *Aegilips laevis* (Hedicke, 1914) n. comb., leaving six species of *Xyalaspis* in the Western Palaearctic: *X. armata, X. hyalina, X. laevigata, X. petiolata, X. pseudolaevigata* Mata-Casanova & Pujade-Villar, n. sp. and *X. rugosa*.

KEY TO THE WESTERN PALAEARCTIC SPECIES OF *XYALASPIS* HARTIG, 1843

1. Mesoscutum longer than wide, scutellar spine rounded in dorsal view, never projected (Figs 1D; 3A, B)..... ..... *X. petiolata* Kieffer, 1901
— Mesoscutum wider than long, scutellar spine never rounded in dorsal view..... 2

2. Mesoscutum smooth or only weakly carinated (Fig. 1A-C) 3
— Mesoscutum transversely carinated over its entire length (Fig. 1E-G) 5

3. Mesoscutum completely smooth (Fig. 1A), petiole wider than long (Fig. 4A).....*X. armata* (Giraud, 1860)
— Mesoscutum always presenting weak transverse carinae at base of notauli (Fig. 1B, C), petiole as long as wide or longer than wide 4

4. Notauli disappeared in anterior part of mesoscutum, transverse carinae reduced to base and edges of the notauli (Fig. 1B), antennae longer than body ..... *X. hyalina* Belizin, 1951
— Notauli fading in anterior part of mesoscutum but not entirely disappearing (Figs 1C; 3C, D), transverse carinae highly variable in extension from the base of notauli (Figs 1C; 3C) to the entire surface of mesoscutum (Fig. 3D), antennae shorter than body .....*X. laevigata* Hartig, 1843

5. Scutellar spine clearly distinguishable from mesoscutellum (Fig. 1F), legs and antennae yellowish, wings hyaline ..... *X. rugosa* Hartig, 1843
— Scutellar spine not clearly distinguishable from mesoscutellum (Fig. 1E, G), legs and antennae black, wings smoked .....*X. pseudolaevigata* Mata-Casanova & Pujade-Villar, n. sp.

The mesoscutum sculpture of the *Xyalaspis* species included in this study is not as highly variable as in the Neotropical species, although they still present variability and this feature has a key role in differentiating the species. The mesoscutum of *X. armata* is smooth, with no internal sculpture in the notauli (Fig. 1A). *X. hyalina* and *X. laevigata* have an overall smooth mesoscutum, although it is slightly carinated at the base of the notauli in *X. hyalina* (Fig. 1B) and has a more extended carinated sculpture in *X. laevigata* (Figs 1C; 3C, D). Both species present weakly impressed notauli that vanish in the anterior third in *X. hyalina*. *X. petiolata* presents high variability in the mesoscutal sculpture, from some weak carinae reduced at the base of the notauli (Fig. 3A) to a completely carinate mesoscutum (Fig. 3B), although the carinated sculpture of the central region is weaker. Finally, *X. rugosa* (Fig. 1F) and *X. pseudolaevigata* Mata-Casanova & Pujade-Villar, n. sp. (Fig. 1E, G) present transversely carinated sculpturing on the entire mesoscutum surface.

The scutellar spine is also highly variable between species. In *X. petiolata* it is rounded and not spiked while in the rest of the studied species it projects and forms a spike (Figs 1D; 3A, B). In *X. hyalina* the scutellar spine is not clearly distinguished from the mesoscutellum (Fig. 1B); in *X. armata* (Fig. 1A), *X. laevigata* (Fig. 1C) and *X. pseudolaevigata* Mata-Casanova & Pujade-Villar, n. sp. (Fig. 1E, G) the mesoscutellum narrows toward the base of the scutellar spine; in *X. rugosa* the scutellar spine has parallel edges and is clearly distinguishable from the mesoscutellum (Fig. 1F). As mentioned earlier, the presence of a true scutellar spine allows to separation of *Xyalaspis* from *Aegilips*. However, it is interesting to note that some individuals of *X. laevigata* and *X. petiolata* present remains of the circumscutellar carina.

With regard to the distribution of the species examined in this study, the data obtained indicate that *Xyalaspis hyalina* has a range from Cyprus to Tadjikistan, being the easternmost of the *Xyalaspis* species present in the Western Palaearctic region. *X. laevigata,* previously cited only from Austria, is here recorded for the first time from Spain, Andorra, France, Germany, Norway, Romania and Iran, extending its distribution across the European continent and reaching the Middle East. The distribution of *X. petiolata*, previously known only from the British Isles, is expanded to include France and Sweden. The distribution of *X. rugosa,* previously known from Austria, is expanded to Britain, Norway, Sweden, the Netherlands and, after being synonymized with *X. subulifera,* it is cited for the first time from France and Switzerland, making it the most widespread species of *Xyalaspis* on the European continent. Although there are no new records for *X. armata,* this species is widely distributed across Europe, being cited in the British Isles, Sweden, Germany, Austria and Russia. *Xyalaspis pseudolaevigata* Mata-Casanova & Pujade-Villar, n. sp. is only known from France; all but one of the available records come from the Mercantour National Park. It is noteworthy that for all species collected in the Mercantour National Park most of the specimens collected were males; the sole specimen of *X. petiolata* obtained was also the only female represented in the collections studied here. The female of *X. pseudolaevigata* Mata-Casanova & Pujade-Villar, n. sp. remains unknown.

The biology of *Xyalaspis* is still poorly understood in regions where this genus occurs. Although it is known that *Xyalaspis petiolata* attacks the aphid-feeding larvae of *Wesmaelius subnebulosus* and *Hemerobius* sp. (Neuroptera: Hemerobiidae), the hosts of the other five species remain unknown. Palaearctic *Xyalaspis* species have a wide range of suitable hosts, with 170 species of Hemerobiidae reported, most of them from the Western Palaearctic (Makarkin, 1995). More research must be undertaken to fully understand thei biology of *Xyalaspis*.

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4.2.8. Knowledge on Australasian Anacharitinae

Austral Entomology

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Current knowledge of the subfamily Anacharitinae (Hymenoptera: Figitidae) in the Australasian region

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Abstract A revision of the Anacharitinae material from Australia and New Zealand deposited in the Natural History Museum of London and material from Papua New Guinea deposited in the Mus um National d'Histoire Naturelle of Paris was conducted. The ranges of the previously known described *Anacharis zealandica* Ashmead and *Xyalaspis victoriensis* New are expanded. A new Australasian species of *Anacharis* Dalman, *Anacharis tasmaniae* **sp. nov.**, is described, and the genus *Aegilips* Haliday is cited for the first time in the region, with the description of *Aegilips papuensis* **sp. nov.** The biology and distribution patterns of Australasian anacharitines are discussed.

Key words *Aegilips*, *Anacharis*, Australia, New Guinea, New Zealand, *Xyalaspis*.

INTRODUCTION

The subfamily Anacharitinae is a group of parasitic wasps included in the family Figitidae, which currently comprises 12 subfamilies (Ronquist 1999; Ronquist & Nieves-Aldrey 2001; Ros-Farr & Pujade-Villar 2007; Buffington & Liljeblad 2008; Paretas-Mart nez *et al*. 2011, 2013). The Anacharitinae can be easily distinguished from the rest of Figitidae by three synapomorphies (Ros-Farr *et al*. 2000): (1) a rounded and continuous pronotal plate; (2) broadly overlapping mandibles; and (3) a triangle-shaped head in front view (although in genera *Proanacharis* Kovalev, 1996 and *Acanthaegilopsis* Pujade-Villar, 2013 and some species of *Aegilips* Haliday, 1835 and *Xyalaspis* Hartig, 1843 it is more square-shaped). The biology of most of the Anacharitinae species remains unknown, although some have been recorded as parasitoids of the aphid-feeding larva of the neuropteran families Chrysopidae and Hemerobiidae (New 1979; Kierych 1984; Fergusson 1986; Ronquist 1999; Mata-Casanova *et al*. 2014a).

The subfamily Anacharitinae is currently composed of nine genera (Mata-Casanova & Pujade-Villar 2013): *Acanthaegilips* Ashmead, *Acanthaegilopsis*, *Aegilips*, *Anacharis* Dalman, *Calofigites* Kieffer, *Hexacharis* Kieffer, *Proanacharis*, *Solenofigites* D az and *Xyalaspis* Hartig. Anacharitinae are distributed worldwide, occurring in all continents except Antarctica. Their biggest diversity is concentrated in the Neotropical region, with three endemic genera (*Acanthaegilopsis*, *Calofigites* and *Solenofigites*) and four other genera present. The only Anacharitinae genera absent from the Neotropical region are *Proanacharis*, a monotypic Palaearctic genus (Kovalev, 1996), and *Acanthaegilopsis*, an Afrotropical genus including two species (Mata-Casanova & Pujade-Villar 2013; Mata-Casanova *et al*. 2014b).

The Anacharitinae are poorly known in the Australasian region. The first known Australasian cynipoid wasps included in the subfamily Anacharitinae were two morphologically related species described by Ashmead (1901): *Anacharis australiensis* Ashmead from Victoria and *Anacharis zealandica* Ashmead from New Zealand. These were the only Australasian Anacharitinae known until the description of *Xyalaspis victoriesis* New 1979 from Victoria (New 1979). Later, New (1982) revised the types of Ashmead and undetermined material and found that the differences between *A. australiensis* and *A. zelandica* were due to intraspecific variability, thus synonymising both species. The last revision of Australian cynipoids did not mention any other species of Anacharitinae (Paretas-Mart nez *et al*. 2013). Therefore, previously to our revision of Anacharitinae material from the Australasian region, only two species were cited there: *Anacharis zealandica* and *Xyalaspis victoriensis*. In the

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present work, the distribution areas of both species are extended and two new species are described: *Anacharis tasmaniae* **sp. nov.** from Tasmania and *Aegilips papuensis* **sp. nov.** from Papua New Guinea, the first citation of this last genus in the Australasian region.

MATERIALS AND METHODS

Specimens examined in this study are from the Natural History Museum (NHM) and the Mus um National d'Histoire Naturelle (MNHN). We have not examined the type material of *Anacharis zealandica* and *Xyalaspis victoriensis* because these species are easily recognised by the exhaustive descriptions given by New (1979, 1982).

A total of 301 specimens were examined for this study: 206 males and 95 females. Morphological terms used are those of Richards (1977), Ronquist (1995) and Ros-Farr *et al.* (2003). All measurements are relative except for body, antennal and wing length. Measurements and abbreviations include the following: F1–F12, first and subsequent flagellomeres; POL (post–ocellar distance) is the distance between the inner margins of the posterior ocelli; OOL (ocular–ocellar distance) is the shortest distance between the inner margin of the compound eye and the outer edge of the posterior ocellus; and LOL (lateral–frontal ocellar distance) is the distance between the edges of the lateral and frontal ocelli. Antennal formula includes the length of scape, pedicel and each flagellomere length with their relative width in brackets.

High-resolution images of specimens were made using a field-emission gun environmental scanning electron microscope (FEI Quanta 200 ESEM) in the 'Serveis Cient fico-T cnics' of the University of Barcelona. Imaging was conducted under a low voltage (12.0 kV) and without gold-coating of the specimens in order to preserve the material.

SYSTEMATICS

Key to Australasian species of Anacharitinae

1 Scutellum projected forming a true scutellar spine (Fig. 1a)……***Xyalaspis*** (Only one species with strongly areolate mesoscutum and longitudinally divided by a complete median mesoscutal furrow (Fig. 1a)….***Xyalaspis victoriensis***) Scutellum not projected, presence of a circumscutellar carina instead; mesoscutum smooth (Figs 1b,2a,c)…2

2 Mesopleuron smooth, except for some short anterior carinae (Fig. 1c); petiole shorter than third coxa (Fig. 1d)……***Aegilips*** (Only one species with internally carinated notauli (Fig. 1b) and not basally defined scutellar foveae (Fig. 1b)……***Aegilips papuensis***) Presence of a transverse groove internally carinated in the mesopleuron (Fig. 1e); petiole longer than third coxa (Figs 1f,2b)……3

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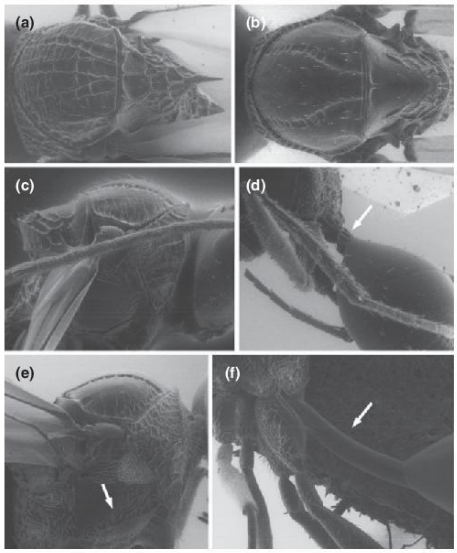


Fig. 1. (a) *Xyalaspis victoriensis* mesosoma in dorsal view; (b–d) *Aegilips papuensis* **sp. nov.**: (b) mesosoma in dorsal view, (c) mesosoma in lateral view and (d) petiole; (e–f) *Anacharis zealandica*: (e) mesosoma in lateral view and (f) petiole.

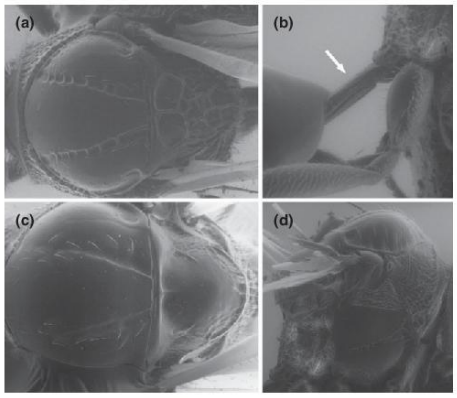


Fig. 2. (a) *Anacharis zealandica*: mesosoma in dorsal view; (b–d) *Anacharis tasmaniae* **sp. nov.**: (b) petiole, (c) mesosoma in dorsal view and (d) mesosoma in lateral view.

3 Weakly excavated notauli, not internally carinated (Fig. 2c); petiole coarsely sculptured (Fig. 2b); pronotum not areolate (Fig. 2d)…….. ……***Anacharis tasmaniae***

Notauli excavated an internally carinated (Fig. 2a); petiole smooth (Fig. 1f); pronotum heavily areolate (Fig. 1e)……***Anacharis zealandica***

Aegilips papuensis sp. nov. (Fig. 1b–d)

Zoobank registration: http://zoobank.org/urn:lsid:zoobank.org:act:76AAB4FF-B143-43DD-BDC8-8A712E79BBEE

Diagnosis. Species with smooth mesoscutum and strongly excavated and internally carinated complete notauli. These characters are also present in the Palaearctic species *A. romseyensis* Fergusson 1986, but *A. papuensis* can be distinguished by an alutaceous pronotum and scutellar foveae that are not basally defined (strongly coarse pronotum and scutellar foveae basally defined by a carina in *A. romseyensis*).

Type material of *Aegilips papuensis*. Holotype ♀[female symbol] deposited in MNHN with the following labels: 'Papua-New-Guinea, Province Madang, Mount Wilhelm 2700 m (−5.814738, 145.1588) 2700 m, 19–20/10/2012, Kua, Yalang, Novotny, Leponce, Plot 3, understorey; Malaise' (white label); 'Holotype of *Aegilips papuensis* sp. nov. ♀[female symbol] desig. Mata-Casanova, 2014' (red label); '*Aegilips papuensis* sp. nov. ♀[female symbol], det. Mata-Casanova, 2014' (red label).

Description

Length. Body: 2.2 mm. Antennae: 1.8 mm (♀[female symbol]). Wings: 2.5 mm.

Colouration. Head, mesosoma and metasoma black. Mandibles yellowish brown with darker teeth. Antennae dark brown. s yellowish brown with darker coxae, third coxa black. Veins of wings yellowish brown.

Head. Subtriangular-shaped in front view. Face smooth and punctate, short and scarce pubescence uniformly distributed across its surface. Width of head 2.5 times its length in dorsal view and 1.1 its height in frontal view. Malar sulcus coriaceous, 0.7 height times of compound eye. Transfacial line 1.3 times the height of the compound eye. Diameter of toruli equal to intertorular distance and bigger than toruli–eye distance. Clypeus smooth, glabrous and shortly convex. Occipital and postocular carinae absent. Compound eyes glabrous. In both sexes, POL : OOL : LOL = 7.5:5:3, ocelli diameter 2. Frons, gena and occiput smooth, shiny and glabrous except for a few sparse setae.

Antennae. Cylindrical flagellomeres covered with pubescence. Female antennal formula: 10(3), 3(3), 8(2), 7(2), 6(2.5), 5(2.5), 5(2.5), 5(2.5), 5(2.5), 5(2.5), 5(2.5), 5(2.5), 8(2.5). Placodeal sensilla starting at F4 in females but scarce, not abundant until F5.

Mesosoma. Pronotum slightly alutaceous, its surface crossed by some strong oblique carinae (Fig. 1c). Mesoscutum width 1.2 times its length in dorsal view. Mesoscutum shiny and smooth, surface punctate and almost glabrous except for some scarce short white setae (Fig. 1b). Notauli complete and deeply excavated, with strong internal carinae; median mesoscutal furrow present but superficial. Lateral region of mesoscutum smooth and glabrous; parapsidal signum present, parascutal sulcus absent. Scutellum length 0.8 times mesoscutum length in dorsal view. Scutellum dorsal region smooth, laterally areolate (Fig. 1b). Scutellar foveae rounded, large and smooth, not basally defined; lateral pits of scutellar foveae absent. Interfoveal line incomplete. Circumscutellar carina complete and clearly defined, not dorsally projected at scutellar apex. Mesopleuron glabrous and shiny, smooth except for some short anterior carinae (Fig. 1d). Mesopleural triangle alutaceous, with some short hairs. Metanotal troughs smooth, pubescence short and scarce. Propodeum alutaceous to coriaceous; central area smoother, defined by two lateral ridges and longitudinally divided by a median carina (Fig. 1b).

Wings. Pubescent. Radial cell of forewing closed, 2.4 times longer than wide. Marginal pubescence of wing denser in apical third.

Metasoma. Shorter than head + mesosoma. Petiole as long as wide, shorter than third coxa, coarsely sculptured and shiny (Fig. 1d). Third abdominal tergum 2.7 times longer than fourth in dorsal view. Abdominal terga smooth and glabrous, no punctuations on abdominal terga.

Etymology. The specific name comes from Papua New Guinea, the only known location of the species.

Biology. Unknown.

Distribution. Australasia. Recorded only from Papua New Guinea.

Anacharis tasmaniae sp. nov. (Fig. 2b–d)

Zoobank registration: http://zoobank.org/urn:lsid:zoobank.org:act:321E72FA-8A84-4A64-A08A-80038CA21321

Diagnosis. Species with a smooth scutellum like that in *A. antennata* Belizin, 1951; *A. belizini* Mata-Casanova and Pujade-Villar 2014; *A. eucharioides* (Dalman, 1818) and *A. rwenzori* Mata-Casanova and Pujade-Villar 2014. Unlike these species, *A. tasmaniae* has superficial notauli that are not internally carinated (notauli deeply excavated and internally carinated in *A. antennata*, *A. belizini*, *A. eucharioides* and *A. rwenzori*). In addition, the lateral regions of the petiole are coarsely sculptured in *A. tasmaniae*, a character not seen in any other *Anacharis* species (completely smooth in other species of the genus).

Type material. Holotype ♀[female symbol] deposited in NHM with the following labels: 'Wandle R. Xing, Tasmania, II.1983: I. Gauld' (white label); 'Holotype of *A. tasmaniae* sp.

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nov. design. N. Mata-Casanova' (red label). PARATYPES (1♂[male symbol] and 2♀[female symbol], deposited in NHM): AUSTRALIA: NEW SOUTH WALES: '1♀[female symbol], nr., 15.XII.1985'. TASMANIA: '1♂[male symbol], King William Creek, 10.XII.1981, I. Gauld'. '1♀[female symbol], Mt Barrow, 1000 m, II.1983, I. Gauld'.

Description

Length. Body: 2.3–2.5 mm. Antennae: 2.1 mm (♀[female symbol]), 1.6 mm (♂[male symbol], until F7). Wings: 2.4–2.5 mm.

Colouration. Head, mesosoma and metasoma black. Mandibles yellowish brown with darker teeth. Antennae dark yellowish with darker first segment. s dark yellowish brown, with black coxae. Veins of wings yellowish.

Head. Triangle-shaped in front view. Face smooth, shiny and almost glabrous. Width of head 2.2 times its length in dorsal view and 1.3 times its height in front view. Malar sulcus coriaceous, 0.8 times height of compound eye. Transfacial line 1.3 times height of compound eye. Diameter of toruli slightly longer than intertorular and toruli–eye distances. Clypeus almost unnoticeable, smooth, glabrous and weakly convex; tentorial pits inside apparent foveae. Occipital and postocular carinae absent. Compound eyes glabrous. POL : OOL : LOL ratio = 6:5:3, ocelli diameter 2 in both sexes. Frons and gena smooth, shiny and glabrous; occiput smooth and shiny with sparse setae.

Antennae. Cylindrical flagellomeres covered with pubescence. Female antennal formula: 9(4), 3.5(3), 11(2), 9(2), 8(2.5), 8(2.5), 7(2.5), 6(3), 5(3), 5(3), 5(3), 5(3), 7(3). Male antennal formula (flagellomeres from F8 to F12 lost): 7(3), 3(3), 9(3), 8(3), 8(3), 7.5(3), 7(3), 7(3), 6(3). Placodeal sensilla starting at F1 in both sexes.

Mesosoma. Lower half of pronotum alutaceous and obliquely carinated in its lower region; upper half of pronotum smooth, pubescent and heavily punctate (Fig. 2d). Mesoscutum width 1.1 times its length in dorsal view. Mesoscutum smooth and shiny, almost glabrous except for a few setae in anterior region. Notauli complete but very superficial; median mesoscutal furrow short and narrow, not clearly defined. Lateral region of mesoscutum smooth; parapsidal signum and parascutal sulcus absent. Scutellum length 0.7 times mesoscutum length in dorsal view. Scutellum smooth. Scutellar foveae smooth and not basally defined by a carina, lateral pits of scutellar foveae present but weakly excavated. Interfoveal line so short that it is almost absent (Fig. 2c). Circumscutellar carina complete and clearly defined, not dorsally projected at scutellar apex. Mesopleuron smooth, glabrous and shiny; some weak anterior carinae present in all individuals and slightly alutaceous sculpture in some specimens; transverse groove present, which is internally carinated and coriaceous in its anterior portion; mesopleural triangle smooth and almost glabrous (Fig. 2d). Metanotal troughs smooth and almost glabrous. Propodeum strongly coriaceous with only few short hairs; one central upper cell partially divided by an incomplete carina while the rest of its surface covered by small cells.

Wings. Pubescent. Radial cell of forewing closed, 2.4 times longer than wide. Marginal pubescence of wing denser in apical third.

Metasoma. Slightly longer than head + mesosoma. Petiole as long as third coxa, dorsum smooth and shiny, slightly coarsely sculptured laterally (Fig. 2b). Third abdominal tergum 2.1 times longer than fourth tergum in dorsal view. Fifth, sixth and seventh abdominal terga visible in dorsal view. Abdominal terga smooth and glabrous, without punctures.

Etymology. The specific name refers to the island of Tasmania, where most of the specimens were collected.

Biology. Unknown.

Distribution. Australasia. Recorded from Tasmania and New South Wales (Australia).

Anacharis zealandica Ashmead, 1901 (Figs 1e,1f,2a)

Diagnosis. Species very similar to *A. afrotropica* Mata-Casanova and Pujade-Villar 2014 and *A. parapsidalis* Belizin 1951. It can be distinguished from *A. parapsidalis* by the oval shape of the scutellar foveae and the presence of some oblique internal carinae inside them (scutellar foveae triangular and internally smooth in *A. parapsidalis*). It differs from *A. afrotropica* by the presence of a complete median longitudinal carina on the propodeum and by lacking a clearly defined median scutellar furrow (propodeum without any clear longitudinal carina, being irregularly carinated instead, and median mesoscutal furrow clearly defined in *A. afrotropica*).

Studied material (183♂[male symbol] and 90♀[female symbol], deposited in BMNH). AUSTRALIA: AUSTRALIAN CAPITAL TERRITORY: '2♀[female symbol], Brindabella Mts, Picadilly Circus, 1000 m, IX.1981, I. Gauld'. NEW SOUTH WALES: '2♀[female symbol], Sydney, VI.1920, H. Greenwood'. '1♂[male symbol], Oxford, 8.XII.1957, M.I. Nikitin'. '1♂[male symbol], Cabramatta, 3.X.1958, M.I. Nikitin'. '1♂[male symbol], Casula, 7.XI.1958, M.I. Nikitin'. '1♂[male symbol], Casula, 11.XI.1958, M.I. Nikitin'. '1♂[male symbol], Windsor, 1.XI.1960, M.I. Nikitin'. '1♀[female symbol], Narrabri, 23.I.1961, M.I. Nikitin'. '1♂[male symbol], Cabramatta, 10.VI.1961, M.I. Nikitin'. '1♀[female symbol], Cabramatta, 19.VIII.1961, M.I. Nikitin'. '1♂[male symbol], Castlereagh, 17.IX.1961, M.I. Nikitin'. '1♀[female symbol], Cabramatta, 22.X.1961, M.I. Nikitin'. '1♀[female symbol], Cabramatta, 2.XII.1961, M.I. Nikitin'. '1♂[male symbol] and 1♀[female symbol], Cabramatta, 15.XI.1964, M.I. Nikitin'. '1♂[male

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symbol], Glenfield, 2.III.1965, M.I. Nikitin'. '1♂[male symbol], Holsworthy, 17.IX.1966, M.I. Nikitin'. '16♂[male symbol] and 2♀[female symbol], Lake George nr. Coplector, 23.X.1976, Z. Bouček'. '5♂[male symbol], 30 km S of Wellington, 30.X.1976, Z. Bouček'. '3♀[female symbol], Sawbit Creek, Mt Kosc. N. Prk, 12.II.1977, Z. Bouček'. '1♂[male symbol], Araluen Valley, 6. XI.1981, I. Gauld'. '1♂[male symbol], Sydney N. Rocks, 22.XI.1982, Z. Bouček'. '14♂[male symbol] and 1♀[female symbol], Mt Keira, 600 m, II.1983, I. Gauld'. QUEENSLAND: '1♀[female symbol], Tambourine Mts, 11-18.IV.1935, R.E. Turner'. '1♂[male symbol], Tambourine Mts, 16-26.IV.1935, R.E. Turner'. '3♂[male symbol], Tambourine Mts, 11-17.V.1935, R.E. Turner'. '3♂[male symbol] and 3♀[female symbol], Mt Glorious nr. Brisbane, 9.XI.1976, Z. Bouček'. '4♂[male symbol] and 1♀[female symbol], Mt Glorious, 17.XI.1976, Z. Bouček'. '1♂[male symbol] and 3♀[female symbol], Mt Glorious, 25.XI.1976, Z. Bouček'. '5♂[male symbol] and 5♀[female symbol], Mt Glorious, 16.XII.1976, Z. Bouček'. '1♂[male symbol], Bunya Mts, 10.IX.1982, Z. Bouček'. SOUTH AUSTRALIA: '3♂[male symbol] and 1♀[female symbol], Adelaide, IX-X.1929, J. Davidson'. '1♂[male symbol], Adelaide, 9. XI.1978, A.D. Austin'. '1♀[female symbol], 5 km S to Mylor, 19.X.1980, A.D. Austin'. '1♂[male symbol], 5 km S to Mylor, 23.XI.1980, A.D. Austin'. '5♀[female symbol], Gosse Area, Kangaroo Is., 10.XII.1980, S.A. Austin'. TASMANIA: '1♂[male symbol] and 1♀[female symbol], Mt Wellington, 12-21.III.1913, R.E. Turner'. '1♀[female symbol], Callinsvale, 300 m, II.1983, M.A. Williams'. '1♂[male symbol] and 1♀[female symbol], Forestier Pna. Flinders Creek, II.1983, I. Gauld'. '1♂[male symbol], Mt Barrow, 1000 m, II.1983, I. Gauld'. '1♂[male symbol], Mt Wellington, I.D. Gauld', collection date not specified. '1♀[female symbol], Kallista Creek, I.D. Gauld', collection date not specified. VICTORIA: '5♀[female symbol], Vict. Kinglake N. P., nr, Melbourne, 31.I.1977, Z. Bouček'. '1♀[female symbol], Toolangi, 5.XII.1981, I. Gauld'. '1♀[female symbol], Ben Cairn, 1000 m, 5.XII.1981, I. Gauld'. WESTERN AUSTRALIA: '1♂[male symbol] and 4♀[female symbol], Perth, 5-9.XI.1935, R.E. Turner'. '1♂[male symbol], Yanchep, 32 mls N of Perth, 24.XI-2.XII.1935, R.E. Turner'. '1♀[female symbol], Yanchep, 32 mls N of Perth, 29.I-28.II.1936, R.E. Turner'. '92♂[male symbol] and 15♀[female symbol], Perth, 14.XI.1982, Z. Bouček'. NEW ZEALAND: NORTHERN ISLAND: '1♂[male symbol], Warkworth, 22.I.1957, R.A. Cumber'. '1♂[male symbol], Mapiu, 8.III.1957, R.A. Cumber'. '1♂[male symbol] and 1♀[female symbol], 7 km N. Gisborne, Grays Bush, Auckland Prov., 8.IV.1976, W.J. Knight'. '1♂[male symbol] and 1♀[female symbol], Rotoma nr. Rotorua, 16.II.1979, L.A. Mound'. '3♀[female symbol], Titirangi, Auckland, XII.1980, P.A. Maddison'. '1♂[male symbol], Lake Rotorua, 2.XII.1980, J.S. Noyes'. '1♂[male symbol] and 1♀[female symbol], Tatarua Ra, Clouston Park, 600 m, 2.III.1981, J.S. Noyes'. '1♀[female symbol], Mt Mangonui, 5.I.1982, J. Clark'. '1♂[male symbol], Lake Rotorua, 5.I.1982, J. Clark'. SOUTHERN ISLAND: '1♂[male symbol], ½ mile W. Unwin Hut, Mt Cook Nat. Park, Tasman Valley, 2300 ft, 26.I.1972, W.J. Knight and P.S. Broomfield'. '1♂[male symbol], N of L. Pukaki, Tasman Valley, 1.II.1972, W.J. Knight and P.S. Broomfield'. '1♂[male symbol], Bush Stream, Tasman Valley, 5.II.1972, W.J. Knight and P.S. Broomfield'. '2♀[female symbol], Tahunanui Beach, Nelson, 12.I.1976, W.J. Knight'. '1♀[female symbol], Coronet Peak nr. Queenstown, Otago, 12.I.1976, W.J. Knight'. '1♂[male symbol], 4 km N. Akaroa on inland, Banks Pen., 22.II.1976, W.J. Knight'. '5♀[female symbol], Sign of the Bell bird nr. Otahuna, Banks Pen., 8.III.1976, W.J. Knight'. '1♀[female symbol], Lake Tekapo, McKenzie district, I.1981, P. Quinn'. '1♂[male symbol], Lake Rotoiti, St. Arnaud, 4.I.1987, A.K. Walker'. '1♂[male symbol], Lake Rotoiti, 1.I.1988, A.K. Walker'. '1♂[male symbol] and 5♀[female symbol], Otepatotu Peninsula, 20.I.1988, M.C. Banks'. 1♂[male symbol] and 1♀[female symbol] without labels.

Biology. Known to attack *Drepanacra binocula* (Newman 1838) and *Micromus tasmaniae* (Walker 1860) (Hemerobiidae) according to New (1979).

Distribution. Australasia. Previously recorded from New Zealand (Ashmead 1901; New 1979) and Victoria (Australia) (Ashmead 1901; New 1979). These are the first records of the species from for Western Australia, South Australia, Queensland, New South Wales, the Australian Capital Territory and Tasmania (Australia).

Xyalaspis victoriensis New 1979 (Fig. 1a)

Diagnosis. Species with complete median mesoscutal furrow reaching the pronotum as in *X. dimorphica* Mata-Casanova and Pujade-Villar 2013 and *X. subsaharica* Mata-Casanova and Pujade-Villar 2013. It differs from these species by having small scutellar foveae and a slender scutellar spine clearly distinguishable from the rest of the scutellum (in *X. dimorphica* and *X. subsaharica*, the scutellar foveae are large and the spine is massive and not distinguished from the rest of the scutellum).

Studied material (22♂[male symbol] and 1♀[female symbol], deposited in NHM). AUSTRALIA: NEW SOUTH WALES: '1♂[male symbol], 30 km S. of Wellington, 30.X.1976, Z. Bouček'. QUEENSLAND: '7♂[male symbol] and 1♀[female symbol], Mt Glorious nr. Brisbane, 9.XI.1976, Z. Bouček'. '5♂[male symbol], Mt Glorious, 17.XI.1976, Z. Bouček'. '7♂[male symbol], Mt Glorious, 16.XII.1976, Z. Bouček'. '1♂[male symbol], Wilson's Peak, SE Killarney, 9.I.1977, Z. Bouček'. TASMANIA: '1♂[male symbol], Forestier Pna. Flinders Creek, Tasmania, II.1983, I. Gauld'.

Biology. Known to attack *Drepanacra binocula* and *Micromus tasmaniae* (Hemerobiidae) according to New (1979).

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Distribution. Australasia. Previously recorded for Victoria (Australia) (New 1979); newly recorded from Queensland, New South Wales and Tasmania (Australia).

DISCUSSION

After the Indomalayan ecozone, which hosts only two known Anacharitinae species (Mata-Casanova *et al*. 2014c,d), the Australasian region is the terrestrial biogeographic region with the poorest known fauna of Anacharitinae. The two new species described in this study have doubled the number of Australasian species to four, still far short of the faunas of Nearctic, Neotropical and Palearctic regions, where the bulk of anacharitine species are present.

The three genera present in the Australasian region are easily distinguished from one another. The genus *Xyalaspis* is characterised by the presence of a scutellar spine instead of a circumscutellar carina (Fig. 1a) (Restrepo-Ortiz & Pujade-Villar 2010), a character absent in *Aegilips* and *Anacharis*. Restrepo-Ortiz and Pujade-Villar (2010) also mentioned the presence of an elongate and completely smooth petiole and the lack of coriaceous sculpture in the malar area in *Anacharis* as characters that were useful to distinguish this genus from *Aegilips*. However, the presence of a carinated petiole in *Anacharis tasmaniae* (Fig. 2b) and a coriaceous malar sulcus in both *A. tasmaniae* and *A. zealandica* have rendered these characters unsuitable to distinguish between the two genera. After examining large series of undetermined material, we propose the presence of an internally carinated transverse groove on the mesopleuron in *Anacharis* (Figs 1e,2d) as the key character to distinguish it from *Aegilips*, which has a smooth mesopleuron (Fig. 1c).

With regard to interspecific variability, the genera *Aegilips* and *Anacharis* present relatively uniform morphology; the main differences among species are those related to the pronotal and scutellar sculpture and the form of the notauli. *Aegilips papuensis*, however, is a particularly distinctive species. The combination of clearly excavated notauli with strong internal carinae (Fig. 1a), a smooth dorsal scutellum (Fig. 1a) and an obliquely carinated pronotum (Fig. 1c,d) is unique for the genus and sets it well apart from the Eurasian species of *Aegilips*.

More can be said regarding the relationships of the Australasian species of genus *Anacharis*. *Anacharis tasmaniae* has a smooth scutellum and pronotum except for some short basal pronotal carinae (Fig. 1a,c), and has weakly excavated and not internally carinated notauli (Fig. 1b). This combination of characters makes this species close to *A. antennata*, *A. belizini*, *A. euchariodes* and *A. rwenzori*. The other Australasian species, *A. zealandica*, represents the other extreme of *Anacharis* interspecific sculpture. It has deeply excavated and internally carinated notauli, an areolate scutellum and a coarsely sculptured pronotum, very similar to *A. afrotropica* and *A. parapsidalis*. It is worth noting that both Australasian species are closely similar to either Indomalayan (*A. belizini*) or Afrotropical species (*A. afrotropica* and *A. rwenzori*), which may suggest a common Gondwanan origin.

Within the genus *Xyalaspis*, interspecific variability is much higher, with species showing a great variability in the form of the mesoscutal sculpture (from completely smooth to strongly carinated), the length of the median mesoscutal furrow and the shape and length of the scutellar spine. *Xyalaspis victoriensis* has close morphological affinities with the Indian species *X. dimorphica* and the Afrotropical species *X. subsaharica*; the two main characters shared by all three species are the presence of a complete median mesoscutal furrow and the heavily carinated surface of the mesoscutum. As we have previously seen in Australasian *Anacharis*, the affinities of *X. victoriensis* can also be interpreted as traces of a common Gondwanan origin.

The distributions of the two previously known Australasian anacharitine species are greatly extended. *Anacharis zealandica* was originally recorded only from New Zealand, while *A. australiensis* was known only from the state of Victoria on the Australian mainland. The synonymisation of these species (New 1982) meant that *A. zealandica* was present in Australia and New Zealand; however, it was confined to the south-eastern portion of the Australasian region. After examining the undetermined material, we found that *Anacharis zealandica* extends across all the Australian continent, being absent only from northern areas. Similarly, *Xyalaspis victoriensis* was previously recorded only from the state of Victoria (New 1979), and its distribution is here extended along the south-eastern and western regions of Australia.

New (1979) mentioned that specimens of *Xyalaspis* were less common than those of *Anacharis*. Our results support New's statement. Considering material collected from the areas where the genera co-occur (Queensland, New South Wales, Victoria and Tasmania), 103 specimens are *Anacharis* (99 of them belonging to *A. zealandica*), while only 23 specimens are *Xyalaspis*.

Regarding their biology, New (1979) mentioned both *A. zealandica* and *X. victoriensis* attacking the cocoons of *Drepanacra binocula* and *Micromus tasmaniae* (Neuroptera: Hemerobiidae) found on *Acacia decurrens* Willd, 1808. Our study was conducted with collection specimens, so no further information of the Australasian Anacharitinae biology was collected. Nevertheless, it is probable that *A. tasmaniae* is also parasitoid of these two species because of their ubiquity in the area where the specimens were collected (New 1984). *Aegilips papuensis* has also a wide range of potential hosts. The Palaearctic species *Aegilips atricornis* and *A. nitidula* have been also cited attacking Hemerobiidae (Fergusson 1986), and the New Guinea fauna is rich in hemerobiids, with 18 species known (New 1988).

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4.2.9. New Afrotropical *Anacharis*

Description of two new species of *Anacharis* Dalman, 1823 (Hymenoptera: Figitidae, Anacharitinae) from the Afrotropical Region

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Two new species of *Anacharis* Dalman, 1823 from the Afrotropical Region are described: *Anacharis afrotropica* sp. n. and *Anacharis rwenzori* sp. n. Diagnostic characters and data about biology, distribution and affinities with other *Anacharis* species are given.

Key words: *Anacharis,* Africa, new species, taxonomy.

INTRODUCTION

The Figitidae are a family of microcynipoid parasitic wasps composed of 12 subfamilies (Paretas-Mart nez *et al.* 2011). The Anacharitinae are one of these subfamilies, currently including nine genera: *Acanthaegilips* Ashmead, 1897, *Acanthaegilopsis* Pujade-Villar, 2013, *Aegilips* Haliday, 1835, *Anacharis* Dalman, 1823, *Calofigites* Kieffer, 1909, *Hexacharis* Kieffer, 1907, *Proanacharis* Kovalev, 1996, *Solenofigites* D az, 1979, and *Xyalaspis* Hartig, 1843. They can be easily distinguished from the rest of Figitidae by three main synapomorphies (Ros-Farr *et al.* 2000): rounded and continuous pronotal plate, triangular head in front view (although it is more quadrangular in shape in *Acanthaegilopsis* and *Proanacharis* and some species of *Aegilips* and *Xyalaspis*) and broadly overlapping mandibles. They are known to attack the aphid-feeding larvae of Chrysopidae and Hemerobiidae (Neuroptera) (Ronquist 1999).

Anacharis is the most diverse Anacharitinae genus, currently including 21 species. It is closely related to the Nearctic genus *Hexacharis* (Buffington *et al.* 2007, 2012), with whom shares the lack of heavy carinated sculpture in the mesoscutum, third abdominal terga length maximum two times the fourth abdominal tergum length and the presence of a longitudinal groove in the mesopleuron; this last character, however, is highly variable within *Hexacharis*, even to have disappeared in some individuals. The character more useful to distinguish *Anacharis* from *Hexacharis* and other Anacharitinae genera is the presence of smooth and elongated petiole, at least as long as the third coxa and usually longer (petiole shorter and coarsely sculptured in the laterals in *Hexacharis*).

The anacharitines present a cosmopolitan distribution, being present on all continents except Antarctica. Its highest diversity is found in the Neotropical Region, with six genera present (Mata-Casanova *et al.* 2014a), three of them – *Acanthaegilips, Calofigites* and *Solenofigites* – being endemic. For a long time, the Afrotropical Anacharitinae record included a single species, *Aegilips capensis* Kieffer, 1912; it is only recently that the anacharitines of this region have become the subject of study. At present, the subfamily is represented by four genera: *Acanthaegilopsis, Aegilips, Anacharis* and *Xyalaspis* (Mata-Casanova *et al.* 2014b). Regarding the genus *Anacharis*, the subject of this study, only one species was previously known: *Anacharis madagascarensis* Pujade-Villar, 2012 from Madagascar; no *Anacharis* from the African mainland were known (Pujade-Villar 2012). The addition of two new species described here, *A. afrotropica* sp. n. and *A. rwenzori* sp. n., makes *Anacharis* the most abundant anacharitine genus in the Afrotropical Region with three known species; moreover, it also expands the distribution area from Madagascar to the African continent.

MATERIAL AND METHODS

The specimens examined in this study (4 males and 11 females) are deposited in the British Museum of Natural History (BMNH) and the Canadian National Collection of Insects (CNCI).

Morphological terms used are those of Richards (1977), Ronquist (1995) and Ros-Farr *et al.* (2003). All measurements are relative except for body

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length. Measurements and abbreviations include: F1–F12, first and subsequent flagellomeres; POL (post-ocellar distance) is the distance between the inner margins of the posterior ocelli; OOL (ocular-ocellar distance) is the shortest distance between the inner margin of the compound eye and the outer edge of the posterior ocellus; LOL (lateral-frontal ocellar distance) is the distance between the edges of the lateral and frontal ocelli. Antennal formula includes scape, pedicel and flagellomere length and relative width in brackets.

The images included were made in the 'Serveis Cient fico-T cnics' of the University of Barcelona. The field-emission gun environmental scanning electron microscope (FEI Quanta 200 ESEM) was used for high-resolution imaging, under a low voltage (12.0 kV) and without gold-coating of the specimens in order to preserve the material.

RESULTS

Anacharis afrotropica Mata-Casanova & Pujade-Villar, **sp. n.**, Fig. 1

Diagnosis

Anacharis afrotropica presents deeply excavated and internally carinated notauli and strongly areolated scutellum like the Nearctic species *A. flavicornis* Kieffer, 1907, *A. melanoneura* Ashmead, 1887 and *A. tripartita* Kieffer, 1907, the Palaearctic species *A. parapsidalis* Belizin, 1951 and the Australian species *A. zealandica* Ashmead, 1901. It can be distinguished from the Nearctic species by the presence of strong carinated sculpture covering the whole surface of the pronotum (pronotum smooth or only weakly carinated in its lower region in *A. flavicornis, A. melanoneua,* and *A. tripartita*). Despite being very similar to *A. parapsidalis* and *A. zealandica*, it can be distinguished by having transverse carinae in the pronotum and irregularly carinated propodeum (in *A. parapsidalis* and *A. zealandica*, pronotum irregularly carinated while the propodeum is divided in two symmetrical areas by a median longitudinal carina).

Type material

Holotype ♀ deposited in BMNH with the following labels: 'Cape Province, Somerset East, 10–22.XII.1930' (white label), 'S. Africa, R.E. Turner, Brit. Mus. 1931–1937' (white label), 'Holotype of *Anacharis afrotropica* n. sp. design. N. Mata-Casanova, 2014' (red label). PARATYPES (4♀ deposited in BMNH, 1♀ & 4♂ deposited in CNCI): SOUTH AFRICA: '1♀ & 1♂, RSA, W. Cape Prov., Hout Bay, Orange Hoot, Forest Pre., 150 m, 16–31.XII.1999, S. & J. Peck'; '3♂, 97–80 RSA: W. Cape PT; Swellendam, Marloth Nature Reserve Duiwelsbos, afromontane forest Fit, 300 m, 17–31.XII.1997, S. & J. Peck'; UGANDA: '1♀, Kawanda, VII. 1943, T.H.C. Taylor'; *KENYA:* '2♀, 15 mls. NE Kisumu, nr. Lake Victoria, XI.1979, M.D. Croft'; D.R. CONGO: '1♀, Congo Belge: P.N.A., Mount Hoyo, sur plantes basses, 1280 m, 15.VII.1955, P. Vanschuytbroeck'.

Description

Female. Length. Body: 3.1 mm. Antennae: 2.1 mm (♀). Wings: 2.7 mm.

Colouration

Head and mesosoma black, metasoma dark brown. Mandibles yellowish brown with darker teeth. Antennae yellowish brown, with the first segment being darker in most of its surface. Legs yellowish with darker coxae. Veins of wings brownish.

Head. Triangular in frontal view. Face smooth, covered with white setae, denser at the front and more sparse near the malar area (Fig. 1d). Width of the head 2.6 times its length in dorsal view and 1.4 times its height in front view. Malar sulcus coriaceous, 0.6 times the height of the compound eye. Transfacial line same length as the height of the compound eye. Diameter of the toruli equal to the distance from the external edge of the toruli to the internal edge of the compound eye but bigger than the intertoruli distance. Clypeus smooth, glabrous and shortly convex, almost unnoticeable. Occipital and postocular carinae absent. Compound eyes glabrous. POL:OOL:LOL ratio = 7.5:6:4, being the ocelli diameter 2.5. Front and gena smooth, shiny and glabrous; occiput smooth and shiny with sparse setae.

Antennae. Cylindrical flagellomeres covered with pubescence. Female antennal formula: 10(3), 4.5(3), 12(2.5), 9(2.5), 8.5(2.5), 8(3), 7.5(3), 6.5(3), 6(3), 6(3), 6(3), 5(3), 9(3). Placodeal sensilla starting at F1 and abundant in all flagellomeres.

Mesosoma. Pronotum coriaceous and pubescent – especially near the mesoscutum edge, heavily crossed by transverse carinae in all its extension

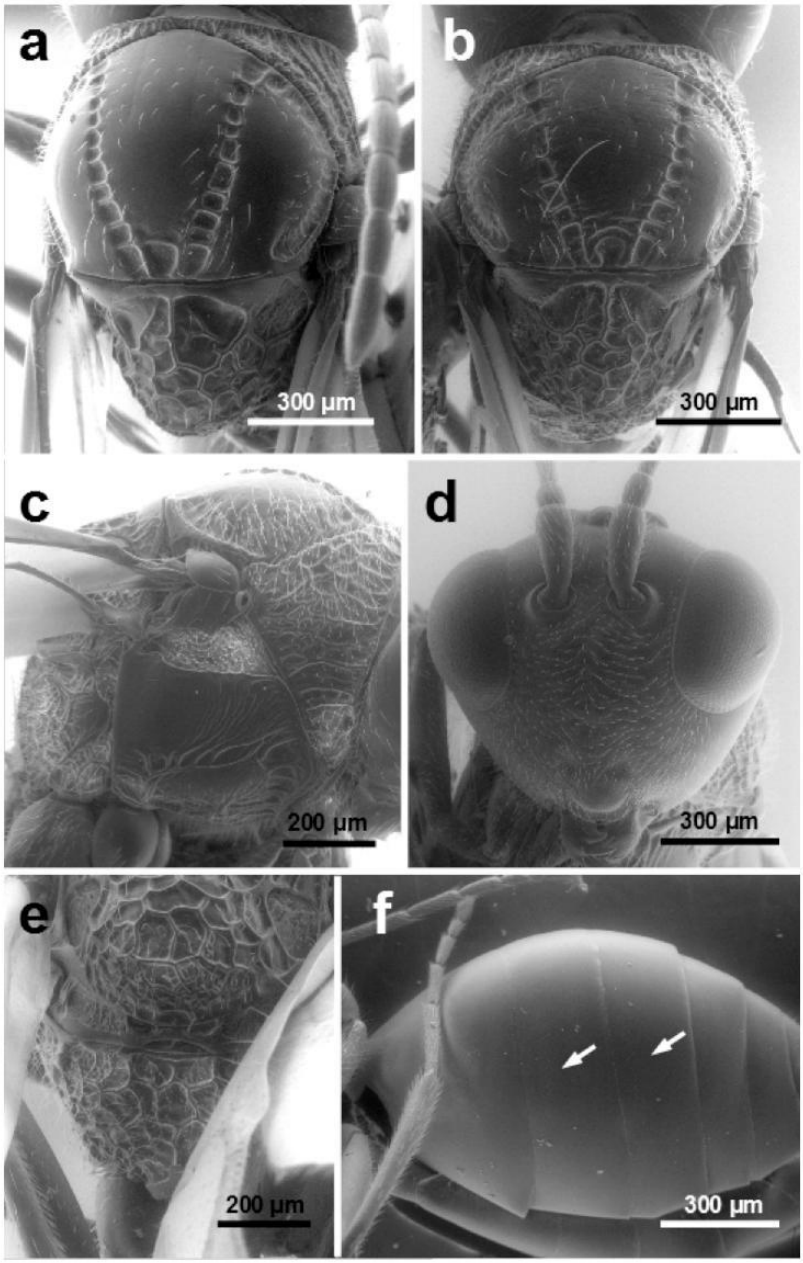


Fig. 1. *Anacharis afrotropica*: **a**, **b**, mesosoma in dorsal view; **c**, mesosoma in lateral view; **d**, head in frontal view; **e**, propodeum; **f**, metasoma in lateral view.

(Fig. 1c); transverse parallel carinae in its lower half and irregular carinae in its upper half. Mesoscutum width 1.2 times its length in dorsal view. Mesoscutum smooth and shiny (Fig. 1a), presence of some weak transverse alutaceous sculpturing at the base of the notauli in some individuals (Fig. 1b); almost glabrous except for a few setae. Notauli complete with transverse carinated sculpture; median mesoscutal furrow short but clearly defined (Fig. 1a,b). Lateral region of the mesoscutum smooth and punctuated, more hairy than the central area; parapsidal signum absent, parascutal sulcus complete and internally carinated. Scutellum length 0.6 times the length of the mesoscutum in dorsal view. Scutellum areolate. Scutellar foveae smooth with some internal oblique carinae, basally defined by a change in the scutellum's sculpture (Fig. 1a,b), lateral pits of the scutellar foveae present but weakly excavated. Interfoveal line present. Circumscutelar carina complete and clearly defined, not dorsally projected at the apex of the scutellum. Mesopleuron glabrous and shiny with a transverse groove internally carinated, smooth except for some weak alutaceous sculpture in the frontal third; mesopleural triangle weakly alutaceous with short pubescence, with some oblique vertical carinae (Fig. 1c). Metanotal troughs longitudinally carinated covered by uniformly distributed short hyaline hairs, not densely pubescent. Propodeum coriaceous and heavily pubescent, divided in large cells; central area with a bigger central cell and some smaller cells surrounding (Fig. 1e).

Wings. Pubescent. Radial cell of forewing closed, 2.4 times longer than wide. Marginal pubescence of the wing denser at the apical third.

Metasoma. Slightly longer than head + mesosoma. Petiole slightly longer than the third coxa, smooth and shiny. Third abdominal tergum 1.6 times longer than the fourth tergum in dorsal view. Fifth, sixth and seventh abdominal terga visible in dorsal view. Abdominal terga smooth and glabrous, punctuated in the anterior region of each tergum, more distinct from T4 to T7 (Fig. 1f).

Male. Similar to female. Length. Body 3 mm. Antennae 3 mm. Wings 2.6 mm. Antennal formula: 9(3.5), 4(3), 12(3), 9(3), 9(3), 9(3), 8.5(3), 8.5(3), 8.5(3), 8(3), 7.5(3), 7.5(3), 7(3), 10(3).

Etymology

The specific name makes reference to its large distribution area across the Afrotropical Region.

Biology

Unknown.

Distribution

Afrotropical: South Africa, Uganda, Kenya and D.R. Congo.

Anacharis rwenzori Mata-Casanova & Pujade-Villar, **sp. n.**, Fig. 2

Diagnosis

Anacharis rwenzori is very similar to the Palearctic species *A. eucharioides* (Dalman, 1818), with whom it shares smooth mesoscutum and complete internally carinated notauli; it can be distinguished from *A. eucharioides* by having alutaceous and completely carinated pronotum, smooth scutellum, densely pubescent metanotal troughs and an incomplete propodeal median carina (*A. eucharioides* with smooth pronotum only basally carinated, scutellum alutaceous, glabrous metanotal troughs and complete median carina).

Type material

Holotype ♀ deposited in BMNH with the following labels: 'Congo Belge: P.N.A., 19.II.1953, P. Vanschuytbroeck & J. Kekenbosch 2116–23' (white label), 'Massif Ruwenzori, Kalonge, 2030 m, R. Kiondo ya Kwanza' (white label), 'Holotype of *Anacharis rwenzori* n. sp. design. N. Mata-Casanova, 2014' (red label).

Description

Female. Length. Body: 3.2 mm. Antennae: 2.5 mm (♀). Wings: 3 mm.

Colouration. Head and mesosoma black, metasoma dark brown. Mandibles yellowish brown with darker teeth. Antennae yellowish brown, with darker first segment. Legs yellowish with darker coxae. Veins of wings dark yellowish.

Head. Triangular in front view. Face smooth, covered with dense white pubescence, malar area glabrous (Fig. 2b). Width of the head 2.2 times its length in dorsal view and 1.2 times its height in front view. Malar sulcus coriaceous, 0.6 times the height of the compound eye. Transfacial line length 1.2 times the height of the compound eye. Diameter of the toruli equal to torulus–eye distance and bigger than inter-torular distance. Clypeus smooth, glabrous and shortly convex, almost unnoticeable. Occipital and postocular carinae absents. Compound eyes glabrous.

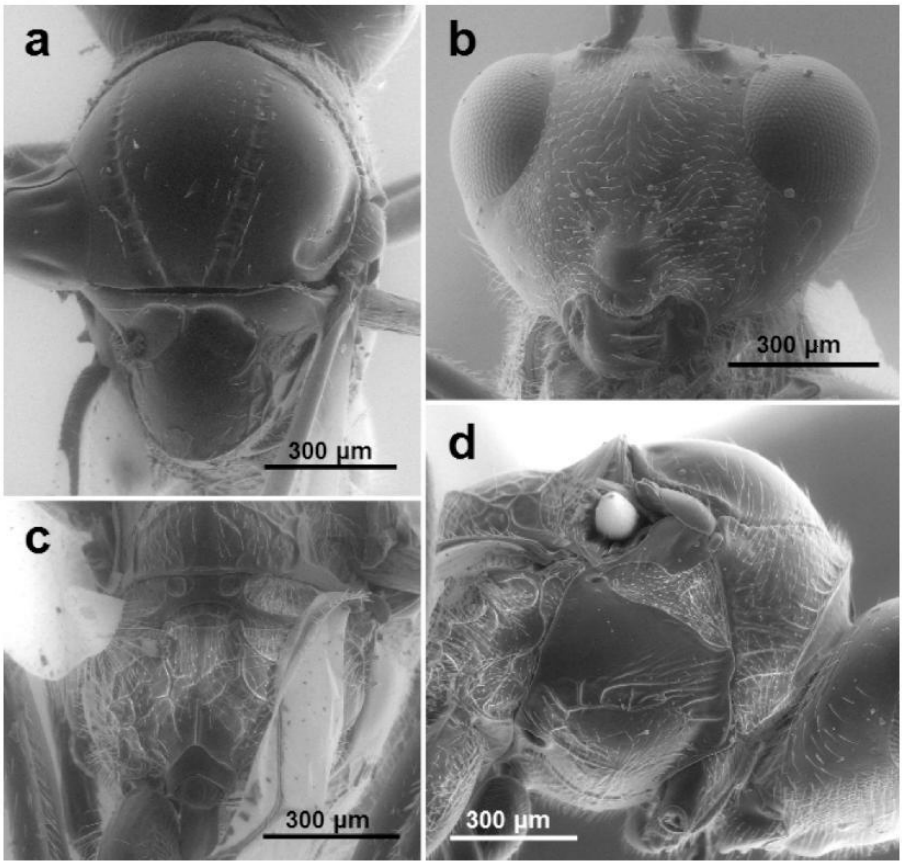


Fig. 2. *Anacharis rwenzori*: **a**, mesosoma in dorsal view; **b**, head in frontal view; **c**, propodeum; **d**, mesosoma in lateral view.

POL:OOL:LOL ratio = 7:5:3, being the ocelli diameter 2. Frons and gena smooth, shiny and glabrous; occiput smooth and shiny with sparse setae; line of hairs at the posterior margin of the gena.

Antennae. Cylindrical flagellomeres covered with pubescence. Female antennal formula: 8(3), 3.5(3), 12(2.5), 10(2.5), 9(2.5), 8(2.5), 8(2.5), 8(3), 7(3), 6.5(3), 6(3), 6(3), 8(3). Placodeal sensilla starting at F1 in females and abundant in all flagellomeres.

Mesosoma. Pronotum alutaceous and transversely carinated, stronger carinae in the lower pronotum (Fig. 2d). Mesoscutum width 1.3 times its length in dorsal view. Mesoscutum smooth and shiny, slightly punctuated; almost glabrous except for a few setae (Fig. 2a). Notauli complete with transverse carinated sculpture; median mesoscutal furrow short and slightly defined. Lateral region of the mesoscutum smooth and punctuated; parapsidal signum and parascutal sulcus absent. Scutellum length 0.8 times length of the mesoscutum in dorsal view. Scutellum smooth and shiny. Scutellar foveae smooth with no internal carinae, not basally defined, lateral pits of the scutellar foveae almost disappeared (Fig. 2a). Interfoveal line present. Circumscutelar carina complete and clearly defined, not dorsally projected at the apex of scutellum. Mesopleuron glabrous and shiny with a transverse groove internally carinated, heavily carinated in its frontal

half; mesopleural triangle alutaceous with short pubescence. Metanotal troughs smooth and covered by long hyaline hairs. Propodeum coriaceous and heavily pubescent, divided in few large cells; central area smooth and partially divided in its lower half by an incomplete median carina (Fig. 2c).

Wings. Pubescent. Radial cell of forewing closed, 2.8 times longer than wide. Marginal pubescence of the wing denser at the apical third.

Metasoma. Longer than head + mesosoma. Petiole slightly longer than the third coxa, smooth and shiny. Third abdominal tergum 1.8 times longer than the fourth tergum in dorsal view. Fifth, sixth and seventh abdominal terga visible in dorsal view. Abdominal terga smooth and glabrous, punctuated in the anterior region of each tergum, more distinct from T4 to T7.

Male. Unknown.

Etymology

The specific name makes reference to Rwenzori Mountains, the area where the type specimen was collected.

Biology

Unknown.

Distribution

Afrotropical: D.R. Congo.

Key to Afrotropical species of *Anacharis*

1. Notauli almost absent, only slightly by a weak depression posteriorly. . . . . *A. madagascarensis*
— Notauli excavated in all its extension and internally carinated. 2
2. Scutellum surface strongly areolate; median mesoscutal furrow short but deeply excavated (Fig. 1a,b). . . . . *A. afrotropica* sp. n.
— Scutellum surface smooth; median mesoscutal furrow absent (Fig. 2a). . . . . *A. rwenzori* sp. n.

DISCUSSION

Regarding the biology of genus *Anacharis,* the aphid-feeding larvae of Hemerobiidae have been cited as hosts of *Anacharis zealandica* (New, 1979), *A. immunis* (Walker, 1835) (Kyerich, 1984), *A. melanoneura* (Miller & Lambdin, 1985; Cave & Miller, 1987) and *A. eucharioides* (Fergusson, 1986). For the rest of the species of the genus their hosts remain unknown, including those from the Afrotropical Region. However, at least 22 species and seven genera of Hemerobiidae are known to occur only in South Africa (Mansell 1986), so it is very plausible some of them are also hosts of the species listed in this paper.

Despite their scarce record when compared to other regions like the Nearctic or the Palaearctic, the Afrotropical *Anacharis* species show great morphological variability. The two newly described species are very different from *A. madagascarensis*: both present complete and deeply excavated notauli and coriaceous malar sulcus, two characters absent in *A. madagascarensis*. They show affinities with other species instead: *A. rwenzori* is very similar to the Palearctic species *A. eucharioides*, with whom it shares smooth scutellum and mesoscutum, while *A. afrotropica* is morphologically close to *A. parapsidalis* from the Russian Far East and Japan and *A. zealandica* from Australia and New Zealand, the three species sharing strongly sculptured scutellum and pronotum. It is interesting to note that *A. madagascarensis'* affinities with other *Anacharis* species are difficult to establish because of its exclusive characteristics: the absence of malar sulcus and notauli and the presence of a long median longitudinal carina at the apex of the scutellum; this uniqueness could be due to their isolated distribution.

When talking about the abundance and distribution area of genus *Anacharis* in the Afrotropical Region, the description of *A. rwenzori* sp. n. and *A. afrotropica* sp. n. provides new information. *Anacharis* is the most diverse Anacharitinae genera in the Afrotropical Region, with three known species; it is also the most diverse anacharitine genus, with 24 *Anacharis* species described to date. Along with the number of *Anacharis* species, the distribution area of the genus in the Afrotropical Region is also extended: while the previously known species *A. madagascarensis* was collected only from Madagascar, the two new species are cited from the African continent: *A. rwenzori* restricted to Uganda while *A. afrotropica* is more widespread, ranging from Equatorial Africa to the southern areas of the continent.

More studies on the Afrotropical *Anacharis* material deposited in collections and additional collecting will help to fill the gaps actually found when dealing with their biology and interspecific rela-

tionships and give us a complete picture of the genus in Africa.

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4.2.10. New Neotropical *Xyalaspis*

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Description of two new species of the genus *Xyalaspis* Hartig, 1843 (Hymenoptera: Figitidae: Anacharitinae) in the Neotropical region

Descripción de dos nuevas especies del género *Xyalaspis* Hartig, 1843 (Hymenoptera: Figitidae: Anacharitinae) en la región Neotropical

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ABSTRACT

Two new species of genus *Xyalaspis* Hartig, 1843, *Xyalaspis dominicana* Mata-Casanova & Pujade-Villar n. sp. from Dominican Republic and *Xyalaspis muzencaba* Mata-Casanova & Pujade-Villar n. sp. from Mexico are described. *Xyalaspis dominicana* Mata-Casanova & Pujade-Villar n. sp. represents the first record of the genus in the Caribbean area. The description and diagnostic characters of the new species are illustrated and discussed.

Key words: Figitidae, *Xyalaspis*, Neotropical, Mexico, Caribbean, new species.

RESUMEN

Se describen dos nuevas especies del género *Xyalaspis* Hartig, 1843: *Xyalaspis dominicana* Mata-Casanova & Pujade-Villar n. sp. de la República Dominicana y *Xyalaspis muzencaba* Mata-Casanova & Pujade-Villar n. sp. de México. *Xyalaspis dominicana* Mata-Casanova & Pujade-Villar n. sp. representa el primer registro del género para el Caribe. Se ilustran y discuten los caracteres diagnósticos de las nuevas especies.

Key words: Figitidae, *Xyalaspis*, Neotropical, México, Caribe, nuevas especies.

Figitidae is a family of microhymenopteran parasitic wasps which currently includes twelve subfamilies (Paretas-Martínez *et al.* 2011). The subfamily comprises nine genera (Mata-Casanova & Pujade-Villar 2013): *Acanthaegilips* Ashmead, 1896, *Acanthaegilopsis* Pujade-Villar, 2013, *Aegilips* Haliday, 1835, *Anacharis* Dalman, 1823 *Calofigites* Kieffer, 1909, *Hexacharis* Kieffer, 1907, *Proanacharis* Kovalev, 1996, *Solenofigites* Díaz, 1979 and *Xyalaspis* Hartig 1847. The Anacharitinae can be easily distinguished from the other subfamilies of Figitidae by three main synapomorphies (Ros-Farré *et al.* 2000): (1) rounded and continuous pronotal plate, (2) broadly overlapping mandibles and (3) triangular-shaped head in front view - although more quadrangular shaped in genera *Acanthaegilopsis, Proanacharis* and some species of *Xyalaspis* and *Aegilips* (Kovalev 1996; Mata-Casanova & Pujade-Villar 2013; Mata-Casanova *et al.* 2014a, 2014c; Mata-Casanova *et al.* 2015). They also present a different biology from other Figitidae, being cited attacking the aphid-feeding larvae of Hemerobiidae (Neuroptera) (Diaz 1979; New 1979; Kyerich 1984; Miller & Lambdin 1985; Fergusson 1986; Cave & Miller 1987; Mata-Casanova *et al.* 2014b).

Genus *Xyalaspis* is closely related to *Aegilips* and *Acanthaegilopsis,* forming a group characterized by a sort of common morphological traits, including a short and carinated petiole, a robust body compared to the slender genera *Acanthaegilips* and *Anacharis,* and the absence of any groove or sulcus in the mesopleuron. Both *Xyalaspis* and *Acanthaegilopsis* present a scutellar spine derived from the circumscutellar carina, a character not seen in *Aegilips*. The main character used for distinguishing between the two spiked genera was the presence of malar sulcus in *Xyalaspis*, which is absent in *Acanthaegilopsis* (Mata-Casanova *et al.* 2014a).

Xyalaspis has a cosmopolitan distribution, being present in all continents except for Antarctica. Prior to our study, it comprised twenty species; five of them occurring in the Neotropical region (Mata-Casanova *et al.* 2014c): *X. aberrans* Mata-Casanova & Pujade-Villar, 2014, *X. alveolata* Mata-Casanova & Pujade-Villar, 2014, *X. flavipes* Ashmead, 1896, *X. hirsuta* Mata-Casanova & Pujade-Villar, 2014 and *X. pilosa* Mata-Casanova & Pujade-Villar, 2014. This makes the Neotropical region the second richest region in *Xyalaspis* species, behind the Palaearctic. However, this biodiversity is reduced to the mainland; no species for the Caribbean islands have been previously described. The objective of this paper is to describe two new species of *Xyalaspis* - *X. dominicana* Mata-Casanova & Pujade-Villar **sp.n.** from Dominican Republic and *X. muzencaba* Mata-Casanova & Pujade-Villar **n. sp.** from Mexico - and to register *X. dominicana* Mata-Casanova & Pujade-Villar **n. sp.** to the Caribbean area.

MATERIAL AND METHODS

Morphological terms used are those of Richards (1977), Ronquist (1995) and Ros-Farré *et al.* (2003). All measurements are relative except for the body length. Measurements and abbreviations include: F1–F12, first and subsequent flagellomeres; POL (post-ocellar distance) is the distance between the inner margins of the posterior ocelli; OOL(ocular-ocellar distance) is the shortest distance between the inner margin of the compound eye and the outer edge of the posterior ocellus; LOL (lateral–frontal ocellar distance) is the distance between the edges of the lateral and frontal ocelli. Antennal formula includes scape, pedicel and flagellomeres length and relative width in brackets.

The images included were made in the 'Serveis Científico-Tècnics' of the University of Barcelona. The field-emission gun environmental scanning electron microscope (FEI Quanta 200 ESEM) was used for high-resolution imaging, under a low voltage (12.0 kV) and without gold-coating of the specimens in order to preserve the material.

The specimens of *Xyalaspis dominicana* Mata-Casanova & Pujade-Villar **n. sp.** And the paratype of *X. muzencaba* Mata-Casanova & Pujade-Villar **n. sp.** are deposited in the Canadian National Collection of Insects (CNCI) while the holotype of *X. muzencaba* Mata-Casanova & Pujade-Villar **n. sp. i**s deposited in the Universitat de Barcelona (UB).

RESULTS

Xyalaspis dominicana Mata-Casanova & Pujade-Villar sp. nov.

Type material. Holotype ♀ (deposited in CNCI) with the following labels: "DOMINICAN REPUBLIC, Independencia, 28 km NW La Descubierta, Sierra de Neiba, 1400m, 5.XII.1991: L. Masner leg" (white label), "Holotype of *Xyalaspis dominicana* n. sp., design.. Mata-Casanova" (red label). Paratype (1♂ deposited in CNCI) with the following labels: "DOMINICAN REPUBLIC, Sierra de Bahoruco, Las Abejas, 1300m, 17-19.I.1989: L. Masner leg" (white label), "Paratype of *Xyalaspis dominicana* n. sp." (red label).

Diagnosis. *Xyalaspis dominicana* shares some characteristics with the Asian species *X. esbelta* Mata-Casanova & Pujade-Villar, 2014: the general slender constitution, the long scutellum transversely divided by a complete median carina and the smooth central region of the propodeum; however, it has a strongly carinated mesoscutum and pronotum (in *X. esbelta*, mesoscutum completely smooth and pronotum with only some weak basal carinae).

Description: **Length.** Body: 1.9 mm. Wings: 2 mm. Antenna: 1.8 mm (♀), 1.9 mm (♂).

Coloration. Head and mesosoma black, metasoma dark yellow. Mandibles yellowish brown with darker teeth. Antennae yellowish, darker flagellum. Legs and coxae yellowish, darker tarsi. Wing veins yellowish to dark yellow, hyaline wings.

Head. Quadrangular-shaped in front view (Fig. 1c). Head as high as wide in front view and 2.5 times its length in dorsal view. Face smooth and shiny with setaceous punctures, covered by uniformly distributed short hairs. Malar sulcus coriaceous, 0.8 times of compound eye height. Transfacial line 1.3 times of compound eye height. Diameter of toruli shorter than intertoruli distance but equal to eye-toruli distance. Clypeus shortly defined, convex, smooth and glabrous. Occipital and postocular carina absent. Compound eyes with only few short hairs. Ocelli almost arranged in line; POL:OOL:LOL ratio in males = 5.5:6:2, ocelli diameter 2; POL:OOL:LOL ratio in females = 5.5:5:2, ocelli diameter 2. Frons smooth and shiny, almost glabrous except for some pubescence near compound eye margin.

Antennae. Cylindrical flagellomeres, covered with pubescence. Female antennal formula: 8(3), 3(2.5), 6.5(2), 6.5(2), 6(2), 6(2), 5(2.5), 5(2.5), 4.5(2.5), 4(2.5), 4(2.5), 4(2.5), 6(2.5). Male antennal formula: 7(2.5), 3(2), 6(2), 6(2), 6(2), 6(2), 6(2), 6(2), 5(2), 5(2), 5(2), 5(2), 4.5(2), 6(2). Placodeal sensilla in females start at F2, in males start at F1.

Mesosoma. Pronotal plate alutaceous and covered by short pubescence. Pronotum smooth, and obliquely carinated (Fig. 1a). Mesoscutum width 1.2 times its length in dorsal view. Mesoscutum smooth covered by short and scarce pubescence and abundant setaceous punctures; alutaceous sculpture in region between notauli (Fig. 1b); complete and internally carinated notauli, median mesoscutal furrow apparent. Parapsidal signum present; parascutal sulcus excavated and internally carinated, divided in cells. Scutellum smooth and glabrous, surrounded by a circumscutelar carina that reaches scutellar spine end. Scutellum 0.9 times of mesoscutum length in dorsal view. Scutellar foveae not basally defined, elongated until of scutellar spine end (Fig. 1b); lateral pits of scutellar foveae absent. Interfoveal line complete, reaching of scutellar spine end; spine end truncated. Spine straight in both sexes in lateral view, being nearly one-third of scutellum total length. Mesopleuron smooth, glabrous and shiny, only some weak and short carinae near pronotum. Mesopleural triangle smooth and shiny, covered with sparse hyaline pubescence. Propodeum alutaceous and pubescent; central area smooth and glabrous (Fig. 1d), without longitudinal or transverse carinae.

Wings. Pubescent. Radial cell of forewing closed, 2.8 longer than wide. Marginal pubescence of wing denser at apical third.

Metasoma. Petiole longer than wide, dorsally smooth or only slightly carinated while heavily carinated in lateral and ventral regions. Third abdominal tergum 3 times longer than fourth abdominal tergum in dorsal view. Fifth, sixth and seventh abdominal terga are visible in dorsal view. Metasoma glabrous and smooth.

Etymology. The specific name makes reference to the country where the specimens were collected.

Biology. Unknown.

Distribution. Neotropical. Only recorded from Dominican Republic.

***Xyalaspis muzencaba* Mata-Casanova & Pujade-Villar sp. nov.**

Type material. - Holotype ♀ (deposited in UB) with the following labels: "MÉXICO, Morelos, Cuernavaca, III-V.1965: N.L.H. Krauss leg" (white label), "Holotype of *Xyalaspis muzencaba* n. sp., det.. Mata-Casanova" (red label). Paratype (1♀ deposited in CNCI) with the following labels: "MEXICO, Chiapas, San Cristóbal de Las Casasm 7200 ft, MT, 18.VI.1969: collector unknown".

Diagnosis. Species closely related to *X. dimorphica* Mata-Casanova & Pujade-Villar, 2014 and *X. subsaharica* Mata-Casanova & Pujade-Villar, 2014. However, *X. muzencaba* has an incomplete median mesoscutal furrow (median mesoscutal furrow reaching the pronotum in *X. dimorphica* and *X. subsaharica*).

Description: **Length.** Body: 2.6 mm. Wings: 2.3 mm. Antenna: 2.2 mm (♀).

Coloration. Head and mesosoma black, metasoma dark yellow. Mandibles yellowish brown with darker teeth. Antennae yellow. Legs and coxae yellow, darker third coxa and tarsi. Wing veins yellowish, hyaline wings.

Head. Quadrangular-shaped in front view (Fig. 2c). Head width 1.2 its height in front view and 2.5 times its length in dorsal view. Face smooth and shiny, densely pubescent. Malar sulcus coriaceous (Fig. 2a), 0.6 times of compound eye height. Transfacial line 1.2 times of compound eye height. Diameter of toruli equal to eye-toruli distance but shorter than intertoruli distance. Clypeus shortly defined, convex, smooth and glabrous. Occipital and postocular carina absent. Compound eyes pubescent. Ocelli arranged in line; POL:OOL:LOL ratio in females = 8:7:3, being the ocelli diameter 2.5. Frons smooth and shiny, with some scarce hyaline hairs.

Antennae. Cylindrical flagellomeres, covered with pubescence. Female antennal formula: 10(4.5), 4(2.5), 9(2.5), 9(3), 8(3), 7(3), 6.5(3), 6(3), 6(3), 5(3), 5(3), 4(3), 7(3). Placodeal sensilla start at F3 in females.

Mesosoma. Pronotal plate slightly projected at it apex. Pronotum alutaceous and pubescent, surface irregularly carinated (Fig. 2d). Mesoscutum width 1.2 times its length in dorsal view. Mesoscutum pubescent, central area glabrous; surface alutaceous, some anterior weak carinae between notauli; complete and internally carinated notauli, median mesoscutal furrow elongated but incomplete, also internally carinated (Fig. 2b). Parapsidal signum present; parascutal sulcus excavated and internally carinated, divided in cells. Scutellum heavily areolate. Scutellum length 0.9 times of mesoscutum length in dorsal view. Scutellar foveae basally defined by a carina; lateral pits of the scutellar foveae present. Interfoveal line complete. Spine straight in lateral view, about one-third of scutellum total length. Mesopleuron smooth, and shiny, some slight anterior carinae (Fig. 2d). Mesopleural triangle smooth and shiny, covered with sparse hyaline pubescence. Propodeum alutaceous and pubescent; central area smooth, with two upper larger cells and two smaller lower cells.

Wings. Pubescent. Radial cell of forewing closed, 2.8 longer than wide. Marginal pubescence of the wing denser at the apical third.

Metasoma. Petiole longer than wide, dorsally smooth while heavily carinated in lateral and ventral regions. Third abdominal tergum 3.7 times longer than fourth abdominal tergum in dorsal view. Fifth, sixth and seventh abdominal terga are visible in dorsal view. Metasoma glabrous and smooth.

Etymology. The specific name makes reference to Ah-Muzencab, the Mayan god of bees.

Biology. Unknown.

Distribution. Neotropical. Only recorded from Mexico (Morelos and Chiapas).

DISCUSSION

Genus *Xyalaspis* presents a highly variable morphology in the mesosomal sculpture, from the completely smooth mesoscutum without any traces of notauli or other features we can find in *X. esbelta* Mata-Casanova & Pujade-Villar, 2014 to the highly areolate sculpture we can see in *X. alveolata*. The scutellum is also highly variable, both in shape and sculpture. In some species, like *X. petiolata* Kieffer, 1901, the scutellum is much shorter than the mesoscutum, while other species like *X. arapahoe* Mata-Casanova & Pujade-Villar, 2014, *X. rugosa* Hartig, 1843 and *X. pilosa*, the scutellum is far larger than the mesoscutum (Mata-Casanova *et al.* 2014c, 2015a).

The newly described *Xyalaspis dominicana* **n. sp.**, presents a transversely carinated mesoscutum with completely and internally carinated notauli, and a strongly carinated pronotal surface. This state of characters is also present in *X. flavipes* and *X. pilosa*, both American species like *X. dominicana* **n. sp.** However, when examining the scutellar and propodeal sculpture we find strong differences with these two species. *X. domicana* **n. sp.** presents a smooth central propodeum and scutellum, the last being transversely divided by a median carina derivative from an elongation of the interfoveal line. These characters are also found in the Asian species *X. esbelta*. Thus, the morphological affinities and position of *X. dominicana* **n. sp.** are pretty ambiguous.

The Mexican species *Xyalaspis muzencaba* **n. sp.** also has some interesting morphological features. It has pubescent composite eyes, strongly sculptured pronotum and mesoscutum, and a long median mesoscutal furrow, like *X. pilosa*. The mesoscutal furrow, nevertheless, is internally carinated in *X. muzencaba*, a trait only seen in other species with complete median mesoscutal furrow: *X. dimorphica*, *X. subsaharica* and *X. victoriensis* New, 1979; this trait seems to reinforce the idea of a common Gondwanan origin for this group of *Xyalaspis* species (Mata-Casanova

et al. 2014a). Moreover, a detailed study of these species shows some shared traits with genus *Acanthaegilopsis*: the complete and internally carinated mesoscutal furrow, the quadrangular-shaped head and the strong carinated sculpture of the body, especially the pronotum and mesoscutum. The only character that is currently useful in separating both genera is the lack of coriaceous malar sulcus in *Acanthaegilopsis* (Mata-Casanova & Pujade-Villar 2013; Mata-Casanova *et al.* 2014a). However, the presence of the malar sulcus is variable within some Anacharitinae genera (Mata-Casanova *et al.* 2014c; 2015b), thus making the distinction between the two genera dubious. More research should be done to assert the validity of *Acanthaegilopsis*.

The Caribbean area has a poor record of Anacharitinae, especially considering that the highest diversity of the subfamily is located in the Neotropical region. The description of *X. dominicana* **n. sp.** represents the first record for genus *Xyalaspis* in the Caribbean and the second record of subfamily Anacharitinae in the area after the description of two species of genus *Acanthaegilips*: *A. alienus* Ros-Farré & Pujade-Villar, 2003 and *A. exiguus* Ros-Farré & Pujade-Villar, 2003 (Ros-Farré *et al.* 2003); the Dominican Republic holds the highest diversity of the subfamily, with two species recorded there – *A. alienus* and *X. dominicana* **n. sp.** The scarce record of Caribbean Anacharitinae appears to be due to the absence of previous works with undetermined material collected in this area; more surveys are very likely to increase the number of species and knowledge on Caribbean Anacharitinae. On the other hand, Mexico is pretty rich in Anacharitinae, with four species of the subfamily recorded there (Cameron 1884; Ros-Farré *et al.* 2003; Mata-Casanova *et al.* 2014c) prior to the description of *X. muzencaba* **n. sp.**

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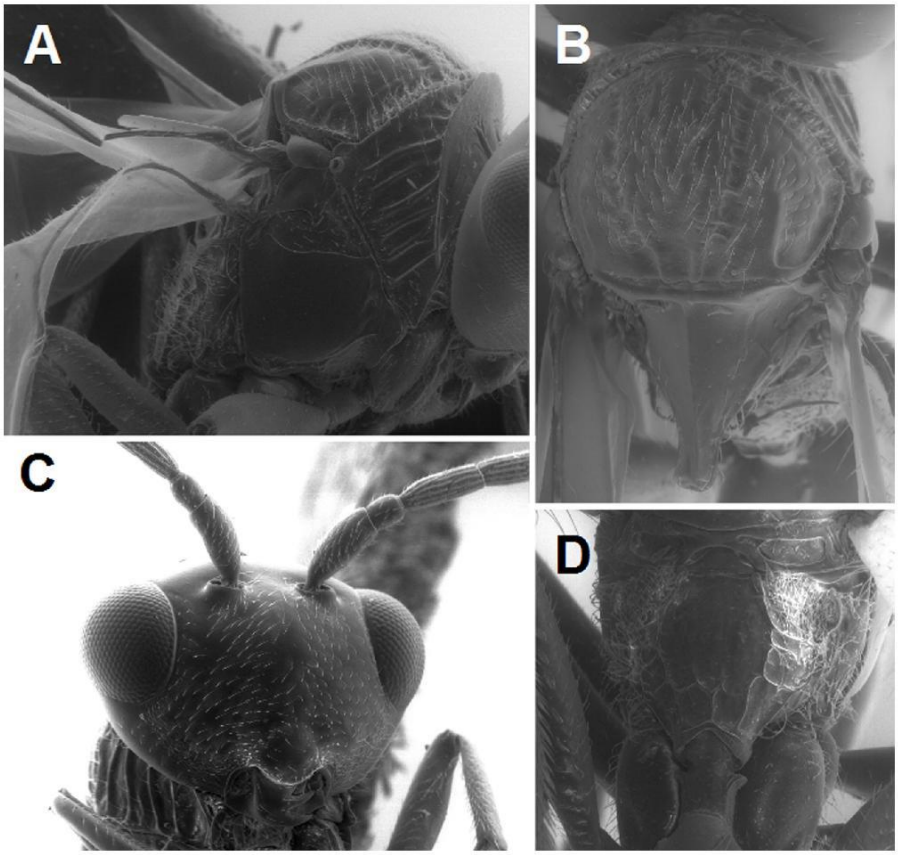


Figure 1. *Xyalaspis dominicana* **n.sp.**: (a) mesosoma in lateral view; (b) mesosoma in dorsal view; (c) head in front view; (d) propodeum.

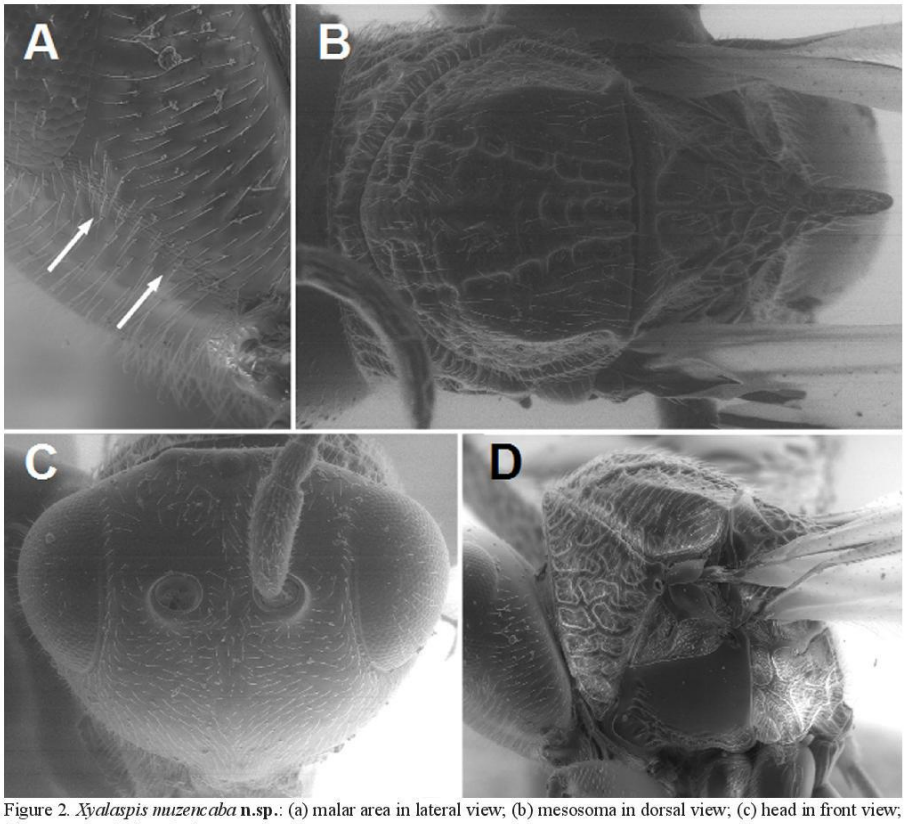


Figure 2. *Xyalaspis muzencaba* **n.sp.**: (a) malar area in lateral view; (b) mesosoma in dorsal view; (c) head in front view; (d) mesosoma in lateral view.

4.2.11. Knowledge on Chinese Anacharitinae

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Diversity of subfamily Anacharitinae (Hymenoptera: Cynipoidea: Figitidae) in China with description of a new species of *Xyalaspis* Hartig, 1843

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ABSTRACT

The poorly known Anacharitinae fauna from China is studied. Two species of genus *Aegilips* Haliday, 1835 (which only had one species previously recorded there) are recorded in China. The genera *Anacharis* Dalman, 1823 and *Xyalaspis* Hartig, 1843 are recorded for the first time with two and four species present respectively. A new species of *Xyalaspis*, *X. ribesi* **sp. n.**, is described. Diagnostic characters of the new species are illustrated, and data about biology, distribution and morphological variability of the Chinese Anacharitinae are discussed.

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Introduction

Anacharitinae are one of the twelve subfamilies currently included in family Figitidae (Paretas-Martínez et al., 2011), characterized by three main synapomorphies: (1) rounded and continuous pronotal plate, (2) broadly overlapping mandibles and (3) triangular-shaped head in frontal view (although some species present a quadrangular-shaped head due to an expansion of the malar area). The subfamily has a low generic diversity, currently including nine genera (Mata-Casanova and Pujade-Villar, 2013): *Acanthaegilips* Ashmead, 1897; *Acanthaegilopsis* Pujade-Villar, 2013; *Aegilips* Haliday, 1835; *Anacharis* Dalman, 1823; *Calofigites* Kieffer, 1909; *Hexacharis* Kieffer, 1907; *Proanacharis* Kovalev, 1996; *Solenofigites* Díaz, 1979; and *Xyalaspis* Hartig, 1843. Some species of *Acanthaegilips* (Mata-Casanova et al., 2014a), *Aegilips* (Fergusson, 1985), *Anacharis* (New, 1979; Kierych, 1984; Fergusson, 1985; Miller and Lambdin, 1985; Cave and Miller, 1987), *Solenofigites* (Díaz, 1979) and *Xyalaspis* (New, 1979; Fergusson, 1986) have been described as hosts of aphid-feeding larvae of Hemerobiidae (Neuroptera), but the biology of most Anacharitinae species remains unknown.

The bulk of Anacharitinae biodiversity is concentrated in four genera: *Acanthaegilips* (20 species), *Aegilips* (24 species), *Anacharis* (25 species) and *Xyalaspis* (21 species). While *Acanthaegilips* is restricted to the Neotropical region, the other three genera present a worldwide distribution, being present in all continents except for Antarctica. Despite this overall abundance, the Anacharitinae record in China is very scarce: the only previously known species of the subfamily was *Aegilips flavidicornis* (Kieffer, 1910) from the Xinjiang Uyghur Autonomous Region. However, all three genera have been abundantly collected in the adjacent countries. Besides *Aegilips flavidicornis*, *A. longicellus* Belizin, 1951, *A. nitidula* (Dalman, 1823), *A. paucus* Belizin, 1961 and *A. vena* Fergusson, 1985 have also been recorded in the Eastern Palaearctic (unpublished data). Regarding genus *Anacharis*, the genus has three species present in the region (unpublished data): the Palaearctic species *A. antennata* Belizin, 1951, *A. immunis* (Walker, 1835) and *A. parapsidalis* Belizin, 1951. Finally, when talking about *Xyalaspis*, four species have been recorded in the surrounding countries (Mata-Casanova et al., 2014b): *X. atemiensis* Ashmead, 1904, *X. esbelta* Mata-Casanova & Pujade-Villar, 2014, *X. hyalina* Belizin, 1951, and *X. is* Mata-Casanova & Pujade-Villar, 2014.

This Anacharitinae abundance suggested a similar diversity in China. The study of the Chinese Anacharitinae has revealed this presumption to be correct: a total of nine species have been recorded, eight of them for the first time. The most abundant genus is *Xyalaspis*, with four species: *X. atemiensis*, *X. esbelta*, *X. orientalis* and the newly described

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X. ribesi **sp. n.** The genus *Aegilips* is the next most abundant Anacharitinae genus in China, with three species present: the previously cited for China *A. flavidicornis*, *A. atricornis* and *A. romseyensis*, both recorded for the first time. *Anacharis* abundance is lower; only two species, *A. antennata* and *A. parapsidalis* have been found in China.

Material and methods

The undetermined specimens examined in this study are deposited in the School of Forestry and Biotechnology in Zhejiang Agricultural and Forest University (ZAFU, Linan, China); the type material of *Xyalaspis ribesi* sp. n. is deposited at ZAFU and University of Barcelona (UB). For this study 89 specimens were examined: 52 males and 37 females. Morphological terms used are those of Richards (1977), Ronquist (1995) and Ros-Farré et al. (2003). All measurements are relative except for the body length. Measurements and abbreviations include: F1–F12, first and subsequent flagellomeres; POL (post-ocellar distance) is the distance between the inner margins of the posterior ocelli; OOL(ocular-ocellar distance) is the shortest distance between the inner margin of the compound eye and the outer edge of the posterior ocellus; LOL (lateral–frontal ocellar distance) is the distance between the edges of the lateral and frontal ocelli. Antennal formula includes scape, pedicel and flagellomeres length and relative width in brackets.

The images were made in 'Serveis Científico-Tècnics' of the University of Barcelona. The field-emission gun environmental scanning electron microscope (Quanta 200 ESEM, FEI, Hillsboro, OR, USA) was used for high-resolution imaging, under a low voltage (12.0 kV) and without gold-coating of the specimens in order to preserve the material.

Systematics

Key to Chinese species of Anacharitinae

1. Mesopleuron with transverse and internally carinated sulcus; petiole longer than third coxa and smooth [genus ***Anacharis***]. …. 2
   Mesopleuron without transverse groove, presence of weak carinated sculpture more or less extended in anterior half; petiole as long as third coxa or shorter, carinated. …. 3
2. Species with smooth pronotum and light coarse sculpture in scutellum, never areolate. …. ***Anacharis antennata***
   Species with strong areolate sculpture in pronotum and scutellum. …. ***Anacharis parapsidalis***
3. Scutellum completely surrounded by a circumscutellar carina [genus ***Aegilips***]. …. 4
   Scutellum not surrounded by a circumscutellar carina but projected forming a spine instead [genus ***Xyalaspis***]. …. 6
4. Complete and strongly internally carinated notauli. …. ***Aegilips romseyensis***
   Notauli incomplete, not reaching anterior margin of mesoscutum, never internally carinated. …. 5
5. Notauli incomplete but extended, reaching anterior half of mesoscutum; scutellum areolate and not forming a tooth. …. ***Aegilips atricornis***
   Notauli residual, reduced to posterior mesoscutum; scutellum alutaceous and slightly raised at the apex forming a tooth. …. ***Aegilips flavidicornis***
6. Species with smooth mesoscutum, without traces of notauli or sculpture; slender scutellar spine divided by a median carina. …. ***Xyalaspis esbelta***
   Notauli present, complete and internally carinated; scutellar spine massive and without any median carina. …. 7
7. Mesosocutum completely smooth, without any carinated microsculpture; median mesoscutal furrow absent. …. ***Xyalaspis atemiensis***
   Mesoscutum with transversely carinated microsculpture more or less extended; median mesoscutal furrow present. …. 8
8. Scutellum shorter than mesoscutum in dorsal view, apically rounded. …. ***Xyalaspis orientalis***
   Scutellum longerr than mesoscutum in dorsal view, spine clearly defined. …. ***Xyalaspis ribesi***

Aegilips Walker, 1835

Diagnosis. Genus with smooth mesopleuron, without any groove, a character that casts it away from *Acanthaegilips*, *Anacharis*, *Calofigites*, *Hexacharis*, *Proanacharis* and *Solenofigites* (all these genera present a groove in the mesopleuron, either transverse or oblique). It is closely related to the other two remaining Anacharitinae genera *Acanthaegilopsis* and *Xyalaspis*. Unlike *Acanthaegilopsis*, the mesopleuron in *Aegilips* does not present traces of coriaceous sculpture while the malar area presents a coriaceous sulcus (a character absent in *Acanthaegilopsis*). These traits are also shared by genus *Xyalaspis*; the key character for distinguishing between both genera is the absence of a true scutellar spine derived from the circumscutellar carina in *Aegilips*.

Distribution. Known from Afrotropical, Australasian, Nearctic, Neotropical and Palaearctic regions.

Aegilips atricornis Fergusson, 1985

Diagnosis. Unlike *A. romseyensis*, this species presents smooth pronotum and non-internally carinated notauli (pronotum heavily rugate and notauli percurrent and internally carinated in *A. romseyensis*). Like *A. flavidicornis*, it has incomplete notauli, but in *A. atricornis* they are extended more than haf of mesoscutum, nerly reaching the pronotal margin in some specimens.

Studied material (2♀ & 6♂). "1♂, Gansu, Zhenyuan, VII.1981: Cao Wei leg"; "1♀ & 1♂, Hubei, Shennongjia, 27.VII.1982: He Junhua leg"; "1♂, Neimenggu, Helan Shan, Gulaben Luancaigou, sweep net, 26.VII.2010: collector unknown"; "1♀, Neimenggu, Helan Shan, Shuimogou, sweep net, 31.VII.2010: Guo Rui"; "2♂, Neimenggu, Helan Shan, Halawu-Shatangzi, sweep net, 4.VIII.2010: Guo Rui"; "1♂, Guangxi, Nanning, Longshan protection zone, sweep net, 1-2.VII.2011: Xu Zaifu".

Biology. Known to attack the Hemerobiidae *Wesmaelius betulinus* (Ström, 1788) and *W. subnebulosus* (Stephens, 1836) (Fergusson, 1985).

Distribution. Oriental and Palaearctic. Known from United Kingdom (Fergusson, 1985), Portugal: Madeira, Morocco, Spain, Andorra, France, Switzerland, Ireland, Slovenia, Hungary, Slovakia, Sweden, Romania, Cyprus, Pakistan and India (unpublished data); first record for China (Gansu, Guangxi, Hubei and Neimenggu).

Aegilips flavidicornis Kieffer, 1910

Diagnosis. Species with incomplete notauli and smooth mesoscutum like *A. atricornis*, from which can be distinguished by having alutaceous scutellum slightly projected at the end (scutellum areolate and not dorsally projected in *A. atricornis*).

Studied material (1♀). "1♀, Beijing, Yanqing, 27.IX.1980: Dong Zhenhua leg".

Biology. Host unknown.

Distribution. Palaearctic. Known from Western China (Xinjiang) (Kieffer, 1910); first record for Eastern China (Beijing).

***Aegilips romseyensis* Fergusson, 1985**

Diagnosis. Species with strongly rugose pronotum and complete notauli which .present strong internal carinated sculpture, characters that cast it apart from the other Chinese *Aegilips* species (*A. atricornis* and *A. flavidicornis* present smooth or only slightly carinated pronotum at the basal region and incomplete notauli variable in length but never internally carinated).

Studied material (11♀ & 2♂). "2♀, Zhejiang, Tianmu Shan, Laodian, sweep net, 19.VIII.1999: Yang Yafen leg"; "1♀, Zhejiang, Fengyangshan, 29.VII.2007: Wang Yipping leg"; "7♀ & 2♂, Zhejiang, Tianmu Shan, Xianrening, 1200 m, sweep net, 25-29.VII.2011: Chen Huayan leg"; "1♀, Zhejiang, Tianmu Shan, Xianrening, sweep net, 9.VII.2012: Chen Huayan leg".

Biology. Host unknown.

Distribution. Palearctic. United Kingdom (Fergusson, 1985), Czech Republic, France, Hungary, Italy and Slovakia (unpublished data); first record for China (Zhejiang).

***Anacharis* Dalman, 1823**

Diagnosis. Unlike *Aegilips* and *Xyalaspis*, genus *Anacharis* presents a complete transverse groove in the mesopleuron which is usually internally carinated. It can be easily distinguishable from the rest of Anacharitinae genera with mesopleural grooves for having an elongated petiole (at least as long as the third coxa, usually longer).

Distribution. Known from Afrotropical, Australasian, Nearctic, Neotropical, Oriental and Palaearctic regions.

***Anacharis antennata* Belizin, 1951**

Diagnosis. Species with complete and internally carinated notauli like the other Chinese *Anacharis* species *A. parapsidalis*. However, it can be distinguished from it for having a smooth pronotum and lacking areolate sculpture in the scutellum.

Studied material (6♀ & 2♂). "1♀, Yunnan, Kunming, 21.III.1981: He Junhua leg"; "1♀, Yunnan, Kunming, 21-24.III.1981: He Junhua leg"; "1♀, Ningxia, Liupanshan, Qiuqianjia, 7.VII.2007: Yao Jiemin leg"; "1♂, Ningxian, Liupan Shan, Fengtai tree farm, sweep net, 5.VII.2009: Wang Guangyue leg"; "1♀, Ningxia, Liupanshan, sweep net, 12.VII.2009: Su Lixin leg"; "1♀, Neimenggu, Helan Shan, 4.VIII.2010: He Junhua leg"; "1♀ & 1♂, Guangxi, Huajiang, Moershan, 400-2100 m, date unknown: Wang Jianfeng leg".

Biology. Host unknown.

Distribution. Palaearctic. Known from Tajikistan (Belizin, 1951) and Japan (unpublished data); first record for China (Guangxi, Neimenggu, Ningxia and Yunnan).

***Anacharis parapsidalis* Belizin, 1951**

Diagnosis. Species presenting smooth to slightly alutaceous mesoscutum and complete internally carinated notauli like *A. antennata*; they can be distinguished by the presence of strong areolate sculpture in the pronotum and scutellum of *A. parapsidalis*.

Studied material (1♀ & 1♂). "1♀, Fujian, Zhangzhou, sweep net, IV.1987: Lin Naiquan leg"; "1♂, Shanxi, Xinshui, Dongxiachenghuanggu, sweep net, date unknown: Wang Huan".

Biology. Host unknown.

Distribution. Palaearctic. Known from Russia (Belizin, 1951), Japan and Romania (unpublished data); first record for China (Fujian and Shanxi).

***Xyalaspis* Hartig, 1843**

Diagnosis. *Xyalaspis* presents a scutellar spine derived from the circumscutellar carina, a character shared with two other Anacharitinae genera, the Neotropical genus *Acanthaegilips* and the Afrotropical *Acanthaegilopsis*. The differences between *Acanthaegilips* and *Xyalaspis* are apparent, making both genera easily distinguishable: the first presents an oblique groove in the mesopleuron, a general slender constiturion, smooth petiole and a straight malar sulcus, while *Xyalaspis* has an smooth mesopleuron (except for some anterior carinae which may be more or less extended), a studier constitution, carinated petiole and a coriaceous line across its malar area. The differences between *Acanthaegilopsis* and *Xyalaspis* are less; both genera are closely related. The diagnostic characters proposed in Mata-Casanova and Pujade-Villar (2013) are the smooth mesopleuron and coriaceous malar sulcus in *Xyalaspis* (malar sulcus absent and mesopleuron at least partially coriaceous in *Acanthaegilopsis*).

Distribution. Known from Afrotropical, Australasian, Nearctic, Neotropical, Oriental and Palaearctic regions.

***Xyalaspis atemiensis* Ashmead, 1904**

Diagnosis. Species easily distinguishable from *X. orientalis* and *X. ribesi* **sp. n.** for having a completely smooth mesoscutum without traces of any alutaceous sculpture and lacking median mesoscutal furrow (median mesoscutal furrow present and mesoscutum alutaceous with some carinated sculpture variable in extension in *X. is* and *X. ribesi* **sp. n.**). Although this state of characters is also present in *X. esbelta*, *X. atemiensis* presents complete and internally carinated notauli (notauli absent in *X. esbelta*).

Studied material (1♂). "1♂, Sichuan, Wanglang, sweep net, 26.VII.2006: Wang Yipping leg".

Biology. Host unknown.

Distribution. Palaearctic. Known from Japan (Ashmead, 1904); first record for China (Sichuan).

***Xyalaspis esbelta* Mata-Casanova & Pujade-Villar, 2014**

Diagnosis. Species characterized for having a completely smooth mesoscutum, without any traces of notauli or other features, and a long slender scutellar spine longitudinally divided by a median carina derived from the interfoveal line (complete and internally carinated notauli while median scutellar carinae absent in *X. atemiensis*, *X. orientalis* and *X. ribesi* **sp. n.**).

Studied material (3♀ & 21♂). "1♂, Sichuan, Xichang, 17.VIII.1980: He Junhua leg"; "1♂, Yunnan, Xinnian, 5.IV.1981: He Junhua leg"; "2♂, Yunnan, Tengchong, 27.IV.1981: He Junhua leg"; "1♂, Guizhou, Guiyang, 2.V.1981: He Junhua leg"; "1♂, Yunnan, Ruili Mengxiu, 2.V.1981: He Junhua leg"; "1♂, Yunnan, Kunming, 16.V.1981: He Junhua leg"; "1♂, Yunnan, Kunming, 18.V.1981: He Junhua leg"; "1♀, Yunnan, Shuang Jiang, 21.IV.1981: He Junhua leg"; "4♂, Guizhou, Guiyang, 21.V.1981: He Junhua leg"; "1♂, Guizhou, Guiyang, 24.V.1981: He Junhua leg"; "1♂, Guangxi, Silin, 29.V.1982: He Junhua leg"; "1♂, Zhejiang, Tianmu Shan, 21.VII.1987: Chen Xuexin leg"; "1♂, Xinjiang, Ürümqi, 3.IX.1987: Ma Qi leg"; "1♂, Zhejiang, Tianmu Shan, Xianrening, sweep net, 1.VII.2001: Pu Meijua leg"; "1♂, Zhejiang, Fengyangshan,

29.VII.2007: collector unknown"; "1♀, Zhejiang, Fengyang Shan, 1600-1700 m, sweep net, 1.VIII.2007: Huang Maojian leg"; "1♂, Fujian, Shanghang, Meihuastan, 5.VI.2008: Yuan Feng leg"; "1♂, Guizhou, Kuankuoshui, 13.VIII.2010: Xu Min leg"; "1♂, Zhejiang, Tianmu Shan, Qingliangfeng, sweep net, 22.X.2011: Wuang Huan leg"; "1♀, Zhejiang, Wuyanling: date & collector unknown".

Biology. Host unknown.

Distribution. Oriental and Palaearctic. Known from India, Japan, Taiwan and Thailand (Mata-Casanova et al., 2014b); first record for China (Fujian, Guangxi, Guizhou, Sichuan, Xinjiang, Yunnan and Zhejiang).

***Xyalaspis orientalis* Mata-Casanova & Pujade-Villar, 2014**

Diagnosis. Species with complete and internally carinated notauli, a character shared with *X. atemiensis* and *X. ribesi* **sp. n.** but, unlike them, it does not have a clearly defined scutellar spine but a rounded end of the scutellum instead (scutellar spine clearly differentiated and projected from the scutellum in *X. atemiensis* and *X. ribesi* **sp. n.**).

Studied material (5♀ & 5♂). "1♂, Gansu, Zhenyuan, 14.VI.1980: Cao Wei leg"; "1♂, Hubei, Shennongjia, 27.VII.1982: He Junhua leg"; "1♀, Zhejiang, Tianmu Shan, sweep net, 2.VI.1990: He Junhua leg"; "1♀, Zhejiang, Tianmu Shan, Laodian, sweep net, 19.VIII.1999: Yang Yafen leg"; "1♂, Sichian, Wanglang, 26.VII.2006: Wang Yipping leg"; "1♂, Zhejiang, Fengyang Shan, 29.VII.2007: Lu Zhan leg"; "1♀, Zhejiang, Sanmuping, sweep net, 25.VII.2011: Wan Yipping leg"; "2♀, Zhejiang, Tianmu Shan, Xianrening, sweep net, 25-29.VII.2011: Chen Huayan leg"; "1♀, Zhejiang, Tianmu Shan, Malaise trap, IX.2012: collector unknown".

Biology. Host unknown.

Distribution. Palaearctic. Known from Japan and South Korea (Mata-Casanova et al., 2014b); first record for China (Gansu, Hubei and Zhejiang).

***Xyalaspis ribesi* sp. n. Mata-Casanova & Pujade Villar**
(Fig. 1)

Diagnosis. Species with complete internally carinated notauli, median mesoscutal furrow present and weak carinated sculpture in some areas of the mesoscutum like *X. orientalis*. However, its scutellum is longer than the mesoscutum and presents a clearly defined scutellar spine (scutellum shorter than mesoscutum and apically rounded in *X. orientalis*).

Type material. HOLOTYPE 1♂ deposited in UB with the following labels: "Zhejiang, Tianmu Shan, Xianrening, sweep net, 25-29.VII.2011: Chen Huayan leg" (white label); "HOLOTYPE ♂, *Xyalaspis ribesi* Mata-Casanova & Pujade-Villar n. sp., design Mata-Casanova-2015" (red label). PARATYPES (6♀ & 15♂: 3♀ & 10♂ deposited in ZAFU 3♀ & 5♂ deposited in UB): "2♀, Zhejiang, Anji, Longwashan, 25.VII.1996: He Junhua leg"; "1♂, Zhejiang, Anji, Longwashan, 28.VII.1996: Wu Hong leg"; "1♂, Henan, Huangshian, 17.VII.1998: Chen Xuexin leg"; "1♂, Zhejiang, Tianumu Shan, Malaise trap, 20.VII.1998: Zhao Mingshui leg"; "1♂, Zhejiang, Tianmu Shan, Xianrening, sweep net, 29.VII.2010: Wu Qiong leg"; "4♀ & 11♂, Zhejiang, Tianmu Shan, Xianrening, sweep net, 25-29.VII.2011: Chen Huayan leg".

Description.
Length. Body: 2.7-3 mm. Antennae: 3 mm (♂), 2.3 mm (♀). Wings: 2.7-2.9 mm.

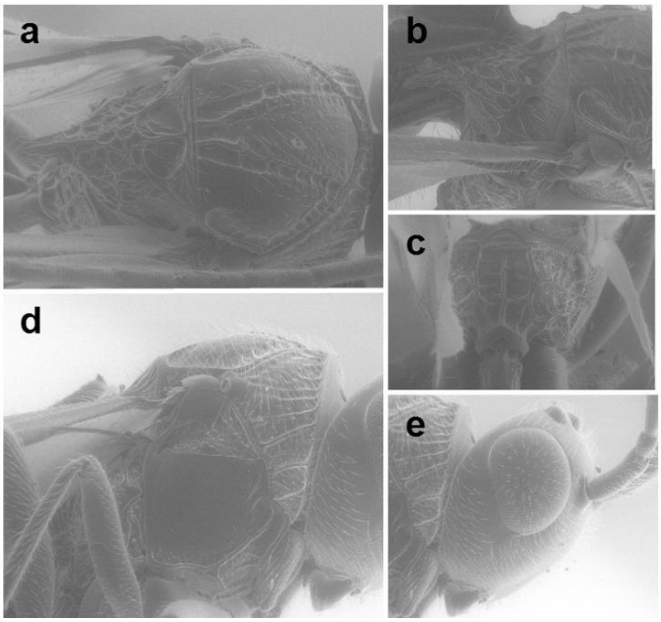


Fig. 1. *Xyalaspis ribesi* **sp. n.**: (a) mesosoma in dorsal view; (b) scutellar spine in lateral view; (c) propodeum; (d) mesosoma in lateral view; (e) head in lateral view.

Coloration. Head, mesosoma and metasoma black. Mandibles yellowish brown with darker teeth. Antennae brown with darker first segment. Legs yellowish brown with darker coxae, third coxa black. Veins of wings brownish.

Head. Subquadrangular-shaped in front view. Face smooth and pubescent, hair abundance weaker in central face. Head as high as wide in front view and 2.3 times its length in dorsal view. Malar sulcus coriaceous (Fig. 1e), 0.8 times as long as height of compound eye. Transfacial line 1.1 times larger than compound eye height. Diameter of the toruli larger than inter-toruli distance and torulus-eye distance. Clypeus shortly defined and convex, almost glabrous. Occipital and postocular carinae absents. Compound eyes pubescent (Fig. 1e). POL:OOL:LOL ratio = 6:6:2.5 and ocelli diameter 2 in both sexes. Frons, gena and occiput smooth and densely pubescent.

Antennae. Cylindrical flagellomeres covered with pubescence. Male antennal formula: 12(4), 4.5(3), 11(3), 10(3), 10(2.5), 9(2.5), 9(2.5), 8(2.5), 7.5(2), 7(2), 6(2), 6(2), 6(2), 7(2). Female antennal formula: 11(4), 4(2.5), 10(2.5), 9(2.5), 8(2), 8(2), 7(2), 6(2), 5(2), 5(2), 4.5(2), 5(2), 7.5(2). Placodeal sensilla starting at F1 in males but absent in dorsal side until F8; placodeal sensilla starting at F3 in females.

Mesosoma. Pronotum pubescent and smooth, with transverse carinae complete in lower prontoum but reduced to anterior margin in upper pronotum (Fig. 1d). Mesoscutum width 1.3 times its length in dorsal view. Mesoscutum smooth, shiny and almost glabrous except for a few short setae in its lateral region, presence of some piliferous punctures; presence of some weak transverse carinae in the area between notauli, usually reduced to anterior mesoscutum and base of notauli (Fig. 1a). Notauli complete with strong internal carinae; median mesoscutal furrow short and not apically closed. Parapsidal signum short and weak; parascutal sulcus present, deeply excavated and internally carinated. Scutellum length 1.1 times of mesoscutum length in dorsal view; scutellar spine narrowing towards the apex, about ½ of scutellar total length, curved downwards in lateral view (Fig. 1b). Scutellum heavily areolate; scutellar foveae rounded, big and smooth, without any internal carinae and basally defined by a carina; lateral pits of scutellar foveae rounded and large (Fig. 1a). Interfoveal line present. Mesopleuron glabrous and shiny, non-carinated except for two short and small anterior ridges; mesopleural triangle smooth and pubescent (Fig. 1d). Metanotal troughs slightly coarse and pubescent. Propodeum alutaceous, pubescence abundant in lateral regions but central area glabrous; central pronotum longitudinally divided in two cells by a complete median carina, presence of some weaker and incomplete transverse carinae (Fig. 1c).

Wings. Pubescent. Radial cell of forewing closed, 2.6 times longer than wide. Marginal pubescence of forewing denser at the apical third.

Metasoma. Longer than head + mesosoma. Petiole almost 2 times longer than wide, anteriorly carinated. Third abdominal tergum 3.7 times longer than fourth tergum in dorsal view. Fifth, sixth and seventh abdominal terga visible in dorsal view. Abdominal terga smooth and glabrous; fourth to seventh abdominal terga anteriorly punctuated.

Etymology. The specific name is dedicated to our fellow hymenopterologist Dr. Antoni Ribes Escolà, deceased on December 2nd, 2014.

Biology. Host unknown.

Distribution. Palaearctic. Known only from China (Henan and Zhejiang).

Discussion

China represents a transitional zone between the Palaearctic and the Oriental regions; both regions are rich in Anacharitinae fauna: 4 genera - including the endemic genus *Proanacharis* (Kovalev, 1996) – and 26 species were previously known for the Palaearctic, while 2 genera and 4 genera were known for the Indomalayan region. Despite this overall abundance, the Chinese anacharitines had never been widely known; only *Aegilips flavidicornis* from Western China (Xinjiang) was previously known prior. The study conducted on the Chinese Anacharitinae has shown a rich diversity: 9 species of the subfamily have been found in China, including one new species, *Xyalaspis ribesi* **sp. n.** Species from the three Anacharitinae genera with worldwide distribution -*Aegilips*, *Anacharis* and *Xyalaspis*- were recorded.

Genus *Aegilips* was the only previously recorded Anacharitinae genera in China, as mentioned above. *A. flavidicornis* was known from a specimen collected in Xinjiang Autonomous Region by Kieffer (1910); one specimen has been recorded in Beijing, suggesting a distribution area extended across all China. Two species have been recorded for the first time in the country: *A. atricornis* and *A. romseyensis*. *A. atricornis* is present mainly in central China; the new records extend the distribution area of the species to reach Eastern Eurasia, where it was absent. The last Chinese *Aegilips* species presents an interesting distribution area, as it was previously known onlye from the Western Palaearctic: its distribution area comprising two separate regions and suggesting a much broader presence across all the Palaeartic region.

Anacharis is the most scarce of the recorded genera; only two species are present in China. Both *A. antennata* and *A. parapsidalis* were previously known from the Eastern Palaeartic. *A. antennata* was previously known from Tajikistan and Japan; it has been record both in Northern and Southern China, suggesting a extended distribution in the Eastern Palaearctic region. *A. parapsidalis* was known from Japan and Far Eastern Russia, plus an isolted Romanian specimen. In China it has been recorded in Central China and the Eastern coastline.

The most abundant and diverse Anacharitine genera in China is *Xyalaspis*; four species have been recorded there: *X. atemiensis, X. esbelta, X. orientalis* and *X. ribesi* **sp. n.** The genus' distribution area is extended across all the country, from Xinjiang Autonomous Region to the coastline provinces; it is absent from Northern China, however. The most abundant and extended *Xyalaspis* species is *X. esbelta*: it is present in seven provinces and its distribution range extends from Xinjiang to the Southern coastline provinces. *X. esbelta* was previously known from South Korea, Japan, India and Thailand; its prominent presence in China makes its distribution area continuous and places it as the most preeminent of the Far Eastern species of *Xyalaspis*. *X. orientalis* is the next more abundant species of the genus, its presence reduced to central China and the coastline province of Zhejiang; the distribution area of the species is also extended from its previous records from South Korea. The newly described *X. ribesi* **sp. n.** presents a smaller distribution area: its records are circumscribed to the Zhejiang province except for one specimen collected in the close Henan province. Finally, *X. atemiensis* has only one specimen collected in China; this record is important because it represents the first record of the species since the original description of the species by Ashmead (1904) from Japan.

The biology of the Chinese Anacharitine species is little understood. Only the hosts of *Aegilips atricornis* are known: *Wesmaelius betulinus* and *W. subnebulosus*, according to Fergusson (1985). Genus *Wesmaelius* Krüger, 1922 is also present in China with at least one recorded species: *Wesmaelius asiaticus* Yang, 1980 (Yang, 1980). Other Hemerobiidae genera known to be Anacharitinae hosts and also recorded for China are *Hemerobius* Linnaeus, 1758, *Sympherobius* Banks, 1904 (Yang, 1990) and *Micromus* Rambur, 1842 (Yang, 1990; Zhao et al., 2014); so the range of suitable hosts for Anacharitinae is wide. More research should be done to unveil the biology of the aforementioned species.

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4.2.12. Revision of Afrotropical *Aegilips*

Revision of the current knowledge of genus *Aegilips* Haliday, 1835 (Hymenoptera: Figitidae: Anacharitinae) in the Afrotropical Region, with description of three new species

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A revision of the current knowledge of the Afrotropical species of *Aegilips* Haliday, 1835 is given. The previously known South African *Aegilips capensis* Kieffer, 1912 is redescribed and its distribution area extended, being cited for the first time in other countries of sub-Saharan Africa. Three new species are described: *Aegilips aethiopicus* Mata-Casanova & Pujade-Villar sp. n., *Aegilips foveata* Mata-Casanova & Pujade-Villar sp. n. and *Aegilips virungae* Mata-Casanova & Pujade-Villar sp. n. Diagnostic characters and data about biology, distribution and affinities with other *Aegilips* species are discussed. An identification key for the Afrotropical species of *Aegilips* is given.

Key words: *Aegilips*, Afrotropical, new species, taxonomy.

INTRODUCTION

The Figitidae is a family of endoparasitoid cynipoid wasps which currently comprises 12 subfamilies: Anacharitinae, Aspicerinae, Charipinae, Emarginae, Euceroptrinae, Eucoilinae, Figitinae, Mikeiinae, Parnipinae, Plectocinipinae, Pycnosticminae and Thrasorinae (Paretas-Mart nez *et al.* 2011). Despite representing about the 90 % of Cynipoidea diversity along with its sister family Cynipidae (Ronquist 1999), the real diversity of Figitidae is poorly known.

The subfamily Anacharitinae comprises nine genera: *Acanthaegilips* Ashmead, 1897, *Acanthaegilopsis* Pujade-Villar, 2013, *Aegilips* Haliday, 1835, *Anacharis* Dalman, 1823, *Calofigites* Kieffer, 1909, *Hexacharis* Kieffer, 1907, *Proanacharis* Kovalev, 1996, *Solenofigites* D az, 1979, and *Xyalaspis* Hartig, 1843. These genera share three synapomorphies (Ros-Farr *et al.* 2000): (1) rounded pronotal plate delimited by a continuous pronotal carinae from one pronotal margin to the other across the dorsum, (2) triangular head in frontal view (more quadrangular in shape in *Acanthaegilopsis* and *Proanacharis* and some species of *Aegilips* and *Xyalaspis*) and (3) broadly overlapping mandibles. They attack the aphid-feeding larvae of the families Chrysopidae and Hemerobiidae (Neuroptera) (D az 1979; New 1979; Kyerich 1984; Miller & Lamdin 1985; Fergusson 1986; Cave & Miller 1987; Ronquist 1999; Mata-Casanova *et al.* 2014a), although the biology of most species remains unknown.

For a long time, the Afrotropical record of Anacharitinae comprised a single species, *Aegilips capensis* Kieffer, 1912 (Kieffer 1912). However, in the last two years several studies have improved the knowledge of the subfamily in the region, with the addition of three new genera and five new species. Genus *Anacharis* is represented by *Anacharis madagascarensis* Pujade-Villar, 2012 (Pujade-Villar 2012) and *A. afrotropica* Mata-Casanova & Pujade-Villar, 2015 and *A. rwenzori* Mata-Casanova & Pujade-Villar, 2015 (Mata-Casanova *et al.* 2015), while the genus *Xyalaspis* is represented by *Xyalaspis subsaharica* Mata-Casanova & Pujade-Villar, 2014 (Mata-Casanova *et al.* 2014b). Also, *Acanthaegilopsis,* an endemic genus for the Afrotropical Region, was described (Mata-Casanova & Pujade-Villar 2013), and it currently comprises two species: *A. malagasy* Mata-Casanova & Pujade-Villar, 2013 and *A. hemicoriaceus* Mata-Casanova & Pujade-Villar, 2014 (Mata-Casanova *et al.* 2014b).

This study focuses on the Afrotropical species of *Aegilips*. The genus *Aegilips* belongs to those Anacharitinae lacking an oblique groove in the mesoscutum (Restrepo-Ortiz & Pujade-Villar 2012). It is closely related to *Acanthaegilopsis*

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(Mata-Casanova *et al.* 2014b) and *Xyalaspis* (Buffington *et al.* 2012), with which it shares a short and coarsely sculptured petiole, transverse carinae in the lower mesopleuron and third abdominal tergum at least two times longer than the fourth and usually longer. However, it lacks the scutellar spine derived from the projection of the circumscutellar carina present in *Acanthaegilopsis* and *Xyalaspis*.

The bulk of *Aegilips* diversity is concentrated in the Holarctic Region. As we have previously mentioned there was only one species known for the Afrotropical Region prior to our study, *Aegilips capensis* from South Africa. In this work, new data on the distribution patterns and biology for this species are given; its distribution area has been extended to include a wider range of sub-Saharan countries. Three new species, *Aegilips aethiopicus* Mata-Casanova & Pujade-Villar sp. n., *Aegilips foveata* Mata-Casanova & Pujade-Villar sp. n. and *Aegilips virungae* Mata-Casanova & Pujade-Villar sp. n., are described, thus increasing the number of known Afrotropical species of genus *Aegilips* to four, making it the region with the highest diversity of *Aegilips* species aside from the Holarctic. Also, diagnostic characters for these species are given, and data about morphological features, distribution area and biology are discussed.

MATERIAL AND METHODS

The undetermined *Aegilips* specimens examined in this study were deposited in the Canadian National Collection of Insects, Arachnids and Nematodes (CNC, Ottawa) and the Natural History Museum (NHM, London) collections. The specimens were loaned to us and studied at Universitat de Barcelona (UB). The identified material is kept at CNC, NHM and UB.

For this study 100 undetermined specimens were examined: 54 males and 46 females. Morphological terms used are those of Richards (1977), Ronquist (1995) and Ros-Farr *et al.* (2003). All measurements are relative except for the body length. Measurements and abbreviations include: F1–F12, first and subsequent flagellomeres; POL (post-ocellar distance) is the distance between the inner margins of the posterior ocelli; OOL (ocular–ocellar distance) is the shortest distance between the inner margin of the compound eye and the outer edge of the posterior ocellus; LOL (lateral–frontal ocellar distance) is the distance between the edges of the lateral and frontal ocelli. Antennal formula includes scape, pedicel and flagellomere lengths with relative width in brackets.

The images were taken at the Serveis Cient fico-T cnics of the University of Barcelona. The field-emission gun environmental scanning electron microscope (Quanta 200 ESEM) was used for high-resolution imaging, under a low voltage (12.0 kV) and without gold-coating of the specimens in order to preserve the material.

RESULTS

Aegilips capensis Kieffer, 1912 **comb. rest.**, Figs 1b, 2b

Aegilips capensis Kieffer, 1912: 451–452.

Xyalaspis capensis van Noort *et al.*, 2015: 34.

Diagnosis. Aegilips capensis has incomplete notauli and smooth mesoscutum, closely resembling *A. atricornis* Fergusson, 1985, *A. longicellus* Belizin, 1951, and *A. paucus* Belizin, 1961. It can be distinguished from *A. longicellus* and *A. paucus* by having the distal edge of the scutellar foveae defined by a strong carina (scutellar foveae without strong basal carina in *A. longicellus* and *A. paucus*). Unlike *A. atricornis*, *A. capensis* presents a short projected tooth at the end of the scutellum (scutellum rounded at its apex, without any projections in *A. atricornis*).

Studied material (12♀ & 2♂ deposited in CNC, 30♀ & 29♂ deposited in NHM, 4♀ & 3♂ deposited in UB). *DEMOCRATIC REPUBLIC OF CONGO*: '1♂, Kanabayonga (Kabasha), 1760 m, 7.XII.1934: G.F. De Witte leg' (deposited in NHM); '1♀, Lusinga, 1760 m, 12–17.XII.1947: G.F. De Witte leg' (deposited in NHM). *UGANDA*: '1♀, location not specified, III.1939: H.C. Taylor leg' (deposited in NHM); '1♀,Rwenzori range, Nyinabitaba, 8650 ft, 7–13.VII.1952: D.S. Fletcher leg' (deposited in NHM). *KENYA*: '1♀, Doondu, XI.1925: Larra leg' (deposited in NHM). *MALAWI*: '4♀, Kasungu, Mtunthama, IX.1982: J. Feehan' (deposited in NHM). *ZIMBABWE*: '2♀, Chishiwasha, VIII.1978: A. Watsham leg' (deposited in NHM); '3♀ & 2♂, Chishiwasha, VIII.1978: A. Watsham leg' (deposited in NHM); '8♀ & 7♂, Chishiwasha, IX.1978: A. Watsham leg' (4♀ & 4♂ deposited in NHM, 4♀ & 3♂ deposited in UB); '2♀ & 1♂, Salisbury, VI.1979: A. Watsham leg' (deposited in NHM); '1♂, Salisbury, VII.1979: A. Watsham leg' (deposited in NHM); '1♀, Salisbury, VIII.1979: A. Watsham leg' (deposited in NHM); '1♀, Salisbury, X.1979: A.

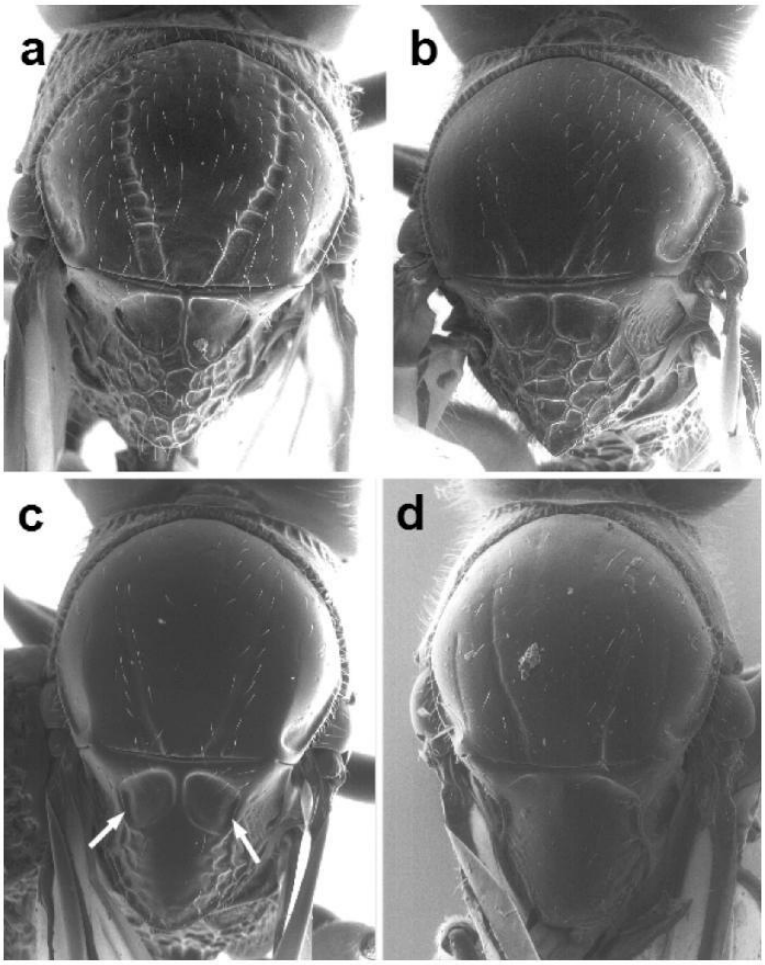


Fig. 1. Mesoscutum in dorsal view of (**a**) *Aegilips aethiopicus*, (**b**) *A. capensis*, (**c**) *A. foveata*, and (**d**) *A. virungae.*

Watsham leg' (deposited in NHM); '1♂, Salisbury, XI.1981: A. Watsham leg' (deposited in NHM); '12♀ & 2♂, Harare, St. Ignatius, MT, V.1990: A. Watsham leg' (deposited in CNC). *SOUTH AFRICA*: '1♀ & 1♂, Cape Province, Mossel Bay, IV.1921: R.E. Turner leg' (deposited in NHM); '1♀, Cape Province, Mossel Bay, VI.1921: R.E. Turner leg' (deposited in NHM); '1♀, Cape Province, Mossel Bay, 1–3.VII.1921: R.E. Turner leg' (deposited in NHM); '3♀ & 3♂, Cape Province, Mossel Bay, 5–31VII.1921: R.E. Turner leg' (deposited in NHM); '6♂, Cape Province, Mossel Bay, VIII.1921: R.E. Turner leg' (deposited in NHM); '1♂, Cape Province, Mossel Bay, IX.1921: R.E. Turner leg' (deposited in NHM); '1♀, Cape Province, Mossel Bay, II.1922: R.E. Turner leg' (deposited in NHM); '1♂, Natal, Kloof, VIII.1926: R.E. Turner leg' (deposited in NHM); '1♀, Cape Province, Mossel Bay, V.1930: R.E. Turner leg' (deposited in NHM); '6♂, Cape Province, Mossel Bay, VI–VII.1930: R.E. Turner leg' (deposited in NHM); '1♂, Cape Province, Mossel Bay, 15.III–20.IV.1932: R.E. Turner leg' (deposited in NHM); '1♀, Cape Province, Mossel Bay, 14–26.XI.1932: R.E. Turner leg' (deposited in NHM).

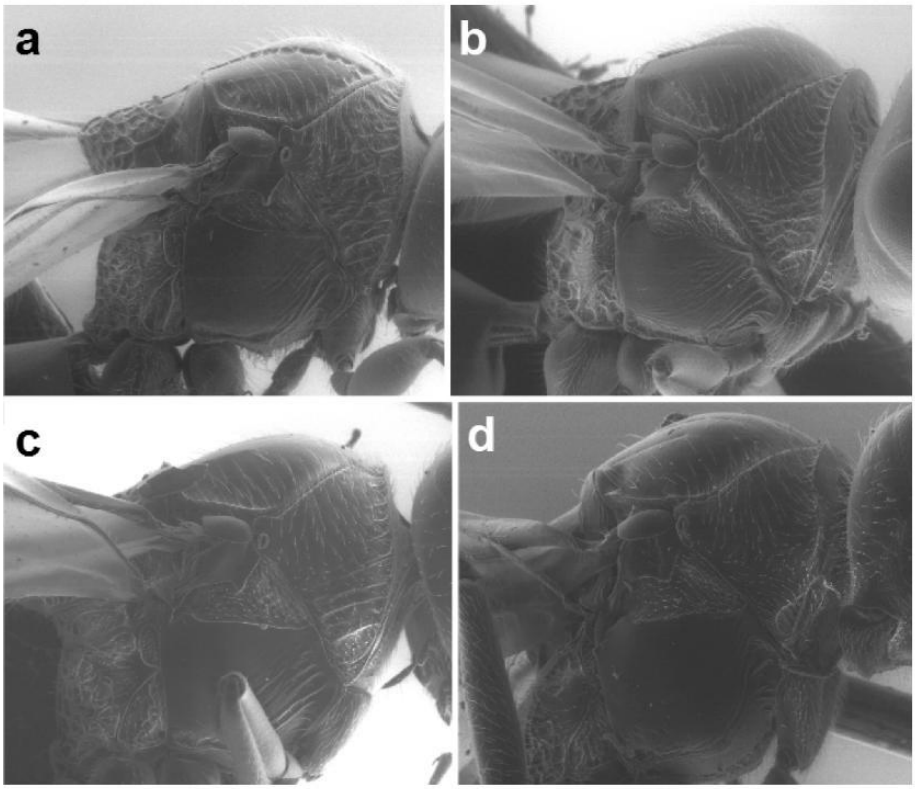


Fig. 2. Mesoscutum in lateral view of (**a**) *Aegilips aethiopicus*, (**b**) *A. capensis*, (**c**) *A. foveata*, and (**d**) *A. virungae*.

Redescription (male)

Length. Body: 2.3–2.9 mm. Antenna: 2.3 mm. Wing: 2.3–2.9 mm.

Colouration. Head, mesosoma and metasoma black. Coxae and tegulae dark brown. Mandibles yellowish brown with darker teeth. Antenna dark yellowish brown, darker last flagellomeres. Forewing veins brown. Legs yellowish brown.

Head. Triangular in frontal view, 1.3 times broader than high. Face smooth and punctured, with short uniform pubescence. Malar area coriaceous, 0.7 times as long as compound eye. Clypeus smooth, glabrous and shortly projected; anterior tentorial pits small, indistinct. Transfacial distance 1.1 times as long as compound eye. Diameter of torulus shorter than distance between toruli and larger than distance between torulus and eye. Frons, gena and occiput smooth and glabrous with few sparse setae; occipital and postocular carinae absent. In dorsal view two times as broad as long in dorsal view, broader than mesosoma. Compound eyes glabrous. POL: OOL: LOL is 7:4:2.5, diameter of lateral ocelus is 2.

Antenna. Antenna with 14 segments; flagellomeres cylindrical and pubescent, same width in all flagellomeres, placodeal sensilla in all flagellomeres, very visible; F1 not modified; antennal formula: 8(3), 4(3), 9(2.5), 9(2.5), 8(2.5), 8(2.5), 7.5(2.5), 7(2.5), 6.5(2.5), 6.5(2), 6(2), 6(2), 5(2), 7(2).

Mesosoma. Pronotum smooth and punctured; lower pronotum alutaceous and carinate (Fig. 2b). Mesoscutum 1.3 times as broad as long in dorsal view. Mesoscutum smooth and punctured, anterior third alutaceous. Pubescence reduced to some scarce short white setae. Notaulus weakly impressed, indistinct at anterior third of mesoscutum (Fig. 1b); median mesoscutal furrow short and weakly impressed, almost inconspicuous. Lateral meso-

scutum smooth and glabrous, except for some short hairs; parapsidal signum reduced to a narrow sulcus, parascutal sulcus very tenuous. Scutellum strongly areolate and triangular, apically not rounded (Fig. 1b), 0.7 to 0.8 times of mesoscutum length; rounded, scutellar foveae large and smooth, basally defined by a carina; superficial and narrow pit next to inner margin of scutellar foveae. Interfoveal line present and complete. Circumscutellar carina projected forming a short tooth visible in lateral view. Anterior and lower mesopleura carinate, central and posterior mesopleura smooth. Mesopleural triangle smooth except for an anterior ridge, presence of scarce short hairs. Metanotal troughs densely pubescent, smooth, with some coarse sculpture. Lateral propodeum with strong coarse sculpture; central propodeum glabrous and tenuously alutaceous, comprised by two upper larger cells and two inferior smaller cells.

Forewings. Pubescent, marginal pubescence denser at apical third. Radial cell closed, 2.3 times longer than wide.

Metasoma. Shorter than head+mesosoma. Petiole as long as wide, shorter than metacoxa, coarsely sculptured and shiny. Third abdominal tergum 2.4 times longer than fourth in dorsal view. Abdominal terga smooth and glabrous, with no punctures.

Female. Same as male, except for not having alutaceous sculpture in anterior mesoscutum. POL:OOL:LOL is 8:5:4, diameter of lateral ocellus is 2. Antenna longer: 2.5 mm. Antenna with 13 segments, filiform. Scape and pedicel smooth, with few scattered setae; flagellomeres cylindrical and pubescent; first three flagellomeres thiner than following ones; placodeal sensilla absent in F1; antennal formula: 11(4), 5(3), 10(2.5), 10(2.5), 10(2.5), 8.5(2.5), 7.5(3), 7.5(3), 7(3), 6.5(3), 5(3), 9(3).

Biology. Associated with Hemerobiidae (Neuroptera).

Distribution. Afrotropical. South Africa (Kieffer 1912); first records for Kenya, Malawi and Zimbabwe.

Comments. The identification of the individuals has been made following the original description of the species found in Kieffer (1912) because of the inability of studying the type material.

Van Noort *et al.* (2015) transferred the species to *Xyalaspis*. However, neither in the original description of Kieffer nor in the figures of van Noort *et al.* (2015) do we see the scutellar spine characteristic of *Xyalaspis*, but rather the blunt-ended scutellum of genus *Aegilips*. Thus we place the species again under the denomination of *Aegilips capensis* according to the evidence.

Despite the loss of the type material, the species is easy to identify. Thus, according to article 75.2 of the International Code of Zoological Nomenclature, there is no necessity to establish a neotype.

Aegilips aethiopicus Mata-Casanova & Pujade-Villar, **sp. n.**, Figs 1a, 2a

Diagnosis. Species similar to *Aegilips romseyensis* Fergusson, 1985, sharing complete and strongly internally carinate notauli and areolate pronotum. However, *A. aethiopicus* Mata-Casanova & Pujade-Villar sp. n. presents irregular carinate sculpture on pronotum, a dorsally areolate scutellum, bigger and triangular scutellar foveae and placodeal sensilla absent on the first three flagellomeres in females (in *A. romseyensis*, pronotum with parallel oblique ridges, scutellum dorsally smooth to coarsely sculptured, scutellar foveae are rounded and smaller, and placodeal sensilla in females are present from F3 onwards).

Type material of Aegilips aethiopicus. Holotype ♂ deposited in CNC with the following labels: 'Cape Province, Hout Bay, Orange Hout Forest Pre., 150 m, 16–31.XII.1999: S. & J. Peck leg' (white label); 'Holotype of *Aegilips aethiopicus* sp. n. ♂ desig. Mata-Casanova, 2014' (red label); '*Aegilips aethiopicus* Mata-Casanova & Pujade-Villar sp. n., 2014' (white label). Paratypes (2♀ & 3♂ deposited in NHM, 2♀ deposited in CNC, 1♀ deposited in UB): *YEMEN*: '1♀, Jebel Jihaf, 7000 ft, 6–9.X.1937: E. Scott & E.B. Britton leg' (deposited in NHM). *DEMOCRATIC REPUBLIC OF CONGO*: '1♂, Kalonge, Rwenzori, 2180 m, 12.VIII.1952: P. Vanschuytbroeck & J. Kekenbosch leg' (deposited in NHM). *ZIMBABWE*: '1♂, Chishiwasha, IX.1978: A. Watsham leg' (deposited in NHM); '1♂, Salisbury, VIII.1979: A. Watsham leg' (deposited in NHM). *SOUTH AFRICA*: '1♀, Cape Province, Katberg, 19–26.II.1933: R. E. Turner leg' (deposited in NHM); '2♀ & 1♂, Cape Province, Hout Bay, Orange Hout Forest Pre., 150m, 16–31.XII.1999: S. & J. Peck leg' (2♀ & 1♂ deposited in CNC, 1♀ deposited in UB).

Description (male)

Length. Body: 2.5–2.6 mm. Antenna: 2 mm. Wing: 2.5 mm.

Colouration. Head, mesosoma and metasoma black. Coxae and tegulae dark brown. Mandibles

yellowish brown with darker teeth. Antenna dark yellowish brown, darker last flagellomeres. Forewing veins brown. Legs yellowish brown.

Head. Triangular in frontal view, 1.3 times broader than high. Face smooth and punctured, with short uniform pubescence. Malar area coriaceous, 0.7 times as long as compound eye. Clypeus smooth, glabrous and shortly projected; anterior tentorial pits small, indistinct. Transfacial distance 1.1 times as long as compound eye. Diameter of torulus as large as distance between toruli and larger than distance between torulus and eye. Frons, gena and occiput smooth and glabrous with few sparse setae; occipital and postocular carinae absent. In dorsal view 2.3 times as broad as long, in dorsal view broader than mesosoma. Compound eyes glabrous. POL:OOL:LOL is 6.5:5:2, diameter of lateral ocelus is 2.

Antenna. Antenna with 13 segments, filiform. Scape and pedicel smooth, with few scattered setae; flagellomeres cylindrical and pubescent; first three flagellomeres thiner than following ones; placodeal sensilla absent in F1–F3; antennal formula: 9(3.5), 4(3), 8(2.5), 6(2.5), 6(2.5), 5(2.5), 4.5(2.5), 4.5(3), 4(3), 4.5(3), 5(3), 8(3).

Mesosoma. Pronotum coarse and irregularly carinate (Fig. 2a). Mesoscutum 1.3 times as broad as long in dorsal view. Mesoscutum slightly alutaceous, some weak carinate sculpture at base of notaulus. Pubescence reduced to some scarce short white setae. Notaulus complete and internally carinate (Fig. 1a); median mesoscutal impression square in shape and conspicuous. Lateral mesoscutum smooth and glabrous, except for some short hairs; parapsidal signum absent, parascutal sulcus tenuous but internally carinate. Scutellum strongly areolate and triangular, apically rounded (Fig. 1a), 0.7 times of mesoscutum length; scutellar foveae triangular, large and smooth, basally defined by carina; superficial and narrow pit next to inner margin of scutellar foveae. Interfoveal line present and complete. Circumscutellar carina not clearly distinguished from areolate sculpture of scutellum. Anterior and lower mesopleura carinate, central and posterior mesopleura smooth. Mesopleural triangle smooth except for an anterior ridge, presence of scarce short hairs. Metanotal troughs alutaceous and scarcely pubescent. Propodeum alutaceous and areolate; central propodeum comprising two upper larger cells and two inferior smaller cells.

Forewings. Pubescent, marginal pubescence denser at apical third. Radial cell closed, 2.3 times longer than wide.

Metasoma. Shorter than head+mesosoma. Petiole as long as wide, shorter than metacoxa, coarsely sculptured and shiny. Third abdominal tergum 2.4 times longer than fourth in dorsal view. Abdominal terga smooth and glabrous, with no punctures.

Male. Same as female, except for presenting expanded malar region in frontal view. POL: OOL: LOL is 7:5:3, diameter of lateral ocelus is 2.5. Antenna longer: 2.4 mm. Antenna with 14 segments; flagellomeres cylindrical and pubescent, same width in all flagellomeres, placodeal sensilla in all flagellomeres, very visible; F1 not modified; antennal formula: 8(3), 3.5(3), 9(2.5), 9(2.5), 8(2.5), 8(2.5), 8(2.5), 8(2.5), 7.5(2.5), 7(2), 7(2), 6.5(2), 6(2), 8(2).

Etymology. The specific name comes from the Ethiopian Region, an alternative name for the Afrotropical Region, in which the species is widespread.

Biology. Unknown.

Distribution. Afrotropical. Collected in Yemen, Democratic Republic of Congo, Zimbabwe and South Africa.

Aegilips foveata Mata-Casanova & Pujade-Villar, **sp. n.**, Figs 1c, 2c

Diagnosis. Species with smooth mesoscutum and dorsal scutellum like *A. flavidicornis* Fergusson, 1982, *A. longicellus*, *A. paucus* and *A. vena* Fergusson, 1985. It can be easily distinguished from these species by having an elongated impression along the margin of scutellar foveae (lateral impression reduced to just a pit in *A. flavidicornis*, *A. longicellus*, *A. paucus* and *A. vena*).

Type material of Aegilips foveata. Holotype ♀ deposited in NHM with the following labels: 'Zimbabwe, Salisbury, Chishawasha, IX.1979: A. Watsham leg' (white label); 'Holotype of *Aegilips foveata* ♀, desig. Mata-Casanova sp. n., 2014' (red label); '*Aegilips foveata* Mata-Casanova & Pujade-Villar sp. n., 2014' (white label). Paratypes (1♀ & 2♂ deposited in NHM, 1♀ deposited in UB): *KENYA*: '2♂, Naivasha, VI.1936: H.J.A. Turner leg' (deposited in NHM). *ZIMBABWE*: '1♀, Salisbury, Chishawasha, IX.1979: A. Watsham leg' (deposited in UB); '1♀, Salisbury, Chishawasha, X.1979: A. Watsham leg' (deposited in NHM).

Description (female)

Length. Body: 2.6–3 mm. Antenna: 2.1 mm. Wing: 2.5–2.8 mm.

Colouration. Head, mesosoma and metasoma black. Coxae and tegulae dark brown. Mandibles yellowish brown with darker teeth. Antenna yellowish brown, darker first segment and last flagellomeres. Forewing veins yellow. Legs yellow.

Head. Triangular in frontal view, 1.2 times broader than high. Face smooth and punctured, with short pubescence scarcer in central face. Malar area coriaceous, 0.6 times as long as compound eye. Clypeus smooth, glabrous and shortly projected; anterior tentorial pits small, indistinct. Transfacial distance 1.1 times as long as compound eye. Diameter of torulus larger than distance between toruli and distance between torulus and eye. Frons, gena and occiput smooth and glabrous with few sparse setae; occipital and postocular carinae absents. In dorsal view 2.3 times as broad as long, in dorsal view broader than mesosoma. Compound eyes glabrous. POL:OOL:LOL is 7:3:3, diameter of lateral ocelus is 2.

Antenna. Antenna with 13 segments, filiform. Scape and pedicel smooth, with few scattered setae; flagellomeres cylindrical and pubescent; first three flagellomeres thiner than following ones; placodeal sensilla absent in F1; antennal formula: 8(3.5), 4(2.5), 7(2), 6.5(2), 6(2.5), 5.5(2.5), 5(2.5), 5(2.5), 4(3), 4(3), 4(3), 4(3), 7(3).

Mesosoma. Pronotum smooth, some basal oblique carinae (Fig. 2c). Mesoscutum 1.2 times as broad as long in dorsal view. Mesoscutum completely smooth. Pubescence reduced to some scarce short white setae along notaulus. Notaulus incomplete and inconspicuous (Fig. 1c), median mesoscutal furrow absent. Lateral mesoscutum smooth and glabrous, except for some short hairs; parapsidal signum and parascutal sulcus absent. Scutellum dorsally smooth and laterally coarse, apically rounded (Fig. 1c), 0.7 times of mesoscutum length; trapezoidal; wide, elongated impression along inner margin of scutellar foveae (Fig. 1c). Interfoveal line present and complete. Circumscutellar carina conspicuous. Anterior mesopleura carinate, central and posterior mesopleura smooth. Mesopleural triangle rugose, presence of scarce short hairs. Metanotal troughs slightly coarse and completely glabrous. Propodeum alutaceous and areolate; central propodeum comprising two upper larger cells and two inferior smaller cells.

Forewings. Pubescent, marginal pubescence denser at apical third. Radial cell closed, two times longer than wide.

Metasoma. Shorter than head+mesosoma. Petiole as long as wide, shorter than metacoxa, coarsely sculptured and shiny. Third abdominal tergum 2.3 times longer than fourth in dorsal view. Abdominal terga smooth and glabrous, with no punctures.

Male. Same as female, except for POL: OOL: LOL is 6:4.5:3, diameter of lateral ocelus is 2.5. Antenna longer: 2.5 mm. Antenna with 14 segments; flagellomeres cylindrical and pubescent, same width in all flagellomeres, placodeal sensilla in all flagellomeres, very visible; F1 not modified; antennal formula: 7(3.5), 3(3), 8(3), 7(3), 7(3), 7(3), 7(3), 7(3), 7(3), 7(3), 6(3), 6(2.5), 6(2.5), 8(2.5). Placodeal sensilla starting at F1.

Etymology. The specific name makes reference to the elongated deep impression along the inner margin of the scutellar foveae, a character only seen in this species.

Biology. Unknown.

Distribution. Afrotropical. Recorded from Kenya and Zimbabwe.

Aegilips virungae Mata-Casanova & Pujade-Villar, **sp. n.**, Figs 1d, 2d

Diagnosis. Species presenting a completely smooth scutellum lacking scutellar foveae and interfoveal line, a character unique within the genus *Aegilips*.

Type material of Aegilips virungae. Holotype ♂ deposited in NHM with the following labels: 'Parc Naturel Albert, Kasimibi, Bikut, 3100 m, 26–28.II.1935: G.F. De Witte leg' (white label); 'Holotype of *Aegilips virungae* sp. n. ♂ desig. Mata-Casanova, 2014' (red label); '*Aegilips virungae* Mata-Casanova & Pujade-Villar sp. n., 2014' (white label).

Description (male)

Length. Body: 2.5 mm. Antenna: 2.6 mm. Wing: 3.1 mm.

Coloration. Head, mesosoma and metasoma black. Coxae and tegulae dark brown. Mandibles yellowish brown with darker teeth. Antenna dark yellowish brown, darker last flagellomeres. Forewing veins yellowish brown. Legs yellowish brown.

Head. Triangular in frontal view, 1.2 times broader than high. Face smooth and punctured, with short uniform pubescence. Malar area coriaceous, 0.7 times as long as compound eye. Clypeus smooth, glabrous and shortly projected; anterior tentorial pits small, indistinct. Transfacial distance 1.1 times

as long as compound eye. Diameter of torulus as large as distance between toruli and larger than distance between torulus and eye. Frons, gena and occiput smooth and glabrous with few sparse setae; occipital and postocular carinae absents. In dorsal view two times as broad as long in dorsal view, broader than mesosoma. Compound eyes glabrous. POL:OOL:LOL is 8:5:3, diameter of lateral ocelus is 2.5.

Antenna. Antenna with 14 segments, flagellomeres cylindrical and pubescent, same width in all flagellomeres, placodeal sensilla in all flagellomeres, very visible; F1 not modified; antennal formula: 7(3.5), 3(3), 9(3), 9(3), 8(3), 8(2.5), 7(2.5), 7(2.5), 7(2.5), 7(2), 7(2), 6.5(2), 6(2), 9(2).

Mesosoma. Pronotum smooth, without any carinae or other sculpture (Fig. 2d); long sparce hyaline pubescence. Mesoscutum 1.2 times as broad as long in dorsal view. Mesoscutum completely smooth. Pubescence reduced to some scarce short white setae along notaulus. Notaulus incomplete and inconspicuous (Fig. 1d), median mesoscutal absent. Lateral mesoscutum smooth and glabrous, except for some short hairs; parapsidal signum and parascutal sulcus absent; presence of narrow sulcus instead of parapsidal signum. Scutellum smooth with some laterally coarse sculpture, apically truncated (Fig. 1d), 0.6 times of mesoscutum length; scutellar foveae and interfoveal line absent (Fig. 1d); superficial and narrow pit next to inner margin of scutellar foveae. Circumscutellar carina inconspicuous. Mesopleura smooth except for some narrow carinae along basal margin. Metanotal troughs coarse and scarcely pubescent. Propodeum alutaceous and areolate; central propodeum comprising two upper larger cells and two inferior smaller cells.

Forewings. Pubescent, marginal pubescence denser at apical third. Radial cell closed, 2.3 times longer than wide.

Metasoma. Shorter than head+mesosoma. Petiole as long as wide, shorter than metacoxa, coarsely sculptured and shiny. Third abdominal tergum 2.8 times longer than fourth in dorsal view. Abdominal terga smooth and glabrous, with no punctures.

Female. Unknown.

Etymology. The specific name makes reference to the Virunga National Park (formerly known as Prince Albert National Park) of Democratic Republic of Congo, where the only specimen known was collected.

Biology. Unknown.

Distribution. Afrotropical. Known only from Democratic Republic of Congo.

DISCUSSION

As previously stated, the knowledge of genus *Aegilips* in the Afrotropical Region was very scarce, reduced to a single species from South Africa, *A. capensis*. Van Noort *et al.* (2015) transferred this species to genus *Xyalaspis*, thus renaming it *Xyalaspis capensis*. The authors mention the lack of apparent circumscutellar carina, a strongly areolate scutellum and a distinctly wider head as characteristics useful to distinguish *Xyalaspis* from *Aegilips*, and thus including *A. capensis* in the former. However, neither of these characters is very useful for distinguishing both genera, as they can be present also in *Aegilips*. The taxonomic relationship between *Aegilips* and *Xyalaspis* is troublesome and it is currently under revision, but one key character serves to distinguish both genera: the presence of a projected scutellar spine derived from the scutellum in *Xyalaspis*. This character is neither mentioned in Kieffer's description of *A. capensis* (Kieffer, 1912) nor seen in the figures provided in van Noort *et al.* (2015). Thus, we return the species to genus *Aegilips* again.

Apart from asserting the validity of *Aegilips capensis*, our study on the African *Aegilips* material has increased the knowledge of the genus in the region, both regarding its distribution area and its diversity. Three new species have been described: *A. aethiopicus* Mata-Casanova & Pujade-Villar, *A. foveata* Mata-Casanova & Pujade-Villar and *A. virungae* Mata-Casanova & Pujade-Villar, thus increasing the number of Afrotropical *Aegilips* species to four and making it the most diverse region after the Palearctic and the Nearctic.

Regarding their distribution, the genus *Aegilips* appears to be widely distributed in the eastern Afrotropical Region. *Aegilips capensis*, previously known only from Cape Province in South Africa, has also been found in Kenya, Malawi and Zimbabwe. The newly described *A. aethiopicus* presents an even wider distribution area, ranging from Yemen to South Africa; *A. foveata* has a similar but smaller distribution area, being found in Kenya and Zimbabwe. The last of the newly described species, *A. virungae*, has only been collected in eastern provinces of Democratic Republic of Congo. Sadly, no material from the western Afrotropical Region has been studied,

so the presence of the genus in the area remains unknown.

Considering the previous works on Afrotropical Anacharitinae (Pujade-Villar 2012; Mata-Casanova *et al.* 2014; Mata-Casanova *et al.* in press), the highest diversity of Afrotropical Anacharitinae is concentrated in the Great Lakes and Albertine Rift region. Eight of the 10 Afrotropical Anacharitinae species are present in this region, two of them being endemic – *Anacharis rwenzori* Mata-Casanova & Pujade-Villar, 2015 and *Aegilips virungae* sp. n. This statement, however, should be contrasted with the study of western Afrotropical Anacharitinae, as no data for them have been recorded yet.

With regard to the morphological features of Afrotropical *Aegilips,* the species are quite homogeneous as we have previously seen when studying other species of *Aegilips* (unpubl. results); the main differences are those related with mesoscutum and scutellar sculpture, with special emphasis on the notauli. Except for *A. aethiopicus* sp. n., the other Afrotropical *Aegilips* species – *A. capensis, A. foveata* sp. n. and *A. virungae* sp. n. – present incomplete and tenuously excavated notauli (Figs 1b, 1c, 1d, respectively). On the other hand, *A. aethiopicus* sp. n. has complete and deeply excavated notauli, with strong transverse internal carinae (Fig. 1a).

The scutellar sculpture shows a higher degree of interspecific diversity. Both *A. capensis* and *A. aethiopicus* sp. n. present strongly areolate scutellum, with large scutellar foveae basally defined by a carina and longitudinally separated by a complete interfoveal line (Figs 1b and 1a, respectively). *Aegilips foveata* sp. n. also shares this trait regarding its scutellar foveae, but it lacks areolate sculpture in dorsal scutellum (Fig. 1c). Finally, *A. virungae* sp. n. is very unusual: it has a completely smooth scutellum without any traces of sculpture, and it lack scutellar foveae; the whole scutellum is a smooth surface (Fig. 1d). This character has not been seen in any other *Aegilips* species saving an undescribed new species endemic from Madeira (unpubl. results).

Taking into account the morphological differences mentioned, the Afrotropical species of *Aegilips* can be distinguished by the following characters:

1. Scutellum completely smooth, without scutellar foveae or any other sculpture features (Fig. 1d).
. . *A. virungae* Mata-Casanova & Pujade-Villar
— Scutellum smooth to heavily areolate in its dorsal region, always laterally areolate; scutellar foveae present and clearly distinguishable (Figs 1a, 1b, 1d). 2
2. Notauli complete and internally carinate (Fig. 1a), pronotum entire surface sulcated (Fig. 2a).
A. aethiopicus Mata-Casanova & Pujade-Villar
— Notauli incomplete and tenuous, not internally carinate (Figs 1b, 1c); pronotum surface smooth with only some basal carinae(Figs 2b, 2c) 3
3. Scutellum completely areolate (Fig. 1b); presence of a narrow pit next to inner margin of scutellar foveae, hardly distinguishable from the rest of scutellum. . *A. capensis* Kieffer
— Scutellum dorsally smooth, laterally areolate; presence of an elongated impression along the margin of scutellar foveae (Fig. 1c).
. . . . *A. foveata* Mata-Casanova & Pujade-Villar

The biology of genus *Aegilips* remains largely unknown. There are only known hosts for the Palaearctic species *A. atricornis* Fergusson, 1985 and *A. nitidula* (Dalman, 1823); both species are mentioned attacking the larvae of the aphid-feeding hemerobiids *Wesmaelius betulinus* and *W. subnebulosus* (Fergusson 1986). In the case of Afrotropical *Aegilips*, there were no previously known citations of hosts. One of the specimens that have been determined as *Aegilips capensis* was collected from a Hemerobiidae cocoon; sadly, no further information about the genus or species is given. Nevertheless, taking into account previous information about their hosts (New 1979; Miller & Lamdin 1985; Fergusson 1986; Cave & Miller 1987), it seems that the Anacharitinae are not strictly host-specific parasitoids. Thus, the Afrotropical *Aegilips* have a wide range of suitable hosts at their disposal since the Hemerobiidae present a high diversity in the Afrotropical Region (Mansell 1986; H lzel & Ohm 2002).

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4.2.13. New Colombian *Acanthaegilips*

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SYSTEMATICS, MORPHOLOGY AND PHYSIOLOGY

Description of Four New Species of Genus *Acanthaegilips* Ashmead, 1897 (Hymenoptera: Figitidae: Anacharitinae) from Colombia

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Abstract
There are four new species of the Neotropical Anacharitinae genus *Acanthaegilips* Ashmead, 1897: *A. boyacensis* sp. n., *A. curvis* sp. n., *A. timidus* sp. n., and *A. truncatus* sp. n. The diagnostic characters of this new species and data about their morphological variability and similarities with other *Acantahegilips* species are discussed. An updated key of genus *Acanthaegilips* is included.

Introduction

Anacharitinae is one of the 11 subfamilies of microcynipoid wasps included in Figitidae (Paretas-Martínez *et al* 2011). They can be easily distinguished from other figitids by the presence of three characters (Ros-Farré *et al* 2000): (1) rounded and continuous pronotal plate, (2) mandibles broadly overlapping and (3) triangular-shaped head in anterior view. The subfamily currently includes nine described genera (Mata-Casanova & Pujade-Villar 2013a): *Acanthaegilips* Ashmead, 1897; *Acanthaegilopsis* Pujade-Villar, 2013; *Aegilips* Haliday, 1835; *Anacharis* Dalman, 1823; *Calofigites* Kieffer, 1909; *Hexacharis* Kieffer, 1907; *Proanacharis* Kovalev, 1996; *Solenofigites* Díaz 1979 and *Xyalaspis* Hartig, 1843.

Acanthegilips is one of the three Anacharitinae endemic to the Neotropical region, along with *Calofigites* and *Solenofigites*. Species of *Acanthaegilips* have an oblique groove on the mesopleuron similar to *Solenofigites*; however, *Acanthaegilips* can be distinguished from *Solenofigites* by having an elongated scutellar spine, large scutellar foveae and modified male flagellomeres (in some species); all of these characteristics are absent in *Solenofigites*. The Anacharitinae are known to attack the aphid-feeding larvae of Hemerobiidae (Díaz 1979; New 1979; Kierych 1984; Fergusson 1985; Miller & Lambdin 1985; Cave & Miller 1987); *Acanthaegilips* is no exception, and it has been recorded from the cocoons of the hemerobiid *Notiobiella cixiiformis* (Gerstaecker, 1888) (Mata-Casanova *et al* 2014).

Prior to this work, *Acanthaegilips* included 16 species (Mata-Casanova *et al* 2014), mostly concentrated in Northern South America. Venezuela had the highest record of *Acanthaegilips* species, with nine recorded species there (Ros-Farré *et al* 2003; Pujade-Villar *et al* 2009a; Pujade-Villar *et al* 2009b; Restrepo-Ortiz *et al* 2010; Mata-Casanova *et al* 2014), with Colombia a close second with seven species (Restrepo-Ortiz *et al* 2010; Mata-Casanova & Pujade-Villar 2013b). In the present work, four new species of *Acanthaegilips* from Colombia are described: *A. boyacensis* Mata-Casanova & Pujade-Villar sp. n., *A. curvis* Mata-Casanova & Pujade-Villar sp. n., *A. timidus* Mata-Casanova & Pujade-Villar sp. n. and *A. truncatus* Mata-Casanova & Pujade-Villar sp. n. Their morphological features and affinities with other *Acanthaegilips* species are discussed. Considering that the last key of genus *Acanthaegilips* is the one found in Ros-

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Farré *et al* (2003), an updated key on the genus has been included, taking into account the species described since then and the interesting morphological features they present.

Material and Methods

The material examined was collected in the period 2000–2004 with Malaise traps as part of the project "Biodiversidad Insectos de Colombia", carried out by the Instituto Alexander von Humboldt (IAvH; Villa de Leiva, Colombia), the University of Kentucky (UK; Lexington, USA) and the Natural History Museum of Los Angeles (NHM; Los Angeles, USA). It is deposited in IavH and the Universitat de Barcelona (UB, Barcelona, Spain). Fourteen undetermined specimens have been studied: eight females and six males.

Morphological terms used are those of Richards (1977) and Ronquist (1995). For the determination of specimens, we used the keys of Ros-Farré *et al* (2003). All measurements are relative except for the body length. Measurements and abbreviations include F1–F12, first and subsequent flagellomeres; post-ocellar distance (POL) is the distance between the inner margins of the posterior ocelli; ocular-ocellar distance (OOL) is the shortest distance between the inner margin of the compound eye and the outer edge of the posterior ocellus and lateral–frontal ocellar distance (LOL) is the distance between the edges of the lateral and frontal ocelli. Antennal formula includes scape, pedicel and flagellomere length and relative width in brackets.

The SEM images included were made in 'Serveis Científico-Tècnics' of the University of Barcelona. The field-emission gun environmental scanning electron microscope (FEI Quanta 200 ESEM) was used for high-resolution imaging, under a low voltage (12.0 kV) and without gold-coating of the specimens in order to preserve the material.

Results

Key to the species of *Acanthaegilips* Ashmead, 1897

1. Mesoscutum smooth; notauli tenuous and incomplete (Fig 1a–c) 2
– Mesoscutum carinate or areolate; notauli complete, although in some specimens are hard to distinguish from the heavily areolate sculpture (Figs 1d–h and 2) 4
2. Scutellum shorter than mesoscutum in dorsal view (Fig 1a). ..... *A. timidus* Mata-Casanova & Pujade-Villar sp. n
– Scutellum longer than mesoscutum in dorsal view (Fig 1b, c). 3
3. Radial cell closed; post-ocular furrow absent; malar furrow slightly curved (Fig 3e) (only male known)..... *A. boyacensis* Mata-Casanova & Pujade-Villar sp. n
– Radial cell open, post-ocular furrow present; malar furrow strongly curved and reaching the post-ocular furrow (Fig 3f) (only female known)..... *A. curvis* Mata-Casanova & Pujade-Villar sp. n
4. Mesoscutum transversely carinated (Fig 1d, e).....5
– Mesoscutum areolate (Figs 1f–h and 2).....6
5. Malar furrow strongly curved (Fig 3f); median mesoscutal impression not divided (Fig 1d). ..... *A. colombiensis* Pujade-Villar & Restrepo-Ortiz, 2010
– Malar furrow slightly curved (Fig 3e), median mesoscutal impression internally divided into two cells (Fig 1e)..... *A. venezuelensis* Ros-Farré & García, 2010
6. Scutellum concave, strongly inclined on each side of the median scutellar carina; male flagellomeres never modified, propodeum with three longitudinal ridges without any sculpture between; notauli not formed by a row of cells. ..... *A. alienus* Ros-Farré & Pujade-Villar, 2003
– Scutellum flat; male antennae with some flagellomeres from F1 to F6 dorsolaterally expanded (Fig 3i, j); propodeum areolate, notauli consisting in a row of cells.....7

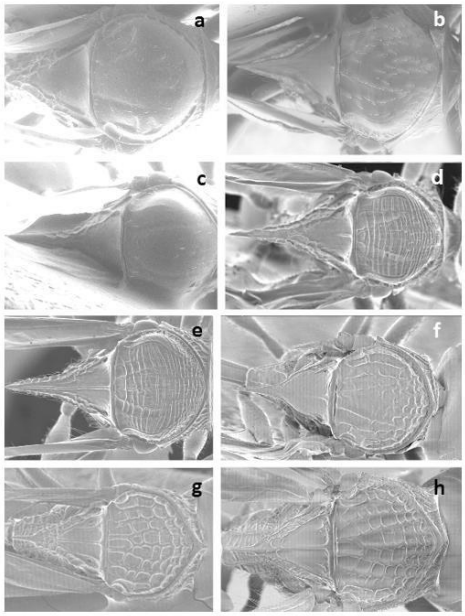


Fig. 1 Mesosoma in dorsal view of *A. timidus* sp. n. (**a**), *A. boyacensis* sp. n. (**b**), *A. curvis* sp. n. (**c**), *A. colombiensis* (**d**), *A. venezuelensis* (**e**), *A. alienus* (**f**), *A. dentis* (**g**) and *A. carinatus* (**h**).

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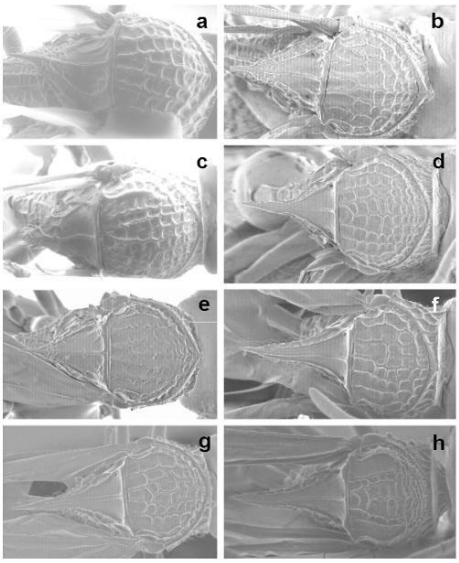


Fig. 2 Mesosoma in dorsal view of *A. notiobiellus* (**a**), *A.occultus* (**b**), *A. truncatus* sp. n. (**c**), *A. huggerti* (**d**), *A. exiguus* (**e**), *A. braziliensis* (**f**), *A. levis* (**g**) and *A. palmirae* (**h**).

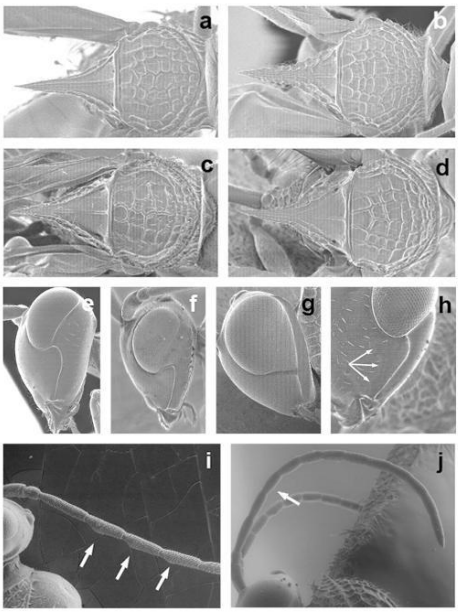


Fig 3 Mesosoma in dorsal view of *A. masneri* (**a**), *A.macropennis* (**b**), *A. diazae* (**c**) and *A. ashmeadi* (**d**). Detail of malar area of *A. venezuelensis* (**e**), *A. colombiensis* (**f**), *A. dentis* (**g**) and *A. palmirae* (**h**). Detail of male flagellomeres of *A. timidus* (**i**) and *A. notobiellus* (**j**).

7. Radial cell open. 8
– Radial cell closed.....17
8. Malar furrow straight to slightly curved, usually connected with post-ocular furrow (Fig 3g). 9
– Malar furrow strongly curved, post-ocular furrow absent (Fig 3e). 15
9. Scutellar foveae with an internal longitudinal carina (foveal carina) dividing them into two areas each (Figs 1g, h and 2a, b); pronotal plate produced into a sharp and strongly raised dorsal tooth in lateral view (Fig 4a–d); petiole as wide as long, sometimes slightly wider than long. 10
– Scutellar foveae without any internal longitudinal carina dividing them (Figs 2c–h and 3a–d); pronotal plate with a small and short dorsal tooth in lateral view (Figs 4e, f and 5a–d); petiole 1.5 to 2 times wider than long. 13
10. Malar and post-ocular furrows strongly impressed (Fig 4a); foveal carina reaching the posterolateral margin of the scutellar foveae (Fig 1g) (only female known). ..... *A. dentis* Ros-Farré & Pujade-Villar, 2003
– Malar furrow effaced; post-ocular furrow weak but with a line of hairs running below the post-ocular and malar furrows; foveal carinae less evident and not reaching the posterolateral margin of the scutellar foveae. 11
11. Lateral surface of pronotum with coarse transverse carina in ventral part and with areolate sculpture in dorsal part (Fig 4b). .....*A. carinatus* Ros-Farré & Pujade-Villar, 2003
– Lateral surface of pronotum completely areolate; lateral pits of scutellar fovea presents. 12
12. Median mesoscutal furrow ¼ to 1/3 of mesoscutum length; two or three foveal carinae present (Fig 2a); lateral pits of scutellum absent; scutellar spine curved downwards..... .....*A. notobiellus* Mata-Casanova & Pujade-Villar, 2014
– Median mesoscutal furrow ¼ or less than mesoscutum length, one foveal carina present (Fig 2b), lateral pits of scutellum present; scutellar spine straight in lateral view. ..... *A. occultus* Ros-Farré & Pujade-Villar, 2003
13. Scutellum shorter than mesoscutum in dorsal view (Fig 2c); scutellar spine blunt-ended (Fig 4e)..... ..... *A. truncatus* Mata-Casanova & Pujade-Villar sp. n
– Scutellum as long as mesoscutum in dorsal view, sometimes longer; scutellar spine spike-ended.....14
14. Scutellar disc narrows abruptly posteriorly and the scutellar spine is entirely slender (Fig 2d); scutellar spine straight in lateral view; lateral pit of scutellar fovea deep. ..... *A. huggerti* Sporrong & Ros-Farré, 2003

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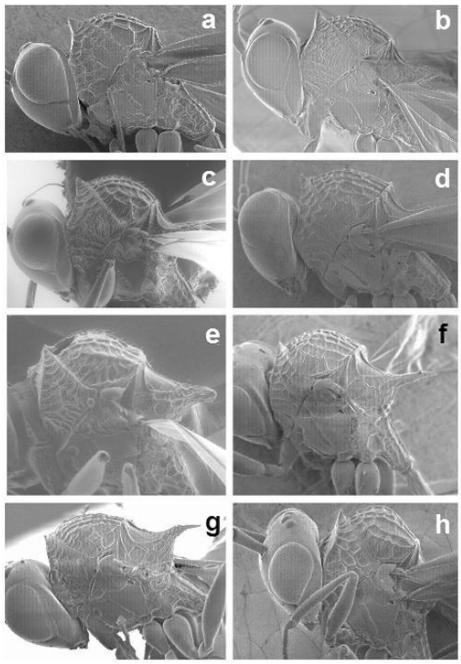


Fig 4 Mesosoma in lateral view of *A. dentis* (**a**), *A. carinatus* (**b**), *A. notiobiellus* (**c**), *A.occultus* (**d**), *A. truncatus* sp. n. (**e**), *A. huggerti* (**f**), *A. exiguus* (**g**) and *A. braziliensis* (**h**).

– Scutellar spine narrowing abruptly before apex (Fig 2e); scutellar spine curved downwards in lateral view; lateral pit of fovea superficial and indistinct (only male known)..... ..... *A. exiguus* Ros-Farré & Pujade-Villar, 2003

15. Scutellar carina visible, in lateral view, running from pronotum to median sulcus; scutum in profile with a distinct hump; pronotal plate with a pointed dorsal tooth when viewed laterally (Fig 4h). .... *A. braziliensis* Ashmead, 1896

– Scutellar carina absent; scutum curved in profile but not humped; pronotal plate dorsally raised but not ending in a pointed dorsal tooth when examined laterally. 16

16. Mesoscutum completely areolate (Fig 2g); malar area smooth (only female known). .... *A. levis* Ros-Farré & Pujade-Villar, 2003

– Mesoscutum surface between notauli and parapsidal signum smooth (Fig 2h); coriaceous line present anterior in front of malar furrow (Fig 3h) (only female known)..... ..*A. palmirae* Mata-Casanova & Pujade-Villar, 2013

17. Pronotal plate ending dorsally in a small tooth; petiole laterally costate (Fig 5a) (only female known). .... *A. masneri* Sporrong & Ros-Farré, 2003

– Pronotal plate rounded dorsally; petiole laterally entirely smooth or slightly carinate anteriorly.....18

18. Scutellar foveae smooth anteriorly; reticulate posteriorly (Fig 3b) (more clear on females), male placodeal sensilla present and abundant from F1 to the end of the antenna. .... *A. macropennis* Sporrong & Ros-Farré, 2003

– Scutellar foveae entirely smooth; male placodeal sensilla dorsally absent on F1 and dorsally scarce or absent on at least some of the following flagellomeres..... 19

19. Notauli complete; mesoscutum with weak areolate sculpture, smooth between parapsidal signum and parascutal impression; parapsidal signum strongly raised and conspicuous (Fig 3c); male placodeal sensilla present on F1, dorsally absent from F1 to F5 and sparse from F6 to F7 (only male known). .... *A. diazae* Ros-Farré & Pujade-Villar, 2003

– Notauli incomplete or not even present, reaching 1/2 the length of mesoscutum; mesoscutum coarsely areolate; parapsidal signum quite conspicuous and not raised (Fig 3d); male placodeal sensilla dorsally absent on F1 and F2, sometimes also on F3; and very scarce on F4.....*A. ashmeadi* Ros-Farré & Pujade-Villar, 2003

Acanthaegilips boyacensis sp.n. Mata-Casanova & Pujade-Villar

Diagnosis. Species belonging to *Acanthaegilips* with a smooth mesoscutum. *Acanthaegilips boyacensis* n. sp. is very similar to *A. curvis* n. sp., but it presents a closed radial cell, a slightly curved malar furrow and lacks a post-ocular furrow (in *A. curvis* n. sp., radial cell open, malar furrow strongly curved and connected to a clearly distinguishable post-ocular furrow).

Description. (Only male known)

Length. Body 2.8 mm. Wing 2.9 mm. Antenna 2.7 mm.

Colour. Head, mesosoma and metasoma black. Antennae dark brown, scapus black and pedicel. Mandibles reddish brown with darker teeth. Legs brownish, coxae darker.

Head. Head glabrous; 1.2 times wider than high in anterior view and 2 times wider than long in dorsal view. Malar furrow slightly curved, post-ocular furrow absent (Fig 2e). Genal

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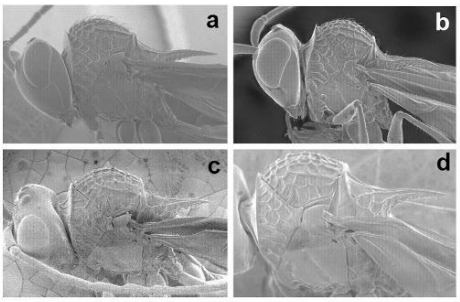


Fig. 5 Mesosoma in lateral view of *A. masneri* (**a**), *A. macropennis* (**b**), *A. diazae* (**c**) and *A. ashmeadi* (**d**).

carina absent, occipital carina strong. Malar space length 0.8 times that of compound eye height. Transfacial line 1.4 times longer than compound eye height. Diameter of toruli bigger than ocular-torular distance but shorter than intertoruli distance. Compound eyes glabrous. POL/OOL/LOL ratio is 7:4.5:2 in males; ocelli diameter 2.5.

Antennae. Flagellomeres cylindrical, glabrous. Male antennae with second to fourth flagellomeres not dorsolaterally expanded. Male antennal formula: 11(4), 3(3), 13(3), 10(3), 9(3), 9(3), 9(3), 8(3), 8(3), 8(3), 7.5(3), 7(3), 7(3), 9(3). Placodeal sensilla starting at F1 but not abundant until F4.

Mesosoma. Lateral pronotal carinae not dorsomedially projected to form raised tooth (Fig 2a). Pronotal plate smooth and glabrous. Pronotum smooth except for few tenuous transverse carinae, densely pubescent. Mesoscutum completely smooth (Fig 1c), 1.2 times wider than long in dorsal view. Median mesoscutal impression absent. Notauli tenuous, indistinct in anterior half of mesoscutum. Hair line on anterior and lateral margins of scutum absent. Parapsidal signum absent, tenuous sulcus present instead. Scutellum 1.1 times longer than mesoscutum in dorsal view. Interfoveal line absent, dorsal scutellum smooth with indistinguishable scutellar foveae (Fig 1c); scutellum laterally areolate. Lateral pits of scutellar foveae present next to scutellar margin. Scutellar spine short and pointed, not distinguished from scutellum, about 1/2 of scutellar length. Scutellar disc in lateral view gradually descending towards terminus of spine. Mesopleural impression narrow, straight, without trace of internal carinae (Fig 2a). Mesopleural triangle smooth, densely pubescent. Propodeum areolate, lateral and median propodeal carinae present, transversely carinate in region between lateral carinae.

Wings. Pubescent. Radial cell of forewing closed, 3.1 times longer than wide. R1 complete. Marginal pubescence of wing denser at apical third.

Metasoma. Petiole as long as wide, slightly shorter than third coxa. Petiole dorsally smooth, latero-ventrally costate. Third abdominal tergum 1.1 times longer than fourth tergum in dorsal view. Fifth and sixth abdominal terga not visible from dorsal view.

Type Material. Holotype ♂ deposited in IAvH with the following labels: "Colombia, Boyacá, PNN Iguaque, El Boquerón, 5°25'N 73°27'W, 2600 m, Malaise, 1-27.XII.2002: P. Reina leg" (white label); "Holotype ♂ of *A. boyacensis* desig. Mata-Casanova" (red label).

Derivatio Nominis. The specific name makes reference to the Colombian province of Boyacá, the place where the only known specimen of the species was found.

Biology. Unknown.

Distribution. Neotropical. Only collected from Colombia.

Acanthaegilips curvis sp.n. Mata-Casanova & Pujade-Villar

Diagnosis. This species has a smooth mesoscutum and tenuous notauli, characters not seen in other *Acanthaegilips* species except for *A. boyacensis* n. sp. and *A. timidus* n. sp. It has an elongate scutellum, a character that separates it from *A. timidus* n. sp. (scutellum shorter than mesoscutum in *A. timidus* n. sp.). *A. curvis* can be separated from *A. boyacensis* n. sp. by having an open radial cell and post-ocular furrow (radial cell closed and post-ocular furrow absent in *A. boyacensis* n. sp.).

Description. (Only female known)

Length. Body 2.5 mm. Wing 2.8 mm. Antenna 2.3 mm.

Colour. Head, mesosoma and metasoma black. Antennae dark brown, scapus black and pedicel. Mandibles reddish brown with darker teeth. Legs brownish, coxae darker.

Head. Head glabrous; 1.1 times wider than high in anterior view, 2 times wider than long in dorsal view. Malar furrow strongly curved, connected with post-ocular furrow (Fig 2f). Genal carina absent, occipital carina strong. Malar space length 0.7 times that of compound eye height. Transfacial line 1.2 times longer than compound eye height. Diameter of toruli bigger than ocular-torular distance but shorter than intertoruli distance. Compound eyes glabrous. POL/OOL/LOL ratio is 7:5:3 in females; ocelli diameter 2.

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Antennae. Flagellomeres cylindrical, glabrous. Female antennal formula: 10(3.5), 3(3), 10(2), 8(2), 8(2), 7.5(2), 7.5(2), 7(2), 7(2.5), 6(3), 6(3), 5(3), 9(3). Placodeal sensilla starting at F6 in females.

Mesosoma. Lateral pronotal carinae not dorsomedially projected to form raised tooth (Fig 2b). Pronotal plate smooth and glabrous. Pronotum smooth with some transverse carinae, presence of some scarce long hyaline hairs in upper pronotum. Mesoscutum completely smooth (Fig 1a), 1.3 times wider than long in dorsal view. Median mesoscutal impression absent. Notauli tenuous, indistinct in anterior half of mesoscutum. Hair line on anterior and lateral margins of scutum absent. Parapsidal signum very tenuous. Scutellum 1.2 times longer than mesoscutum in dorsal view. Interfoveal line absent, dorsal scutellum smooth with indistinguishable scutellar foveae (Fig 1a); scutellum laterally areolate. Lateral pits of scutellar foveae small, next to scutellar margins. Scutellar spine short, pointed, about 1/2 of scutellar total length. Scutellar disc in lateral view gradually descending towards terminus of spine. Mesopleural impression narrow, straight, with weak internal carinae (Fig 2b). Mesopleural triangle smooth, sparsely pubescent. Propodeum areolate, lateral and median propodeal carinae present, transversely carinate between lateral carinae.

Wings. Pubescent. Radial cell of forewing open, three times longer than wide. R1 absent. Marginal pubescence of wing denser at apical third.

Metasoma. Petiole as long as wide, 0.7 times of third coxa length. Petiole dorsally smooth, latero-ventrally costate. Third abdominal tergum as long as fourth tergum in dorsal view. Fifth and sixth abdominal terga not visible from dorsal view.

Type Material. Holotype ♀ deposited in IAvH with the following labels: "Colombia, Cundinamarca, PNN Chingaza, Charrascales, 4°34'N 73°45'W, 2990 m, Malaise, 4-24.IV.2002: F. Guzma". (white label); "Holotype ♀ of *A. curvis* desig. Mata-Casanova" (red label).

Derivatio Nominis. The specific name makes reference to the curved malar furrow, the key character that casts the species apart from the closely related *A. boyacensis* n. sp.

Biology. Unknown.

Distribution. Neotropical. Only collected from Colombia.

Acanthaegilips timidus sp.n. Mata-Casanova & Pujade-Villar

Diagnosis. This species has a smooth mesoscutum and short scutellar spine. The smooth mesoscutum is also present in *A. variabilis* sp. n., but *A. variabilis* sp. n. presents a short scutellar spine and dorsolateral expanded second, third and fourth flagellomeres in males (scutellar spine longer than mesoscutum and no modified male flagellomeres in *A. variabilis* sp. n.).

Description. (Female)

Length. Body 2.1–2.5 mm. Wing 2.5–2.9 mm. Antenna 2.4–2.5 mm.

Colour. Head, mesosoma and metasoma black. Antennae dark yellowish brown. Mandibles yellowish brown with darker teeth. Legs yellowish brown, coxae and femurs darker. Wing veins dark brown.

Head. Head glabrous; 1.1 times wider than high in anterior view, 2.1 times wider than long in dorsal view. Malar furrow apparent and slightly curved, connected with post-ocular furrow. Genal carina absent, occipital carina strong. Malar space length 0.6 times of compound eye height. Transfacial line as long as compound eye height. Diameter of toruli equal to ocular-torular distance but bigger than intertoruli distance. Compound eyes glabrous. POL/OOL/LOL ratio is 5:5:2; ocelli diameter 2.

Antennae. Flagellomeres cylindrical, glabrous. Female antennal formula: 11(3), 3(3), 13(2), 11(2), 10(2), 10(2), 7.5(2), 7.5(2), 6(3), 6(3), 6(3), 5(3), 9(3). Placodeal sensilla starting at F5.

Mesosoma. Lateral pronotal carinae not dorsomedially projected to form raised tooth (Fig 2c). Pronotal plate smooth. Pronotum smooth, with some scarce transverse carinae; lower half alutaceous, upper half with sparse long hyaline hairs. Mesoscutum completely smooth (Fig 1d), 1.2 times wider than long in dorsal view. Median mesoscutal impression absent. Notauli tenuous, indistinct in anterior half of mesoscutum. Hair line on anterior and lateral margins of scutum absent. Parapsidal signum absent. Scutellum as long as mesoscutum in dorsal view. Interfoveal line absent, dorsal scutellum smooth with indistinguishable scutellar foveae (Fig 1d); scutellum laterally areolate. Laterals pit of scutellar foveae absent. Scutellar spine short and pointed but never distinguished from scutellum, about 1/3 of scutellar length. Scutellar disc in lateral view gradually descending towards terminus of spine. Mesopleural impression narrow, straight, without traces of internal carinae (Fig 2c). Mesopleural triangle coarsely sculptured, glabrous. Propodeum coriaceous and areolate, presence of an irregular median carina.

Wings. Pubescent. Radial cell of forewing closed, 3.8 times longer than wide. R1 complete. Marginal pubescence of wing denser at apical third.

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Metasoma. Petiole as long as wide, slightly shorter than third coxa. Petiole dorsally smooth, latero-ventrally costate. Third abdominal tergum as long as fourth tergum in dorsal view. Fifth and sixth abdominal terga not visible from dorsal view.

Male. Same as female, except for longer antenna relative to body, with second to fourth flagellomeres dorsolaterally expanded and placodeal sensilla starting at F1; male antennal formula: 8(2.5), 3(2), 10(2.5), 9(2.5), 9(2.5), 9(2), 8(2), 8(2), 8(2), 8(2), 7.5(2), 7(2), 7(2), 9.5(2). POL:OOL:LOL ratio is 5:4:2; ocelli diameter 2.

Type Material. Holotype ♀ deposited in IAvH with the following labels: "Colombia, Cauca, PNN Munchique, Sector La Romelia, 2°38′N 76°54′W, 2640 m, Malaise, 27.VII-9.VIII.2004: H. Pino leg." (white label); "Holotype ♀ of *A. timidus* desig. Mata-Casanova" (red label). Paratypes (4♀ & 2♂): "1♀, Colombia, Magdalena, PNN Sierra Nevada de Santa Marta, El Ramo, 10°48′N 73°39′W, 2500 m, Malaise, 29.I.15.II.2001: J. Cantillo leg" (deposited in IAvH); "1♀, Colombia, Boyacá, SFF Iguaque, Cabaña Chaina, 5°25′N 73°27′W, 2600 m, Malaise, 30.IV-17.V.2001: P. Reina leg" (deposited in IAvH); "1♀, Colombia, PNN Cueva de los Guácharos, Alto el Mirador, 1°38′N 76°6′W, 1980 m, Malaise, 2-5.XII.2001: D. Campos leg" (deposited in UB); "1♂, Colombia, Valle del Cauca, Farallones de Cali, Cgto. La Meseta, 3°34′N 76°40′W, 2080 m, Malaise, 10-25.IX.2003: S. Sarria & M. Losso leg" (deposited in IAvH); "1♂, Colombia, Valle del Cauca, Farallones de Cali, Cgto. La Meseta, 3°34′N 76°40′W, 2080 m, Malaise, 24.IX-9.X.2003: S. Sarria & M. Losso leg" (deposited in UB); "1♀, Colombia, Cauca, PNN Munchique, Sector La Romelia, 2°38′N 76°54′W, 2640 m, Malaise, 27.VII-9.VIII.2004: H. Pino leg" (deposited in UB).

Derivatio Nominis. The specific name makes reference to the short scutellar spine and the smooth mesoscutum, which is in contrast with the elongated spine and areolate sculpture of mesoscutum that we can see in most species of the genus.

Biology. Unknown.

Distribution. Neotropical. Only collected from Colombia.

Acanthaegilips truncatus Sp.N. Mata-Casanova & Pujade-Villar

Diagnosis. Species very close to *A. exiguus* Ros-Farré & Pujade-Villar, 2003 and *A. huggerti* Sporrong & Ros-Farré, 2013, to which it shares an open radial cell, presence of post-ocular furrow and absence of foveal carinae in scutellar foveae. However, it can be easily distinguished from these species by having a truncated scutellum, shorter than mesoscutum, a character only shared with *A. timidus* sp. n. (scutellum longer than mesoscutum in the other described *Acanthaegilips* species).

Description. (Female).

Length. Body 2.4–2.6 mm. Wing 2.4–2.8 mm. Antenna 2.3–2.4 mm.

Colour. Head, mesosoma and metasoma black. Antennae yellowish brown, scapus and pedicel darker. Mandibles yellowish brown with darker teeth. Legs yellowish brown, dark brown coxae. Wing veins dark yellowish.

Head. Head glabrous; 1.2 times wider than high in anterior view, 1.9 times wider than long in dorsal view. Malar furrow apparent and curved, connected with post-ocular furrow (Fig 2g). Genal carina absent, occipital carina strong. Malar space times 0.6 times of compound eye height. Transfacial line as long as compound eye height. Diameter of toruli bigger than intertoruli and ocular-torular distance. Compound eyes glabrous. POL:OOL:LOL ratio is 6:5.5:2.5; ocelli diameter 2.

Antennae. Flagellomeres cylindrical, glabrous. Female antennal formula: 11(3.5), 3.5(2), 12(2), 9(2), 8(2), 7.5(2), 7(2.5), 6(2.5), 6(3), 5(3), 5(3), 5(3), 9(3). Placodeal sensilla starting at F2.

Mesosoma. Lateral pronotal carinae not dorsomedially projected to form raised tooth (Fig 2d). Pronotal plate rugose, with a few scattered hairs near dorsolateral margins. Pronotum alutaceous and pubescent, lateral surface with areolate sculpture, stronger in posterior pronotum. Mesoscutum with areolate sculpture (Fig 1b), 1.2 times wider than long in dorsal view. Median mesoscutal impression short, less than ¼ of mesoscutum total length. Notauli complete, comprised by cells (Fig 1b). Hair line on the anterior and lateral margins of the scutum absent. Parapsidal signum present and strong. Scutellum in dorsal view 0.7 times of mesoscutum total length in dorsal view. Scutellar foveae smooth with few irregular sculpture near its posterior margin; absence of internal longitudinal carinae (Fig 1b). Laterals pit of scutellar foveae present. Scutellar spine short, truncated, about 1/3 of scutellar length. Scutellar disc in lateral view gradually descending towards terminus of spine. Mesopleural impression narrow and straight, without traces of any internal carinae (Fig 2d). Mesopleural triangle smooth and sparsely pubescent. Propodeum coriaceous and areolate, presence of an irregular median carina.

Wings. Pubescent. Radial cell of forewing open, 3.3 times longer than wide. R1 complete. Marginal pubescence of wing denser at apical third.

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Metasoma. Petiole as long as wide, shorter than third coxa. Petiole dorsally smooth, latero-ventrally costate. Third abdominal tergum as long as fourth tergum in dorsal view. Fifth and sixth abdominal terga not visible from dorsal view.

Male. Same as female, except for longer antenna relative to body, with second to fourth flagellomeres dorsolaterally expanded and placodeal sensilla starting at F1; male antennal formula: 8(3), 3(2.5), 7.5(2), 7.5(2), 8(2), 8(2), 7(2), 7(2), 7(2), 6(2), 6(2), 6(2), 6(2), 8(2). POL/OOL/LOL ratio is 6:5:3; ocelli diameter 2.

Type Material. Holotype ♀ deposited in IAvH with the following labels: "Colombia, Cauca, PNN Munchique, Sector La Romelia, 2°38'N 75°54'W, 2640 m, Malaise, 24.V-9.VI.2004: E. Fino leg" (white label); "Holotype ♀ of *A. truncatus* desig. Mata-Casanova" (red label). Paratypes (1♂ & 1♀): "1♀, Colombia, Boyacá, SFF Iguaque, Cabaña Mamarramos, 5°25' N 73°27'W, 2855 m, Malaise, 19.IV-6.V.2000: P. Reina leg" (deposited in IAvH); "1♂, Colombia, Boyacá, SFF Iguaque, Qda. Carrizal, 5°25'N 73°27'W, 3350 m, Malaise, 1-23.IX.2000: P. Reina leg" (deposited in UB).

Derivatio Nominis. The specific name makes reference to the short and truncate scutellar spine.

Biology. Unknown.

Distribution. Neotropical. Only collected from Colombia.

Discussion

The four newly discovered species expand the morphological characters associated with *Acanthaegilips*. *Acanthaegilips truncatus* sp. n. has a strong areolate mesoscutum, like most of *Acanthaegilips* species (Ros-Farré *et al* 2003, Mata-Casanova & Pujade-Villar 2013a, 2013b); however, the scutellar spine is truncate and shorter than the total length of the mesoscutum (Figs 2c and 4e), a feature that casts it apart from the rest of areolate *Acanthaegilips* species. The other three species, *A. timidus* n. sp., *A. boyacensis* n. sp. and *A. curvis* n. sp., have a smooth mesoscutum with incomplete notauli ((Fig 1a–c); this feature has never been previously seen in *Acanthaegilips*: the previously described species of the genus had either an areolate mesoscutum or carinate one (Pujade-Villar *et al* 2009a) and always presented complete notauli.

The three species with smooth mesoscutum can be divided into two categories according to the shape and length of the scutellar spine. While *A. timidus* n. sp. has a short scutellar spine (Fig 1a) (like *A. truncatus* n. sp.), *A. boyacensis* n. sp. and *A. curvis* n. sp. have a longer scutellar spine like in the rest of the *Acanthaegilips* species (Fig 1b, c). This characteristic is not enough to consider as theme to be of different species; it is not strange to see sexual dimorphism regarding the radial cell in *Acanthaegilips* (Ros-Farré *et al* 2000) and taking into account that the two specimen studies belong to different sexes, it was difficult to assess if they are of different species. However, there are also differences regarding the malar area: while *A. boyecensis* n. sp. presents a slightly curved malar furrow and lacks post-ocular furrow, *A. curvis* n. sp. presents both malar and post-ocular furrow, the first being strongly curved and connected to the former. This feature is not due to sexual dimorphism and has taxonomic importance, hence separating the specimens in two different species.

Considering that the last species key for *Acanthaegilips* is the one found in Ros-Farré *et al* (2003), we thought that an updated key of the genus should be included, taking into account the species described since then and the interesting morphological features they present.

The bulk of known *Acanthaegilips* species diversity is located in Venezuela and Colombia—most probably due to a collection bias. The description of these four new species increases the Colombian *Acanthaegilips* diversity to 11 species, surpassing Venezuela as the country with the most species of this genus. Despite being only found in Colombia, it is very plausible for these species to have a larger distribution area. More research should be done in order to confirm this statement and unveil more aspects about their biology that remain unknown for now.

Acknowledgments Thanks are due to Claudia Medina (IAvH) for loaning of the undetermined materials in which this study is based. This study has been funded by project CGL2011-22889 of the Science and Innovation Ministry of Spain.

Nomenclature ZooBank registration can be found for
A. boyacensis: http://zoobank.org/urn:lsid:zoobank.org:act:00528B91-53D7-4D4F-9EE4-901BF5B1E218;
A. curvis: http://zoobank.org/urn:lsid:zoobank.org:act:F95792F9-3C0B-41C4-A62D-F298B439FBFE;
A. timidus: http://zoobank.org/urn:lsid:zoobank.org:act:6ADA87D4-BDBA-4C5D-BB37-17A7FB9A9C3E;
A. truncatus: http://zoobank.org/urn:lsid:zoobank.org:act:88C5E5E1-453F-4FD2-8706-ADCE4057E5D6.

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4.2.14. Revision of Eurasian *Anacharis*

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Three new species of *Anacharis* Dalman, 1823(Hymenoptera: Figitidae) with revised taxonomy and distribution records of Palaearctic and Indomalayan species

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Running title:

Eurasian species of genus *Anacharis* Dalman, 1823

The present paper has not been submitted to any other journal, nor will it be in the 6 months after initial submission to *EJT*. All co-authors are aware of the present submission.

ABSTRACT

An update of the current knowledge of *Anacharis* Dalman, 1823 for the Palaearctic and Indomalayan regions is given. The previously known Palaearctic species *Anacharis antennata* Belizin, 1951, *Anacharis eucharoides* (Dalman, 1818), *Anacharis immunis* (Walker, 1835) and *Anacharis parapsidalis* Belizin, 1951 are redescribed. Three new species are described: *Anacharis fergussoni* sp. n. from Europe, *Anacharis norvegica* sp. n.. from Norway and *Anacharis belizini* sp. n. from Thailand, the first recorded Indomalayan species of genus *Anacharis*. *Anacharis gracilipes* Ionescu, 1969, is synonymized with *A. eucharoides*, while *Anacharis flavidicornis* Kieffer, 1910 is transferred to genus *Aegilips* Haliday, 1835, resulting in *Aegilips flavidicornis* (Kieffer, 1910) n. comb. Diagnostic characters and data about the biology, distribution and affinities with other *Anacharis* species are discussed. An identification key for the Palaearctic and Indomalayan species of *Anacharis* is given.

Key words: *Anacharis, Aegilips*, Palaearctic, Indomalayan, new species, taxonomy.

INTRODUCTION

Anacharis Dalman, 1823 (Hymenoptera: Figitidae) is one of the 9 genera included in the subfamily Anacharitinae (Mata-Casanova & Pujade-Villar 2013), the eight others being *Acanthaegilips* Ashmead, 1896, *Acanthaegilopsis* Pujade-Villar, 2013, *Aegilips* Haliday, 1835, *Calofigites* Kieffer, 1909, *Hexacharis* Kieffer, 1907, *Proanacharis* Kovalev, 1996, *Solenofigites* Díaz, 1979, and *Xyalaspis* Hartig, 1843. Anacharitinae is one of the 12 subfamilies of the Figitidae (Paretas-Martínez *et al.* 2011), and are easily identified by three synapomorphies (Ros-Farré *et al.* 2000): (1) rounded and continuous pronotal plate; (2) broadly overlapping mandibles; and (3) triangle-shaped head in front view – although it is more quadrangular shaped in genus *Acanthaegilopsis, Proanacharis* and some species of *Xyalaspis* (Mata-Casanova *et al.* 2014a). Although they have been cited attacking the aphid-feeding larvae of the Neuroptera families Chrysopidae and Hemerobiidae (Ronquist 1999; Buffington, 2012), the biology of most Anacharitinae species is still unknown.

Anacharis is the second most diverse of the Anacharitinae genera after *Aegilips*, and includes 21 described species. *Anacharis* does not have scutellar spine, a trait shared with *Aegilips*, *Calofigites*, *Hexacharis*, *Proanacharis* and *Solenofigites*. Among them, *Aegilips* and *Hexacharis* are the closer ones to *Anacharis* (Buffington *et al.* 2007, 2012). *Anacharis* can be distinguished from them by having an elongated petiole (at least as long as metacoxa, usually longer) with smooth surface (Restrepo-Ortiz & Pujade-Villar 2010).

Anacharis has a cosmopolitan distribution, being present in all continents except

for Antarctica. Twelve species of *Anacharis* were recorded for the Palaearctic region: *Anacharis antennata* Belizin, 1951; *Anacharis eucharoides* (Dalman, 1818), *Anacharis ensifera* (Walker, 1835), *Anacharis flavidicornis* Kieffer, 1910, *Anacharis gracilipes* Ionescu, 1969, *Anacharis immunis* (Walker, 1835), *Anacharis parapsidalis* Belizin, 1951, *Anacharis rufiventris* (Hartig, 1841), *Anacharis tincta* (Walker, 1835) and *Anacharis typica* (Walker, 1835). Fergusson's revision (1986) based on material from Dalman, Hartig, Walker, Westwood and undetermined material concluded that *A. tincta* and *A. typica* were junior synonyms of *A. eucharoides,* while *A. ensifera* and *A. rufiventris* were junior synonyms of *A. immunis*. Thus, before the present study was carried out, the Palaearctic region comprised six valid species of the genus; on the other hand, *Anacharis* had not been cited for the Indomalayan (also known as Oriental) region yet.

Anacharis flavidicornis was described by Kieffer (1910) from Central Asia. The knowledge of Eastern Palaearctic *Anacharis* was extended by Belizin (1951), who cited *A. immunis* as occurring in the Russian Far East and described two new species: *Anacharis antennata* from Central Asia and *A. parapsidalis* from the Russian Far East. Belizin (1961) also cited *A. eucharoides* for the westernmost parts of Central Asia (Chelyabinsk oblast in Russia). The Western portion of the Palaearctic region had an scarcer record of *Anacharis*, with only three species being collected: *Anacharis eucharoides* and *A. immunis* cited from Eastern and Central Europe, and *A. gracilipes*, exclusively present in Romania.

In this study, we describe *A. belizini* sp. n., *A. fergussoni* sp. n., and *A. norvegica* sp. n., the first one being the first Indomalayan species of the genus. The Palaearctic

species *A. antennata, A. eucharoides, A. immunis* and *A. parapsidalis* are redescribed and their known distribution area is extended, while *A. flavidicornis* is moved to *Aegilips* and *A. gracilipes* is described as a junior synonym of *A. eucharoides.* Diagnostic characters for these species are given, and data about morphological features, distribution area and biology are discussed.

MATERIAL AND METHODS

The undetermined specimens examined in this study are from the Natural History Museum (NHM, London), the Canadian National Collection of Insects, Arachnids and Nematodes (CNC, Ottawa), the Muséum National d'Histoire Naturelle (MNHN, Paris) and the Université de Liège (ULg). The type material studied belongs to *Anacharis ensifera, A. flavidicornis, A. gracilipes, A. immunis, A. tincta* and *A. typica* and is deposited in the Natural History Museum (NHM, London), Muzeul National de Istorie Naturala "Grigore Antipa" (Bucharest) and the Museum für Naturkunde (ZMB, Berlin); additional material of *A. eucharoides* comes from Lund University (LU, Lund). The material is deposited in CNC, LU, MNHN and UB (Universitat de Barcelona).

For this study 137 undetermined specimens were examined: 57 males and 80 females. Morphological terms used are those of Richards (1977), Ronquist (1995) and Ros-Farré *et al.* (2003). All measurements are relative except for the body length. Measurements and abbreviations include: F1–F12, first and subsequent flagellomeres; POL (post-ocellar distance) is the distance between the inner margins of the posterior ocelli; OOL (ocular-ocellar distance) is the shortest distance between the inner margin

of the compound eye and the outer edge of the posterior ocellus; LOL (lateral–frontal ocellar distance) is the distance between the edges of the lateral and frontal ocelli. Antennal formula includes scape, pedicel and flagellomeres length and relative width in brackets.

The images included were made in the 'Serveis Científico-Tècnics' of the University of Barcelona. The field-emission gun environmental scanning electron microscope (FEI Quanta 200 ESEM) was used for high-resolution imaging, under a low voltage (12.0 kV) and without gold-coating of the specimens in order to preserve the material.

RESULTS

Phylum Arthropoda von Siebold, 1848

Subphylum Hexapoda Blainville, 1816

Class Insecta Linnaeus, 1758

Order Hymenoptera Linnaeus, 1758

Superfamily Cynipoidea Billberg, 1820

Family Figitidae Hartig, 1840

Subfamily Anacharitinae Thomson, 1862

Genus *Anacharis* Dalman, 1823

Key to the Palearctic and Indomalayan species of genus *Anacharis*

1. Notauli tenuous, almost entirely effaced in the anterior region of the mesoscutum, sometimes internally carinate (Fig. 2c, 4d); petiole as long as metacoxa (Fig. 4f). .. 2

-- Notauli excavated along their entire extension, and internally carinate; petiole longer than metacoxa. 3

2. Scutellum surface smooth to areolate, but never with small cells (Fig. 2c, 2e), median mesoscutal furrow absent, apex of scutellum with prominent tooth (Fig. 2f). ..... ***A. immunis*** **(Walker)**

-- Scutellum surface strongly areolate and covered with small cells (Fig. 4d), median mesoscutal furrow short and weakly excavated but always present, apex of scutellum without a tooth (Fig. 4e). ..... ***A. norvegica*** **sp. n.**

3. Parascutal sulcus absent; in some cases a coarse band surrounding the mesoscutum is present instead (Fig. 1b, 2d). 4

-- Parascutal sulcus present, internally carinate, and completely surrounding the mesoscutum (Fig. 1d, 3b, 4b). 5

4. Mesoscutum completely smooth without any carinate sculpture; scutellum also smooth, with a short, median scutellar carinae at the apex of the scutellum; notauli strongly carinate (Fig. 1b). ..... ***A. antennata*** **Belizin**

-- Mesoscutum with some weak carinae at the edges of the notauli, extended to comprise the whole anterior region in some specimens; scutellum alutaceous, without short median scutellar carinae at the posterior margin of the scutellum; notauli not always carinate; if carinae are present, they are weak (Fig. 2a, 2b). ..... ***A. eucharoides*** **Dalman**

5. Pronotum smooth except for some short basal carinae (Fig. 4b).

…….. ***A. fergussoni* sp. n.**

-- Pronotum surface completely covered by strong carinate sculpture (Fig. 1b, 3b)..... 6

6. Scutellum strongly areolate (Fig. 1c), with only two basal parallel carinae; pronotum surface is covered by strong and irregular coarse sculpture (Fig. 1d). …….. ***A. parapsidalis* Belizin**

-- Scutellum smooth with a short median scutellar carinae at the apex of the scutellum (Fig. 3c); pronotum surface crossed by oblique parallel carinae (Fig. 3b). …….. ***A. belizini* sp. n.**

***Anacharis antennata* Belizin, 1951**

(Figures 1a, 1b)

Diagnosis. Species very similar to *A. eucharoides*, from which it can be distinguished by always having a completely smooth mesoscutum and scutellum, strongly carinate notauli, with a short median scutellar carina at scutellar apex (mesoscutum and notauli weakly carinate in some specimens of *A. eucharoides* while smooth in others, the scutellum is alutaceous and lacks median carina).

Type material. Holotype ♂ deposited in ZIN with the following labels: "Kondara, Tadzhik SSR, 9.IX.1945, V. Gussakovskij" (white label, handwritten, in Cyrillic); "Holotype *Anacharis antennata* ♂, V. Belizin det" (red label, handwritten).

Type locality: Kondara, Tajikistan.

Material examined. (1♀ & 1♂: deposited in CNC). JAPAN: 1♂, Fukota

Hakozaki, Kyushu, PT, 16-24.VIII.1979: K. Yamagishi leg. 1♀, Ibaraki Tsukuba, 15-25.VII.1989: M. J. Sharkey leg.

Redescription.

Length. Body: 4.4 mm. Antennae: 3.5 mm (♀), 3.6 mm (♂). Wings: 4.1 mm.

Coloration. Head, mesosoma and metasoma black. Mandibles yellowish brown with darker teeth. Antennae dark brown with first segment black. Legs yellowish brown with black coxae. Veins of wings brownish.

Head. Triangular-shaped in anterior view. Face smooth, punctate, covered with sparce white setae. Width of head 2.3 times its length in dorsal view while in anterior view, 1.2 times its height. Malar sulcus coriaceous, 0.7 times height of compound eye. Transfacial line length 1.1 times height of compound eye. Diameter of toruli larger than inter-toruli distance and torulus to compound eye distance. Clypeus smooth, glabrous, shortly convex, almost unnoticeable. Occipital and postocular carinae absents. Compound eyes glabrous. In females POL:OOL:LOL ratio = 8.5:7.5:4, ocelli diameter being 2.5; in males POL:OOL:LOL ratio = 8:6:5, ocelli diameter being 3 . Frons and gena smooth, shiny and glabrous; occiput smooth and shiny with sparse setae..

Antennae. Cylindrical flagellomeres covered with pubescence. Female antennal formula: 12(4), 4.5(3.5), 14(3), 14(3), 12(3), 12(3), 12(3), 11(3), 10(3), 10(3), 9(3), 8(3), 13(3). Male antennal formula: 9(4), 4(3.5), 13(3.5), 12.5(3.5), 12(3.5), 11.5(3.5), 10(3), 10(3), 10(3), 10(3), 9(3), 9(3), 9(3), 13(3). Placodeal sensilla starting at F1 and abundant in all flagellomeres in both sexes.

Mesosoma. Pronotum smooth and pubescent, with some oblique carinae in ventral region (Fig. 1b). Mesoscutal width 1.1 times its length in dorsal view.

Mesoscutum smooth and shiny; almost glabrous except for a few setae. Notauli complete with transverse carinate sculpture; median mesoscutal furrow short and almost not present (Fig. 1a). Lateral region of mesoscutum smooth; parapsidal signum and parascutal sulcus absent, with a line of dense pubescence instead. Scutellar length 0.7 times of mesoscutum length in dorsal view. Scutellum smooth and shiny (Fig. 1a). Scutellar foveae triangular, smooth, basally defined by a carina; lateral pits of scutellar foveae present but weakly excavated. Interfoveal line present, shortly extended into scutellum. Short median scutellar carinae present at scutellum apex. Circumscutellar carina complete, clearly defined, slightly dorsally projected at scutellar apex. Mesopleuron completely smooth, glabrous and shiny, with internally carinate transverse groove; carinae more abundant in posterior region; mesopleural triangle presents dense pubescence. Metanotal troughs heavily pubescent, smooth, densely covered by short hyaline hairs. Propodeum smooth, heavily pubescent, divided into large cells; median propodeal cell present, occupying 2/3 of upper propodeum, rest of propodal surface divided into irregular, smaller cells .

Wings. Pubescent. Radial cell of fore wing closed, 2.9 times longer than wide. Marginal pubescence of fore wing denser at apical third.

Metasoma. Longer than head + mesosoma. Petiole, smooth, shiny about 2.0 times as long as metacoxa. Third metasomal tergum 2.3 times longer than fourth tergum in dorsal view. Fifth, sixth, seventh metasomal terga visible in dorsal view. Metasomal terga smooth and glabrous, not punctate.

Biology. Unknown.

Distribution. Palaearctic. Known from Tajikistan (Belizin, 1951); first citation

for Japan.

***Anacharis eucharoides* Dalman, 1818**

(Figures 2a, 2b, 2d)

Cynips eucharoides Dalman, 1818. Type material lost, according to Fergusson, 1986.

Anacharis eucharoides Dalman, 1823

Anacharis tinctus Walker, 1835. Synonymized by Fergusson (1986). Type examined.

Anacharis typicus Walker, 1835.

Anacharis typica Walker, in Reinhard, 1860: 215. Synonymized by Fergusson (1986). Type examined.

Megapelmus spheciformis Hartig, 1840.

Anacharis spheciformis (Hartig) in Giraud, 1860. Synonymized by Fergusson (1986).

Anacharis gracilipes Ionescu, 1969 **syn. n.** Type examined.

Diagnosis. Species morphologically very similar to *A. antennata*, except for having some weak transverse carinae at the edges of the notauli, alutaceous scutellum and a weak posterior carina on the scutellar foveae (in *A. antennata* , mesoscutum and scutellum smooth, scutellar foveae defined by a strong posterior carina).

Type material of *Anacharis eucharoides*: lost (Fergusson, 1986).

Type material of *Anacharis tincta*. Lectotype ♂ deposited in NHM with the following labels: "B. M. 1981 under *tincta*" (white label); "Lectotype *Anacharis tincta* Walker, det. N. D. M. Fergusson, 1981" (white label); B. M. Type Hym. 7.162" (white

label).

Type material of *Anacharis typica*. Lectotype ♀ deposited in NHM with the following labels: "In coll. under *typica*" (white label); "B. N. 1981 under *typica*" (white label); "Lectotype *Anacharis typica* Walker, det. N. D. M. Fergusson, 1981" (white label); B. M. Type Hym. 7.163" (white label).

Type material of *Anacharis gracilipes*. Lectotype ♀ deposited in Muzeul National de Istorie Naturala "Grigore Antipa" with the following labels: "26.VII.1956, Rarău" (white label); "*Anacharis eucharoides* ♀ (Dalman, 1818), N. Mata-Casanova det. 2014". Paralectotype ♀ (deposited in Muzeul National de Istorie Naturala "Grigore Antipa"): Pădurea Greci, 5.VII.1961.

Type locality: Västergötland, Sweden.

Material examined. (37♀ & 27♂: 2♀ deposited in NHM, 8♀ & 9♂ deposited in CNC, 2♀ & 1♂ deposited in MNHN, 8♀ & 1♂ deposited in LU, 3♀ & 2♂ deposited in ULg, 10♀ & 14♂ deposited in UB). MOROCCO: 1♀, Marrakech Ouirgane, 1000 m, MT, 22-29.X.1996, C. Kaseebeer leg. ANDORRA: 1♂, Santa Coloma, MT, VIII.1992, J. Pujade leg. 1♂, Santa Coloma, MT, X.1992, J. Pujade leg. 1♀, Santa Coloma, MT, 16-30.VI.1993, J. Pujade leg. FRANCE: 2♀, Til-Châtel, 25km N of Dijon, 7.IX.1979, Bouček leg. 1♀, Collioure, Pyreneés Orientales, 29.II.1984, C. Delvare leg; 1♀, Valdeblore, Col de Salèse, 11-24.VI.2009; 1♂, Valdeblore, le Boréon, 11-24.VI.2009. 1♀, Saint-Dalmas-le-Selvage, Vallon de Saint-Dalmas, 10-23.VII.2009; 1♂, Saint-Dalmas-le-Selvage, Vallon de Sestrière, 10-23.VII.2009; 1♀ & 1♂, Valdeblore, Col de Salèse, MT, 24.VII-13.VIII.2009; 1♀, Valdeblore, Col de Salèse, MT, 13-27.VIII.2009; 2♀, Valdeblore, le Boréon, 13-27.VIII.2009. UK: 1♂, Toraguay, 25.VI.1960, J. R.

Vocherath. BELGIUM: 1♀ & 1♂, Somal, 28.V.2013, P. N. Libert leg. ITALY: 2♀, Abruzzo, L'Aquila, 20.VI.1992, John D. Pinto leg. SWITZERLAND: 1♂, Solothun, Hinter Weissensten, 1250 m, 45°15'2' N, 7°29'15' E, 17.VI.1999, Goulet leg. GERMANY: 1♂, Mainz, 26.VIII-3.IX.1965, A. W. Steffan leg. 1♀, Mainz, 18.IX-1.X.1965, A. W. Steffan leg. CZECH REPUBLIC: 1♂ & 2♀, Moravia, R. V. Dyje nr. Znojmo, 12.IX.1991, L. Masner leg. HUNGARY: 1♀, Kelebia, 5.X.1949, Erdös leg. 1♂, Mátra, 25.VI.1952, Erdös leg. 1♂, Börzsöny, 16.VIII.1956, Erdös leg. 1♀, Börzsöny, W. Hideghedy, 15.VI.1957, Erdös leg. 1♀, Bükk, 28.VIII.1957, Erdös leg. 1♂, Tataváros, 26.V.1959, Sólymosne leg. 1♂, Fót, 19.IX.1960, Mihályi leg. 1♂, Mátra, 5.VII.1962, Erdös leg. 1♀ & 1♂, Pilis, 24.VIII.1962, Erdös leg. 3♂, Vas m. Orseg, Szalafo-Felsoszer, 1.VII.1994, Kotenko A. leg. 1♂, Vas m. Cák, 8.VII.1994, Kotenko A. leg. 1♂, Vas Co., Hörmann forr., 27.VII.1996, Cs. Thuróczy leg. ROMANIA: 1♀, Hargita Co., Kiruly Valley, 10.VIII.2000, Zoltán Acs leg. 1♂, Hargita Co., Kiruly Valley, 15.VIII.2000, Zoltán Acs leg. RUSSIA: 1♂, Caucasus, Temmolesskaya, 700 m, 25.VII.1999, V. Gebrennikov leg. SWEDEN: 1♀, Norbottens Lan. Nat. Park, 10.VIII.1999, G. Melika leg. 1♂ & 2♀, on Road 276 nr. Kvista, 18.VIII.1999, G. Melika leg. 1♂ & 8♀, with no specified location. NORWAY: 1♀, Oppdal, Kongsvoll, Blesbekken, MT, 4.IX.1980, J. O. Solem. 1♂, Oppdal, Kongsvoll, Raubekken, 900m, MT, 25.VIII.1981, J. O. Solem. 1♀, Oppdal, Kongsvoll, Gabaljbk, MT, 10.VIII.1982, J. O. Solem.

Redescription.

Length. Body: 3.2 mm. Antennae: 2.8 mm (♂), 2.1 mm (♀). Wings: 2.8 mm.

Coloration. Head, mesosoma and metasoma black. Mandibles yellowish brown

with darker teeth. Antennae dark yellowish brown. Legs yellowish brown with darker coxae. Veins of wings dark brown.

Head. Triangular-shaped in anterior view. Face smooth, covered with sparce white setae. Width of head 2 times length in dorsal view and 1.3 times height in anterior view. Malar sulcus coriaceous, 0.6 times height of compound eye. Transfacial line same length as height of compound eye. Diameter of toruli larger than inter-toruli distance and torulus to compound eye distance. Clypeus smooth, glabrous, shortly convex. Occipital and postocular carinae absents. Compound eyes glabrous. In both sexes POL:OOL:LOL ratio = 7:4:4, ocelli diameter being 2.5. Frons, gena and occiput smooth, shiny and glabrous except for few sparse setae..

Antennae. Cylindrical flagellomeres covered with pubescence. Male antennal formula: 8(4), 3.5(3), 12(3), 10(3), 9(3), 9(2.5), 9(2.5), 9(2.5), 8(2.5), 8(2.5), 8(2), 7.5(2), 7.5(2), 10(2). Female antennal formula: 7(3), 4(2.5), 9.5(2), 8(2), 7.5(2), 7(2), 7(2), 7(2), 6.5(2), 6(2), 6(2), 6(2), 10(2.5). Placodeal sensilla start at F1 in both sexes.

Mesosoma. Pronotum smooth, shiny, with some lower transverse carinae, covered by short white setae (Fig. 2d). Mesoscutal width 1.2 times length in dorsal view. Mesoscutum smooth and shiny, almost glabrous except for a few setae; some weak transverse carinae at edges of notauli, extended in anterior region between notauli in some specimens (Fig. 2a, 2b). Notauli complete and clearly excavated; transverse internal carinae ranging from being absent (Fig. 2a) to present (Fig. 2b); median mesoscutal furrow absent. Lateral region of mesoscutum smooth except for few isolated punctures; parapsidal signum, parascutal sulcus, absent. Scutellar length 0.8 times that of mesoscutal length in dorsal view. Scutellum alutaceous, never areolate (Fig. 2a, 2b).

Scutellar foveae rounded, large, alutaceous, with short oblique internal ridges in some specimens, basally defined by weak carina (Fig. 2a, 2b); lateral pits of scutellar foveae absent. Interfoveal line present. Circumscutellar carina complete, clearly defined, not projected at scutellar apex. Mesopleuron smooth, glabrous, shiny, with transverse groove not internally carinate; some anterior oblique carinae present. Mesopleural triangle smooth, densely pubescent. Metanotal troughs alutaceous, glabrous. Propodeum coriaceous, pubescent, divided into large cells; central area with one large upper cell partially divided by median carina and four lesser smaller cells.

Wings. Pubescent. Radial cell of fore wing closed, 2.6 times longer than wide. Marginal pubescence of forewing denser at apical third.

Metasoma. Longer than head + mesosoma. Petiole longer than metacoxa, smooth, shiny, weak dorsal carinae present in last third of the petiole. Third metasomal tergum 2.5 times longer than fourth tergum in dorsal view. Fifth, sixth, seventh metasomal terga visible in dorsal view. Metasomal terga smooth, glabrous, punctate in anterior region of each tergum, more distinct from T4 to T7.

Taxonomic remarks. The holotype of *A. eucharoides* is lost (Fergusson, 1986); we studied the lectotypes *A. tincta* and *A. typica* designated by Fergusson (1986) instead. Regarding *A. gracilipes* syn.n., in the original work of Ionescu, the different coloration and longer radial cell and petiole are cited as differences for establishing a new species. After examining the type material of *A. gracilipes* as well as the lectotypes of *A. eucharoides* designated by Fergusson and series of undetermined material, we concluded that the coloration cannot be taken into account when distinguishing between species, and the morphometric differences cited by Ionescu (1969) fall within the ranges

of intraspecific variability.

Biology. Known to attack *Hemerobius micans* Olivier, 1792, *Wesmaelius betulinus* (Ström, 1788) and *W. subnebulosus* (Stephens, 1836) (Fergusson, 1986).

Distribution. Palaearctic. Known from Sweden (Dalman, 1818; Zetterstedt, 1838); United Kingdom (Walker, 1835); Austria (Giraud, 1860); France (Hedicke, 1914); Netherlands and Germany (Dalla-Torre & Kieffer, 1910); Russia (Belizin, 1951); Georgia (Belizin, 1961); Romania (Ionescu, 1969) first citation for Morocco, Andorra, Belgium, Italy, Switzerland, Czech Republic, Hungary and Norway.

***Aegilips flavidicornis* (Kieffer, 1910) comb. n.**

Anacharis flavicornis Kieffer, 1910. Type examined.

Anacharis flavidicornis Kieffer, 1911.

Type material of *Anacharis flavidicornis*. Holotype ♂ (ZMB): "Chinese Turkestan, Kora-Ssu b. Polu, 2115m, 6.6.90, Conradt S." (white label); "Type" (red label); "A. flavidicornis" (white label); "Zool. Mus. Berlin" (white label); "*Aegilips flavidicornis* ♂ (Kieffer, 1910), N. Mata-Casanova det, 2014" (white label).

Taxonomic remarks. After examining the holotype, we found it has characters that fit within genus *Aegilips* instead of *Anacharis*: petiole shorter than the metacoxa and coarsely sculptured, mesopleuron anteriorly carinated and without transverse mesopleural groove. For this reason we rename here this species as *Aegilips flavidicornis* (Kieffer 1910) comb. n.

***Anacharis immunis* (Walker, 1835)**

(Figures 2c, 2e, 2f)

Anacharis immunis Walker, 1835. Type examined.

Anacharis ensifer Walker, 1835

Anacharis ensifera Walker, in Reinhard, 1860. Synonymized by Fergusson (1986). Type examined.

Cynips petiolata Zetterstedt, 1838. Synonymized by Fergusson (1986).

Megapelmus rufiventris Hartig, 1841

Anacharis rufiventris (Hartig) Giraud, 1860. Synonymized by Fergusson (1986).

Anacharis staegeri Dahlbom, 1842. Synonymized by Dalla-Torre (1893).

Synapsis aquisgranensis Förster, 1869

Prosynapsis aquisgranensis (Förster) Dalla-Torre & Kieffer, 1910. Synonymized by Kyerich (1984).

Diagnosis. Species easily distinguishable from most Eurasian species of *Anacharis* by the weakly excavated notauli which tend to disappear in its anterior region in some individuals (In *A. antennata, A. eucharoides, A. parapsidalis* and *A. belizini* sp. n. and *A. fergussoni* sp. n., notauli always complete, deeply excavated, internally carinate). This character is also shared with *A. norvegica,* but *A. immunis* can be distinguished by always having smooth mesoscutum and big cells in the scutellum (mesoscutum carinate in its anterior region and scutellum densely covered by small

cells in *A. norvegica*).

Type material of *Anacharis immunis*. Lectotype ♂ deposited in NHM with the following labels: "*immunis*, Walker" (white label); "In coll. under *immunis*" (white label); "Lectotype of *A. immunis* Walker det. N. D. M. Fergusson, 1981" (white label); "B. M. Type Hym. 2.160" (white label).

Type material of *Anacharis ensifera*. Lectotype ♀ deposited in NHM with the following labels: "F. Walker coll, 81-86" (white label); "In coll. 1981 under *ensifer*" (white label); "Lectotype of *A. ensifer* Walker det. N. D. M. Fergusson, 1981" (white label); "B. M. Type Hym. 7.161" (white label).

Type locality: Unknown.

Material examined. (6♀ & 6♂: 3♀ & 4♂ deposited in CNC, 1♀ & 1♂ deposited in ULg, 2♀ & 1♂ deposited in UB). ANDORRA: 1♀, Santa Coloma, MT, VIII.1992, J. Pujade leg. BELGIUM: 1♀, Somal, 26.IX.2009, P. N. Libert leg. 2♂, Somal, 27.V.2013, P. N. Libert leg. 2♀, Somal, 28.V.2013, P. N. Libert leg. GERMANY: 1♀, Mainz, 26.VIII-3.IX.1965, A. W. Steffan leg. DENMARK: 1♂, S-Zealand, Feddent nr. Pastro, 27.VIII. 1994. 1♀, W. Zealand, Woodat bromme, 28.VIII.1994, Munk & Sharkey leg. SWEDEN: 1♂, Uppsala, Hagadalen, MT, 1-10.VIII.1990, F. Ronquist leg. 1♂, Uppsala, Hagadalen, MT, 1-17.VIII.1990, F. Ronquist leg. 1♀, Uppsala, Hagadalen, MT, 26.VIII-5.IX.1990, F. Ronquist leg. NORWAY: 1♀, Oppdall, Kongsvoll, Raubekken, 900m, MT, 31.VII.1980: J. O. Solem leg. RUSSIA: 1♂, Yakutia, Cherskiy, MT, 15-20.VII.1990: D. N. Wood leg. JAPAN: 1♂, Hokkaido, Sapporo, Jozankei, 350m, 20-31.VII.1989: K. Maeto & M. Sharkey.

Redescription.

Length. Body: 2.9 mm. Antennae: 2.7 mm (♂), 2.3 mm (♀). Wings: 2.6 mm.

Coloration. Head, mesosoma and metasoma black. Mandibles yellowish brown with darker teeth. Antennae yellowish brown. Legs yellowish brown with darker coxae. Veins of wings yellowish.

Head. Triangular-shaped in anterior view. Face smooth, covered with white setae denser at malar area. Width of head 1.7 times length in dorsal view and 1.3 times height in anterior view. Malar sulcus coriaceous, 0.5 times height of compound eye. Transfacial line same length as height of compound eye. Diameter of toruli larger than inter-toruli distance and torulus to compound eye distance. Clypeus smooth, glabrous, shortly convex. Occipital and postocular carinae absent. Compound eyes glabrous except for a few short setae. In both sexes POL:OOL:LOL ratio = 7:4:3, ocelli diameter being 2.5. Frons, gena and occiput smooth, shiny and glabrous except for few sparse setae..

Antennae. Cylindrical flagellomeres covered with pubescence. Female antennal formula: 9(3.5), 3.5(3), 10.5(2.5), 10(2.5), 8(2.5), 7(2.5), 6.5(3), 6.5(3), 6(3), 6(3), 6(3), 11(3). Male antennal formula: 8(3.5), 3.5(3.5), 9.5(2.5), 8(2.5), 8(2.5), 7.5(2.5), 7(2.5), 7(2.5), 7(2.5), 7(2.5), 6.5(2.5), 6(2.5), 6(2), 9(2). Placodeal sensilla start at F4 in females and F1 in males.

Mesosoma. Pronotum smooth, punctate, covered by pubescence denser in its dorsal region; short carinae at base of pronotum, (Fig. 2e) so reduced to being almost unnoticeable in some specimens. Mesoscutal width 1.2 times length in dorsal view. Mesoscutum smooth to slightly alutaceous, shiny, almost glabrous except for few setae in its anterior third. Notauli weakly excavated, not internally carinate, complete in some

specimens but effaced in anterior third of mesoscutum in others (Fig. 2c); median mesoscutal furrow absent. Parapsidal signum, parascutal sulcus, absent. Scutellar length 0.6 to 0.7 times length that of mesoscutum in dorsal view. Scutellar sculpture highly variable: in some specimens, scutellum areolate, while in some others smooth to slightly alutaceous. Scutellar foveae triangle-shaped and smooth, basally defined by a weak carina which can be distinct or almost unnoticeable; lateral pits of scutellar foveae absent. Interfoveal line present. Circumscutellar carina complete, clearly defined, raised tooth projected at scutellar apex (Fig. 2f). Mesopleuron smooth, glabrous, shiny, with internally carinate transverse groove; some oblique carinae next to edge of pronotum, in some individuals slightly coriaceous. Mesopleural triangle smooth, pubescent. Metanotal troughs internally carinate, in some specimens carinae extended across all surface. Propodeum strongly alutaceous, pubescent; large central cell longitudinally divided by incomplete median carina, presence of weaker transverse carinae.

Wings. Pubescent. Radial cell of fore wing closed, 2.9 times longer than wide. Marginal pubescence of fore wing denser at apical third.

Metasoma. Shorter than head + mesosoma. Petiole as long as metacoxa, smooth and shiny. Third metasomal tergum 2.8 times longer than fourth tergum in dorsal view. Fifth, sixth, seventh metasomal terga visible in dorsal view. Metasomal terga smooth and glabrous, punctate in anterior region of each tergum, more distinct from T4 to T7.

Taxonomic remarks. *A. immunis* and *A. ensifera* were described as separate species by Walker (1835). In Fergusson (1986) they were synonymized. After examining the type material and series of undetermined material, we concluded that *A. immunis* is a valid species with high variability in the scutellar sculpture (from

completely smooth to softly areolate) and in the scutellar foveae (clearly defined by a carina in some specimens while in others there is a coarse band at the base of the foveae instead of the basal carina). The *A. immunis* holotype has smooth scutellum and scutellar foveae without basal carina, while the lectotype of *A. ensifera* has areolate scutellum and basal carina in the scutellar foveae; others specimens reflect intermediate states of those characters. The other synonymy established by Fergusson was *A. rufiventris*, but we could not examine the type material.

Fergusson (1986) mentioned the petiole of females being shorter than metacoxa, while it is as long as metacoxa in males. After examining the type material and other specimens we did not see the differences mentioned by Fergusson; both sexes present petiole as long as metacoxa.

Biology. Known to attack *Hemerobius nervosus* Fabricius, 1793 and *Wesmaelius subnebulosus* (Kierich, 1984).

Distribution. Palaearctic. Known from United Kingdom (Walker, 1835; Evenhuis, 1965; Fergusson, 1986); Austria, Germany, Norway and Sweden (Dalla-Torre & Kieffer, 1910) Latvia and Russia (Belizin, 1951); Armenia and Ukraine (Belizin, 1961); Finland and Poland (Kyerich, 1984); first citation for Andorra, Belgium, Denmark and Japan.

***Anacharis parapsidalis* Belizin, 1951**

(Figures 1c, 1d)

Diagnosis. Species easily distinguishable from other Palaearctic *Anacharis*

species by the strongly areolate scutellum and coarsely sculptured pronotum (pronotum smooth with some weak basal carinae and scutellum smooth to alutaceous, sometimes presenting weak carinae at the margins but never strongly areolate in *A. antennata, A. eucharoides,* and *A. immunis*).

Type material. Holotype ♀ deposited in ZIN with the following labels: "Khabarovskij krai: Nikhno-Tambovskoye, r. Kul'ku, 28.VII.1911, V. Sovlatov j" (white label, handwritten, in Cyrillic); "Holotype *Anacharis parapsidalis* ♂, V. Belizin det" (red label, handwritten).

Type locality: Nikhno-Tambovskoye, Khabarovsk krai, Russia.

Material examined. (5♀ & 4♂: 2♀ & 2♂ deposited in CNC, 2♀ & 2♂ deposited in UB). ROMANIA: 1♀, Transylvania, Mt. Gymes, Középlak, Sötét-patak, 1300m, 19.VIII.1990, Cs. Thuróczy leg. JAPAN: 1♂, Mt Hiko, Fukukoa, 700 m, 28.IV-10.V.1989: M. J. Sharkey leg. 1♀, Horoha, Hokkaido, 800 m, 5.VII.1989: M. J. Sharkey leg. 1♀ & 1♂, Jozankei, Sapporo, Hokkaido, 350 m, 20-31.VII.1989: K. Maeto & M. Sharkey leg. 1♂, Mt Hiko, MT, 18-25.IX.1989: Takeno & M. J. Sharkey leg. 2♀, Jozankei, Sapporo, Hokkaido, 350 m, MT, 21-29.IX.1989: K. Maeto & M. Sharkey leg. 1♂, Mt below Pyoton, Hidaka, Hokkaido, 500 m, 14.VIII.1996: L. Masner leg.

Redescription.

Length. Body: 3.8 mm. Antennae: 3.2 mm (♀), 3.3 mm (♂). Wings: 3.2 mm.

Coloration. Head, mesosoma and metasoma black. Mandibles yellowish brown with darker teeth. Antennae yellowish brown with darker first segment. Legs yellowish brown, coxae dark brown. Veins of wings dark yellow.

Head. Triangular-shaped in anterior view. Face smooth, covered with abundant

white setae. Width of head 1.3 times height in front view and 2.3 times length in dorsal view. Malar sulcus coriaceous, 0.7 times height of compound eye. Transfacial line 1.1 times of height compound eye. Diameter of toruli equal to inter-toruli distance and bigger than torulus to compound eye distance. Clypeus shortly defined, smooth, glabrous, shortly convex. Occipital and postocular carinae absent. Compound eyes glabrous. In both sexes, POL:OOL:LOL ratio 8:6:4, ocelli diameter being 3. Frons alutaceous, gena and occiput smooth and shiny with sparse setae..

Antennae. Cylindrical flagellomeres covered with pubescence. Female antennal formula: 9(3.5), 4.5(3), 13.5(3), 12.5(3), 10(3), 10(3), 10(3), 9(3), 9(3), 8.5(3), 8(3), 7(3), 11(3). Male antennal formula: 9(4), 4(3.5), 14(3.5), 13(3.5), 12.5(3.5), 12(3.5), 11(3), 11(3), 10(3), 10(3), 10(3), 10(3), 9(3), 13(3). Placodeal sensilla starting at F1 in both sexes.

Mesosoma. Pronotal plate alutaceous. Pronotum strongly alutaceous, pubescent, carinate in all its surface: ventrally obliquely carinate, dorsally irregularly carinate (Fig. 1d). Mesoscutal width 1.1 times length in dorsal view. Mesoscutum alutaceous, some weak carinae between notauli, specially in anterior mesoscutum and base of notauli (Fig. 1c). Notauli complete with transverse carinate sculpture; median mesoscutal furrow short, almost entirely effaced. Parapsidal signum very short, forming elongated sulcus; parascutal sulcus slightly excavated, internally carinate, more defined at anterior region of mesoscutum. Scutellar length 0.6 times that of mesoscutum length in dorsal view. Scutellum alutaceous, divided into cells by strong carinae (Fig. 1c). Scutellar foveae triangular, smooth, basally defined by a carina; lateral pits of scutellar foveae absent. Interfoveal line present but short. Circumscutellar carina complete, clearly

defined, raised tooth dorsally projected at scutellar apex. Mesopleuron glabrous and shiny, anteriorly coriaceous; with internally carinate transverse groove, some carinae surpassing groove and reaching anterior margin of mesopleuron (Fig. 1c); mesopleural triangle smooth, densely pubescent. Metanotal troughs present dense pubescence. Propodeum slightly alutaceous, heavily pubescent, divided into large cells; central area divided into two halves separated by a median carina and asymmetrically divided by some weak transverse carinae.

Wings. Pubescent. Radial cell of fore wing closed, 2.4 times longer than wide. Marginal pubescence of fore wing denser at the apical third.

Metasoma. Longer than head + mesosoma. Petiole about 2.0 times as long as metacoxa, smooth and shiny. Third metasomal tergum 1.8 times longer than fourth tergum in dorsal view. Fifth, sixth, seventh metasomal terga visible in dorsal view. Metasomal terga smooth and glabrous, not punctate.

Biology. Unknown.

Distribution. Palaearctic. Known from Russia (Belizin, 1951); first citation for Romania and Japan.

Comments. According to our sources, the type material of *A. antennata* was deposited in the Zoological Institute of St. Petersburg (ZIN), but is now lost. The specimens of our study were determined with the help of Belizin's original descriptions.

***Anacharis belizini* Mata-Casanova & Pujade-Villar sp. n..**

(Figures 3a, 3b, 3c, 3d)

Diagnosis. Species similar to *A. antennata*, from which can be distinguished by having parallel oblique ridges covering most of the pronotal surface (pronotum carinate sculptured reduced only to few short ridges at the lower region in *A. antennata*).

Etymology. The specific name was chosen to honor the Russian entomologist V. I. Belizin, whose work unveiled much of the current knowledge of the Asian Anacharitinae.

Type material. HOLOTYPE 1♀ deposited in CNC with the following labels: "THAILAND, Doi Inthanon Nat. Park, MT, 6-12.VI.1990: B. V. Brown leg" (white label); "*Anacharis belizini* Mata-Casanova & Pujade-Villar sp. n.., desig. Mata-Casanova 2014" (white label); "HOLOTYPE ♀, *Anacharis belizini* Mata-Casanova & Pujade-Villar sp. n.., design Mata-Casanova-2014" (red label).

Type locality: Doi Inthanon Nat. Park, Chiang Mai Province, Thailand.

Description.

Length. Body: 3 mm. Antennae: 2.3 mm (♀). Wings: 2.5 mm.

Coloration. Head, mesosoma and metasoma black. Mandibles yellowish brown with darker teeth. Antennae brown with darker first segment. Legs yellowish brown with darker coxae, third coxa black. Veins of wings brownish.

Head. Triangular-shaped in anterior view. Face smooth, covered with abundant white setae (Fig. 3a). Width of head 1.3 times height in front view and 1.8 times length in dorsal view. Malar sulcus coriaceous, 0.8 times height of compound eye. Transfacial line length equal to compound eye height. Diameter of the toruli larger than inter-toruli distance and torulus to compound eye distance. Clypeus shortly defined, convex,

densely covered by pubescence. Occipital and postocular carinae absent. Compound eyes glabrous. In females, POL:OOL:LOL ratio = 7.5:5:3, being ocelli diameter 2.5 in females. Frons, gena and occiput smooth and densely pubescent.

Antennae. Cylindrical flagellomeres covered with pubescence. Female antennal formula: 9(3), 2(3), 11(2), 9(2), 8(2), 8(2), 7(2), 7(2), 6.5(2), 6(2), 6(2), 5.5(2), 10(2). Placodeal sensilla starting at F1.

Mesosoma. Pronotal plate coriaceous. Pronotum pubescent, alutaceous, most of surface covered with parallel oblique ridges (Fig. 3b). Mesoscutal width 1.2 times length in dorsal view. Mesoscutum smooth, shiny, almost glabrous except for few short lateral setae; weak carinate sculpture at edges of notauli (Fig. 3c). Notauli complete with variable transverse carinate sculpture; median mesoscutal furrow short but distinct. Parapsidal signum absent; parascutal sulcus present, internally carinate. Scutellar length 0.8 times that of mesoscutum length in dorsal view. Scutellum smooth, shiny, not areolate (Fig. 3c). Scutellar foveae rounded, smooth, without any internal carinae , basally defined by a carina; lateral pits of scutellar foveae present. Interfoveal line present. Short median scutellar carinae present at scutellum apex. Circumscutellar carina complete, clearly defined, not dorsally projected at scutellar apex. Mesopleuron glabrous, shiny, with internally carinate transverse groove; presence of weak carinae in anterior mesopleuron. Mesopleural triangle smooth, glabrous. Metanotal troughs densely pubescent. Propodeum alutaceous, pubescent; central area with large superior cell symmetrically divided into two areas by a transverse carina, upper area being internally divided by median longitudinal carina while lower one not; rest of propodeum divided in few large cells (Fig. 3d).

Wings. Pubescent. Radial cell of for ewing closed, 2.8 times longer than wide. Marginal pubescence of for ewing denser at the apical third.

Metasoma. Longer than head + mesosoma. Petiole about 2.0 times as long as metacoxa, smooth and shiny. Third metanotal tergum 1.5 times longer than fourth tergum in dorsal view. Fifth, sixth, seventh metanotal terga visible in dorsal view. Metanotal terga smooth and glabrous, punctate in anterior region of each tergum, more distinct from T4 to T7.

Biology. Unknown.

Distribution. Indomalayan. Known only from Thailand.

***Anacharis fergussoni* Mata-Casanova & Pujade-Villar sp. n..**

(Figures 4a, 4b, 4c)

Diagnosis. Species very similar to *A. parapsidalis,* from which can be distinguished by having smooth pronotum with only some short carinae in its lower region (pronotum strongly carinate in all its surface in *A. parapsidalis*). It is also very similar to the Nearctic species *A. melanoneura,* except for having alutaceous and more strongly areolate scutellum, a complete median carina in the propodeum and placodeal sensilla starting at F1 (In *A. melanoneura*, the scutellum is smooth and not so strongly areolate, the median propodeal carina is incomplete and placodeal sensilla start at F2).

Etymology. The specific name was chosen to honor the British entomologist N. Fergusson, who systematized the confusing information on European Anacharitinae.

Type material. HOLOTYPE 1♀ deposited in CNC with the following labels:

"GERMANY, Ingelheim Rhein, MT, 1-30.IX.1968: I. Sreffan Orchard leg" (white label); "*Anacharis fergussoni* Mata-Casanova & Pujade-Villar sp. n.., desig. Mata-Casanova 2014" (white label); "HOLOTYPE ♀, *Anacharis fergussoni* Mata-Casanova & Pujade-Villar sp. n.., design Mata-Casanova-2014" (red label). PARATYPES (22♀ & 18: 5♀ deposited in CNC, 17♀ & 18♂ deposited in UB): SPAIN: 1♂, Teruel, Mora de Rubielos, 28.VIII.1965, I. Docavo Alberti leg. 1♀, Sot de Chera, 3.VIII.1988, J. Pujade leg. ANDORRA: 4♀, Santa Coloma, MT, VIII.1992, J. Pujade leg. 2♀, Santa Coloma, MT, IX.1992, J. Pujade leg. 1♀, Santa Coloma, MT, IX.1992, J. Pujade leg. 1♀, Santa Coloma, MT, 16-30.IV.1993, J. Pujade leg. 1♀, Santa Coloma, MT, 1-15.VII.1993, J. Pujade leg. FRANCE: 1♀, Alpes-de-Haute-Provence, Parc Nat. Mercantour, Uvernet-Fours, Bois de la Tellière, 44°19' N 6°37' E, 1407m, 20.VII.2011: Takuma Yoshida leg. GERMANY: 1♀, Mainz, 26.VIII-3.IX.1965: A. W. Steffan leg; 1♀, Gelnhausen in Hessen Deutschland, MT, IX.1967: L. Masner leg; 1♀, Ingelheim Rhein, MT, 1-30.IX.1968: I. Sreffan Orchard leg. SLOVAKIA: 2♀, Cachtice env., 11.VIII.1991: L. Masner leg. HUNGARY: 1♂, Kalocsa, 25.IV.1939, Erdös leg. 3♂, Vas m. Cák, 4.VII.1994, Melika G. leg. 8♂, Vas m. Celdömölk, 5.VII.1994, Melika G. leg. 4♀ & 1♂, Vas m. Cák, 8.VII.1994, Kotenko A. leg. 1♀ & 1♂, Vas Co., Hörmann forr., 20.VII.1996, Cs. Thuróczy leg. 1♂, Veszprém Co., Bakonygyepes, 2.VII.2000, Zóltan Acs leg. ROMANIA: 1♀, Hargita Co., Kiruly Valley, 10.viii.2000, Zóltan Acs leg. NORWAY: 1♂, Oppdal, Kongsvoll, Raubekken, 900m, MT, 14.VIII.1980, J. O. Solem. 1♀, Alta, Detsika, Buolamalia, MT, 24.VI-16.VII.1996, Lars Ove Hansen leg.

Type locality: Ingelheim am Rhein, Rhineland-Palatinate, Germany.

Description.

Length. Body: 2.9 mm. Antennae: 2.3 mm (♀), 2.5 mm (♂). Wings: 2.8 mm.

Coloration. Head, mesosoma and metasoma black. Mandibles yellowish brown with darker teeth. Antennae brown with black first segment. Legs yellowish brown, upper femur and coxae darker. Veins of wings brownish.

Head. Triangular-shaped in anterior view. Face smooth, covered with abundant white setae. Width of head 1.3 times height in anterior view and 2.4 times length in dorsal view. Malar sulcus coriaceous, 0.7 times height of compound eye. Transfacial line length 1.1 times height of compound eye. Diameter of the toruli shorter than inter-toruli distance but bigger than torulus to compound eye distance. Clypeus shortly defined, convex, densely covered by facial pubescence. Occipital and postocular carinae absent. Compound eyes glabrous. In both sexes POL:OOL:LOL ratio = 7:5:3, ocelli diameter being 3. Frons and occiput smooth covered by some scarce hyaline hairs, gena densely pubescent.

Antennae. Cylindrical flagellomeres covered with pubescence. Female antennal formula: 8(3), 3(2.5), 11(2), 9(2), 8(2), 8(2), 8(2), 7.5(2), 6.5(2), 6.5(2), 6(2), 5.5(2), 9.5(2). Male antennal formula: 9(3), 3.5(3), 10.5(2.5), 9(2.5), 9(2.5), 8(2), 8(2), 7.5(2), 7.5(2), 7(2), 7(2), 7(2), 6(2), 7(2). Placodeal sensilla starting at F1 in both sexes (Fig. 4c).

Mesosoma. Pronotum alutaceous, densely pubescent, slightly coarse in most of its surface, presence of some short carinae in its ventral region (Fig. 4b). Mesoscutal width 1.2 times length in dorsal view. Mesoscutum smooth, shiny, almost glabrous except for a few lateral short setae; weak alutaceous sculpture at base of notauli (Fig. 4a). Notauli complete with strong transverse carinae; median mesoscutal furrow short

but distinct. Parapsidal signum short; parascutal sulcus present, internally carinate, being more distinct in anterior mesoscutum (Fig. 4b). Scutellar length 0.6 times that of mesoscutum length in dorsal view. Scutellum alutaceous, shiny, completely areolate (Fig. 4a). Scutellar foveae rounded, smooth, without any internal carinae, basally defined by a carina; lateral pits of scutellar foveae present but superficial. Interfoveal line present. Circumscutellar carina complete, clearly defined, not dorsally projected at scutellum apex. Mesopleuron glabrous, shiny, with internally carinate transverse groove, presence of more or less extended coarse sculpture in anterior mesopleuron which may not be present in some cases. Mesopleural triangle densely covered by long hyaline hairs. Metanotal troughs densely pubescent. Propodeum heavily alutaceous, pubescent; central area longitudinally divided in two symmetrical areas by median carina; both areas are further divided by short transverse carinae in one big upper cell and two smaller cells.

Wings. Pubescent. Radial cell of fore wing closed, 2.7 times longer than wide. Marginal pubescence of forewing denser at apical third.

Metasoma. Longer than head + mesosoma. Petiole about 2.0 times as long as metacoxa, smooth and shiny. Third metanotal tergum 2.1 times longer than fourth tergum in dorsal view. Fifth, sixth, seventh metanotal terga visible in dorsal view. Metanotal terga smooth and glabrous, punctate in anterior region of each tergum, more distinct from T4 to T7.

Taxonomic remarks. After examining large series of material we have concluded that although most Anacharitinae species show a substantial degree of intraspecific variability in their body sculpture, the difference regarding the pronotal sculpture

between *Anacharis fergussoni* and *A. parapsidalis* species is greater than the variation among the individuals of each species, thus supporting *A. fergussoni* sp. n. as a new species.

Biology. Unknown.

Distribution. Palaearctic. Collected from Spain, Andorra, France, Germany, Slovakia, Hungary, Romania and Norway.

***Anacharis norvegica* Mata-Casanova & Pujade-Villar sp. n..**

(Figures 4d, 4e, 4f)

Diagnosis. Species with incomplete notauli like *A. immunis,* from which can be distinguished by having median mesoscutal furrow, carinate sculpture in anterior mesoscutum and strongly areolate scutellum (median mesoscutal furrow absent, mesoscutum completely smooth and scutellum smooth to tenuously areolate in *A. immunis*). This species is also morphologically similar to *A. eucharoides*, however it can be easily distinguished by the strongly areolate scutellum (scutellum alutaceous to rugose, never areolate, in *A. eucharoides*).

Etymology. The specific name makes reference to the distribution area of the type series.

Type material. HOLOTYPE 1♀ deposited in UB with the following labels: "NORWAY, Oppdal, Kongsvoll, Raubekken, 900m, MT, 21.VIII.1980: J. O. Solem leg" (white label); "Holotype of *Anacharis norvegica* Mata-Casanova & Pujade-Villar sp. n.., desig. Mata-Casanova 2014" (red label); "HOLOTYPE ♀, *Anacharis norvegica*

Mata-Casanova & Pujade-Villar sp. n.., design Mata-Casanova-2014" (red label). PARATYPES (7♀ deposited in UB): NORWAY: 1♀, Oppdal, Kongsvoll, Raubekken, 900m, MT, 7.VIII.1980, J. O. Solem. 2♀, Oppdal, Kongsvoll, Gavalibk, MT, 13.VII.1982, J. O. Solem. 1♀, Oppdal, Kongsvoll, Raubekken, 900m, MT, 31.VII.1982, J. O. Solem. 1♀, Oppdal, Kongsvoll, Gavalibk, MT, 3.VIII.1982, J. O. Solem. 2♀, Oppdal, Kongsvoll, Raubekken, 900m, MT, 14.VIII.1980, J. O. Solem.

Type locality: Oppdal, Trøndelag, Norway.

Description.

Length. Body: 3.5 mm. Antennae: 3 mm (♀). Wings: 3.3 mm.

Coloration. Head, mesosoma and metasoma black. Mandibles yellowish brown with darker teeth. Antennae brown with black first segment. Legs yellowish brown, upper femur and coxae darker. Veins of wings brownish.

Head. Triangular-shaped in anterior view. Face smooth, covered with abundant white setae. Width of head 1.2 times height in anterior view and 1.9 times length in dorsal view. Malar sulcus coriaceous, 0.6 times height of compound eye. Transfacial line as long as compound eye height. Diameter of toruli equal to torulus to compound eye distance but larger inter-toruli distance. Clypeus shortly defined, convex, margins densely covered by facial pubescence. Occipital and postocular carinae absent. Compound eyes glabrous. In females, POL:OOL:LOL ratio = 7:4.5:3, ocelli diameter being 2.5. Frons and occiput smooth covered by some scarce hyaline hairs, gena densely pubescent.

Antennae. Cylindrical flagellomeres covered with pubescence. Female antennal formula: 9(5), 3.5(3), 9(2), 8.5(2), 8.5(2), 8(2.5), 8.5(2.5), 8(3), 7(3), 6.5(3), 6(3), 6(3),

11(3). Placodeal sensilla start at at F4 but not abundant until F5 in females.

Mesosoma. Pronotum smooth, punctate, shortly extended ridges from pronotal plate margin that become transverse carinae in ventral pronotum (Fig. 4e). Mesoscutal width 1.1 times length in dorsal view. Mesoscutum smooth, shiny, almost glabrous except for a few short setae; weak carinate sculpture in region between notauli more distinct in anterior mesoscutum (Fig. 4d). Lateral region of mesoscutum smooth and glabrous, except for some peripheral short setae and punctures. Notauli weakly impressed, effaced in anterior mesoscutum, presence of weak internal carinate sculpture (Fig. 4d); median mesoscutal furrow short but distinct. Parapsidal signum tenuous, parascutal sulcus absent. Scutellar length 0.6 times that of mesoscutum length in dorsal view. Scutellum alutaceous, shiny, completely covered by small areolate sculpture (Fig. 4d). Scutellar foveae triangular, smooth, without any internal carinae, basally defined by a carina; lateral pits of scutellar foveae elongated and deeply excavated. Interfoveal line present. Circumscutellar carina complete, clearly defined, not dorsally projected at scutellum apex. Mesopleuron glabrous, shiny, with internally carinate transverse groove alutaceous, presence of coarse sculpture in anterior mesopleuron. Mesopleural triangle densely covered by long hyaline hairs. Metanotal troughs coarse, densely pubescent. Propodeum coriaceous, pubescent; central area longitudinally divided in two symmetrical areas by a median carina; both areas are further divided by short transverse carinae.

Wings. Pubescent. Radial cell of fore wing closed, 3 times longer than wide. Marginal pubescence of the fore wing denser at apical third.

Metasoma. Longer than head + mesosoma. Petiole about as long as metacoxa

(fig. 4f), smooth and shiny. Third metanotal tergum 2.9 times longer than fourth tergum in dorsal view. Fifth, sixth and seventh metanotal terga visible in dorsal view. Metanotal terga smooth and glabrous, never punctate.

Biology. Unknown.

Distribution. Palaearctic. Only collected from Norway.

DISCUSSION

After relocating *Anacharis flavidicornis* to *Aegilips,* the synonymization of *A. gracilipes* with *A. eucharoides* and the description of *A. belizini* sp. n., *A. fergussoni* sp. n. and *A. norvegica*, seven species of *Anacharis* are present in the Palaearctic and Indomalayan regions: *Anacharis antennata, A. belizini* sp. n., *A. eucharoides, A. fergussoni* sp. n., *A. immunis, A. norvegica* sp. n., and *A. parapsidalis.* The number of valid species of *Anacharis* rises to twenty-two species.

For the Eastern Palaearctic species *Anacharis antennata* and *A. parapsidalis,* both are cited for the first time from Japan. *Anacharis antennata* maintains a known distribution area restricted to the northeastern Asian continent, from Japan to Khabarovskiy krai in Russia. In the case of *A. parapsidalis*, previously only known from Tajikistan in Central Asia, the presence of specimens in Japan and one specimen from Romania suggests a wide distribution area across the Palaearctic region.

Anacharis eucharoides was mostly circumscribed to the Western portion of the Palaearctic region, with only one exemplar collected in the Asian continent (Belizin 1961); its known European distribution area previously comprised mostly Central and

Eastern Europe. The new data presented in this work expands its known distribution to Southern Europe and North Africa, with one specimen collected in Morocco. The current knowledge of the species distribution patterns suggests a Palaearctic distribution area centered in Central and Eastern Europe.

Anacharis immunis known distribution was divided between two areas before our study: one ranging from Western Europe to the Caucasus while the other limited to the Russian Far East. The presence of *A. immunis* in Europe has been consolidated with the addition of new citations in central Europe and the first specimens collected in Southern Europe. When talking about the Asian distribution of the species, only two specimens have been collected, both of them still limited to the Easternmost regions of Asia. This distribution pattern, divided into two areas, suggests a very plausible presence of the species across the whole Palearctic region, but more specimen from Asia will need to be collected in the future to support this hypothesis.

Regarding the distribution of the newly described species, *Anacharis fergussoni* sp. n. has been found in Southern and Central Europe, while the distribution of *A. norvegica* sp. n. is restricted to Southern Norway. More interesting is the description of *A. belizini* sp. n., the first species of *Anacharis* for the Indomalayan region, where the Anacharitinae record in was previously limited to two species of *Xyalaspis* cited from Thailand (Mata-Casanova *et al.* 2014b). The new data on *A. belizini* sp. n. makes the genus present in all regions and extends the knowledge of the anacharitines in the region. However, the Indomalayan anacharitines are still far from being well known. More research should be done in order to improve our knowledge of the Indomalayan anacharitines.

Unlike *Xyalaspis,* which presents high interspecific variability in mesoscutal sculpture (Mata-Casanova *et al.* 2014a, 2014b), the variability in the sculpture of the mesoscutum in *Anacharis* is reduced to some weak carinae in some species. Regarding their mesoscutal traits, *Anacharis* species could be roughly divided between those species with complete and deeply excavated notauli usually internally carinate and those species with incomplete notauli or so weakly excavated that appear to be incomplete. In the case of Eurasian species, all species fall in the first category except for *A. immunis* and *A. norvegica* **sp. n.**, which have tenuous notauli effaced in anterior mesoscutum (Fig. 3c, 4d).

More useful characters to distinguish between *Anacharis* species are those related to the pronotum and the scutellum. When talking about the pronotum, most species of the genus have a smooth surface with only some short lower carinae; that is the case of *A. antennata* (Fig. 1b), *A. eucharoides* (Fig. 2d), *A. immunis* (Fig. 2e) -in which carinae are very reduced- and *A. norvegica* sp. n. (Fig. 4e). *A. fergussoni* sp. n. represents the next step in pronotal sculpture, have a more extended lower carinae, while the rest of the pronotum is slightly coarse (Fig. 4b). *A. parapsidalis* (Fig. 1d) and *A. belizini* sp. n. (Fig. 2b) represent the other side of the spectrum with completely carinated pronotum.

Regarding the scutellar sculpture, the studied species of *Anacharis* have a high degree of interspecific variability: *Anacharis antennata* and *A. belizini* sp. n. have a smooth and shiny scutellum with no traces of carinae (Fig. 1a and 2c, respectively); both species also present a short median scutellar carinae at the apex of the scutellum, which can be interpreted as the remains of a more developed scutellar sculpture. The

next degree in scutellar sculpture is seen in *A. eucharoides*, which has an alutaceous scutellar surface and shows traces of areolate sculpture near the circumscutellar carina (Fig. 2a, 2b). *Anacharis immunis* has a high degree of variability in scutellar sculpture, ranging from an almost smooth scutellum in some individuals (Fig. 2c) to having areolate sculpture in others (Fig. 2e, 2f), but their carinae are not as strong as in *A. norvegica* sp. n., *A. parapsidalis* and *A. fergussoni* sp. n. in which the surface is completely covered by strong areolated sculpture (Fig. 4d, 1c and 2c, respectively). The sculpture in the mesoscutum, however, is not constant: while *A. parapsidalis* and *A. fergussoni* sp. n. have large cells across scutellar surface (Fig. 1c, 2c), the scutellum in *A. norvegica* sp. n. is divided into small cells (Fig. 4d).

The Palaearctic is the region where more hosts have been recorded for *Anacharis,* all of them belonging to subfamily Hemerobiidae (Neuroptera): Kierych (1984) listed *Wesmaelius subnebulosus* and *Wesmaelius nervosus* as *Anacharis immunis* hosts; later, Fergusson (1986) listed *Hemerobius micans*, *Wesmaelius betulinus* and *Wesmaelius subnebulosus* as hosts of *Anacharis eucharoides.* There are one hundred and seventy species of Hemerobiidae cited for the Palaearctic region (Makarkin, 1995), so the *Anacharis* species studied have plenty of potential hosts. More research should be done in order to unveil the life cycle of Eurasian *Anacharis.*

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Figure

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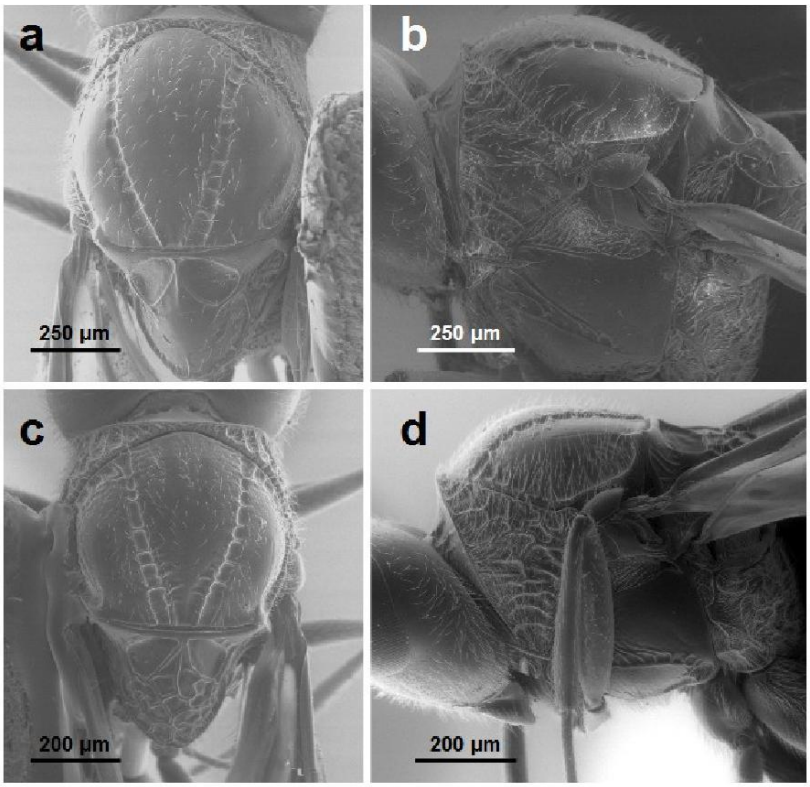


Figure 1. *Anacharis antennata*: (a) mesosoma in dorsal view, (b) mesosoma in lateral view. *Anacharis parapsidalis*: (c) mesosoma in dorsal view, (d) mesosoma in lateral view.

1

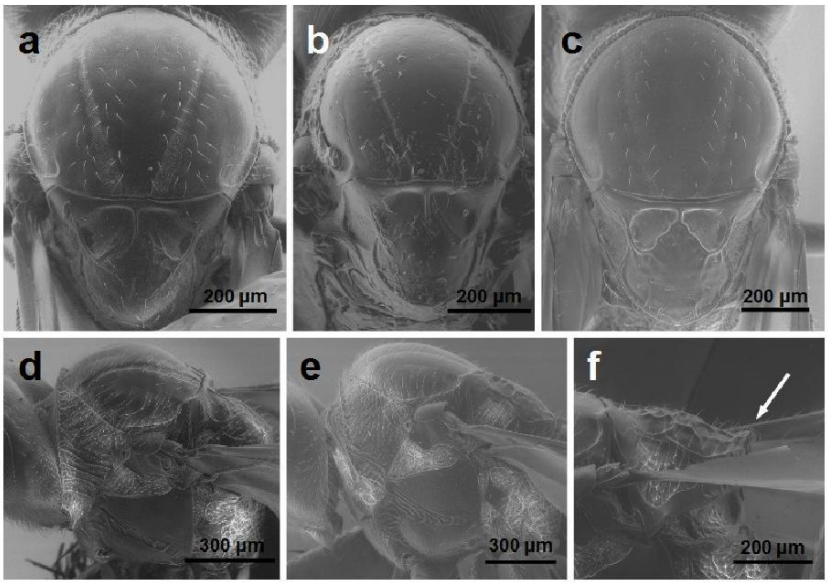


Figure 2. Mesosoma in dorsal view: (a, b) *Anacharis eucharoides;* (c) *Anacharis immunis*. Mesosoma in lateral view: (d) *Anacharis eucharoides;* (e) *Anacharis immunis.* (f) Detail of *A. immunis* scutellum.

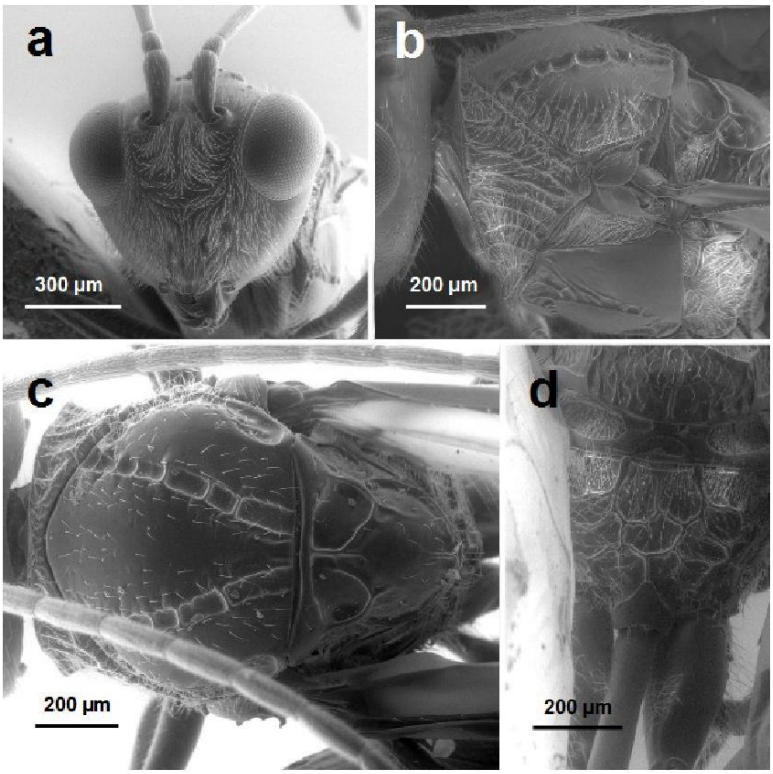


Figure 3. *Anacharis belizini* **sp.n.**: (a) head in front view; (b) mesosoma in lateral view; (c) mesosoma in dorsal view; (d) propodeum.

3

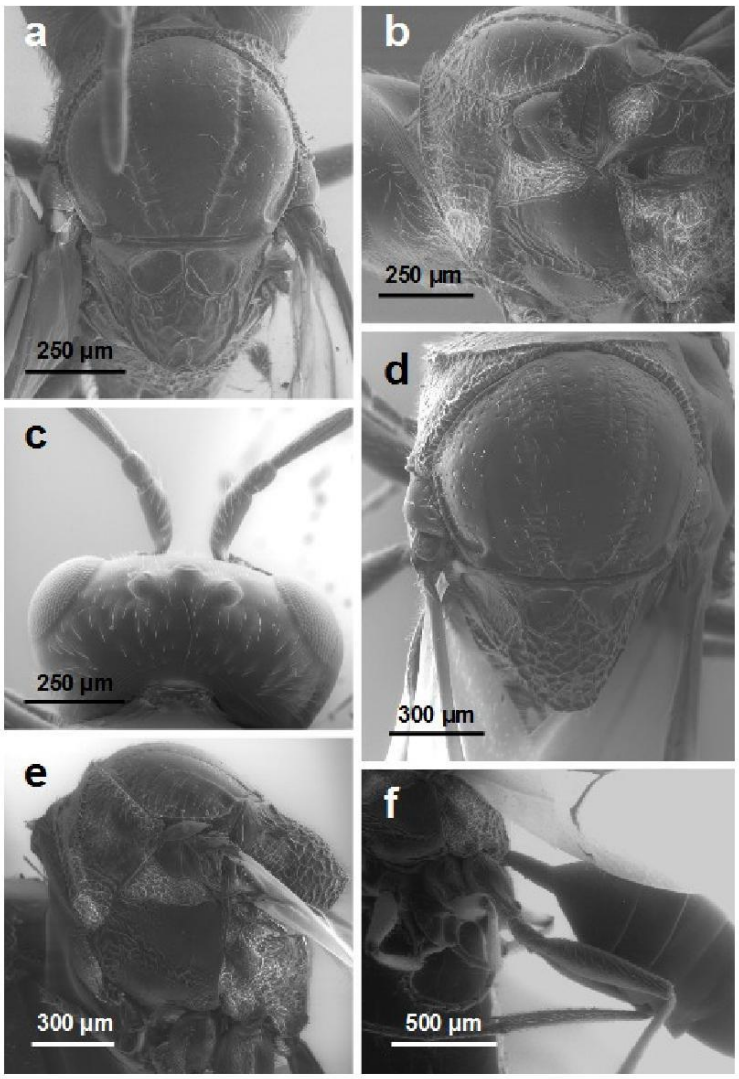


Figure 4. *Anacharis fergussoni* **sp.n.**: (a) mesosoma in dorsal view; (b) mesosoma in lateral view; (c) head in dorsal view. *Anacharis norvegica* **sp.n.**: (d) mesosoma in dorsal view; (e) mesosoma in lateral view; (f) petiole.

4.2.15. Revision of Eurasian *Aegilips*

Revision of the Eurasian species of *Aegilips* Haliday, 1835 (Hymenoptera: Figitidae: Anacharitinae)

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For Peer Review

Key words: Anacharitinae, *Aegilips*, Palaearctic, Indomalayan, new species, taxonomy.

Abstract

The knowledge of *Aegilips* in Eurasia is updated. One new species is described: *Aegilips insularis* Mata-Casanova and Pujade-Villar **sp. n.** from Madeira. The genus is also cited for the first time in the Indomalayan region with specimens of *A. atricornis* found on Northern India and Pakistan. *Aegilips curvipes* Giraud, 1860, *Aegilips gemellus* Belizin, 1961, *Aegilips laevis* (Hedicke, 1914), *Aegilips montanus* Belizin, 1951 and *Aegilips punctatus* Belizin, 1951 are synonymized with *A. nitidulus*. *Aegilips vena* Fergusson, 1985 is synonymized with *Aegilips zaitzevi* Kovalev, 1974. *Aegilips notatus* Belizin, 1951; and *Aegilips punctulatus* Hedicke, 1928 are designated as incertae sedis. The known distribution of *A. atricornis*, *A. kozlovi*, *A. nitidulus* and *A. romseyensis* are expanded. Morphological differences are discussed and a key for Eurasian *Aegilips* species is given.

INTRODUCTION

Aegilips Haliday, 1835 is a genus of cynipoid parasitoid wasp included in the Anacharitinae. Anacharitinae is one of 12 subfamilies currently composing Figitidae (Paretas-Martínez et al., 2011), and can be distinguished from the rest of figitid wasps by the presence of three synapomorphies (Ros-Farré et al., 2000): (1) rounded and continuous pronotal plate (Fig. 1a), (2) broadly overlapping mandibles and (3) triangular-shaped head in anterior view (Fig. 1d) – This character is less clear, due to a secondary expansion of the malar area in *Acanthaegilopsis, Proanacharis* and some species of *Xyalaspis* (Mata-Casanova et al., 2015a), as well as some *Aegilips*; the result is a more quadrangular head shape in anterior view (Fig. 1f). Anacharitinae currently includes nine genera: *Acanthaegilips* Ashmead, 1896, *Acanthaegilopsis* Pujade-Villar, 2013, *Anacharis* Dalman, 1823, *Calofigites* Kieffer, 1909, *Hexacharis* Kieffer, 1907, *Proanacharis* Kovalev, 1996, *Solenofigites* Díaz, 1979, and *Xyalaspis* Hartig, 1843 (Mata-Casanova and Pujade-Villar, 2013). Regarding their biology, the aphid-feeding larvae of Hemerobiidae (Neuroptera) have been cited as hosts of some Anacharitinae (Díaz, 1979; New, 1979; Kyerich, 1984; Miller and Lamdin, 1985; Fergusson, 1986; Cave and Miller, 1987; Ronquist, 1999; Buffington et al., 2012; Mata-Casanova et al., 2014a).

Aegilips is morphologically close to *Acanthaegilopsis* and *Xyalaspis* (Buffington et al., 2012; Mata-

Casanova et al., 2014b), all three sharing short and coarsely sculptured petiole, transverse carinae on the lower mesopleuron and third metasomal tergum at least two times longer than the fourth an usually longer. The differentiation of these three morphologically similar genera is often troublesome; however, both *Acanthaegilopsis* and *Xyalaspis* possess a spine derived from the circumscutellar carina (Fig. 1b), a character absent in *Aegilips* (Fig.1c).

Aegilips was described by Haliday in Walker (1835), based on Dalman material labeled as *Cynips nitidula*. In the original description the authors did not mention anything about the etimology of the genus, not assigning grammatical genus to it. *Aegilips,* deriving from an adjective form which can be equally treated as feminine or masculine and without any statement of the describing author regarding the grammatical genus, should be treated as masculine according to ICZN article 30.1.4.2 (Alonso-Zarazaga pers. comm.). The pertinent nomenclatural changes have been made.

Aegilips is the most diverse of the Anacharitinae genera, with 27 described species worldwide prior to our study. It has a cosmopolitan distribution, being present in all continents except for Antarctica. Data for *Aegilips* in the Palearctic region has been out of date for some time, and limited to Western Europe, with 10 described species: *Aegilips bicolorata* Cameron, 1887, *Aegilips curvipes* Giraud, 1860, *Aegilips dalmani* Reinhard, 1860, *Aegilips fumipennis* Westwood, 1833, *Aegilips nitidulus* (Dalman, 1823), *Aegilips punctulatus* Hedicke, 1928, *Aegilips ruficornis* Cameron, 1883, *Aegilips rufipes* Westwood, 1833, *Aegilips rugicollis* Reinhard, 1860 and *Aegilips striolata* Cameron, 1883. The studies of Belizin (1951, 1961, 1973) extended the known distribution of the genus to the Caucasus, Central Asia and the Russian Far East, and added 6 new species to the Palearctic *Aegilips: Aegilips gemellus* Belizin, 1961, *Aegilips longicellus* Belizin, 1951, *Aegilips montanus* Belizin, 1951, *Aegilips notatus* Belizin, 1951, *Aegilips paucus* Belizin, 1961, *Aegilips punctatus* Belizin, 1951 and *Aegilips ustulatus* Belizin, 1973. Two more species were described by Kovalev (1974): *Aegilips kozlovi* Kovalev, 1974 and *Aegilips zaitzevi* Kovalev, 1974. The last revision on the Palearctic *Aegilips* was done by Fergusson (1986), in which *A. bicolorata, A. dalmani, A.fumipennis, A. ruficornis, A. rufipes, A. rugicollis* and *A. striolata* were synonymized with *A. nitidulus*, and 3 new species from the British Isles were described: *Aegilips atricornis* Fergusson, 1985, *Aegilips romseyensis* Fergusson, 1985 and *Aegilips venus* Fergusson, 1985. Our previous work on *Xyalaspis* (Mata-Casanova et al., 2014a, Mata-Casanova et al., 2016) showed that *Xyalaspis laevis* (Hedicke, 1914) belonged to *Aegilips; Anacharis flavidicornis* Kieffer, 1910 also belongs to *Aegilips* (unpublished data). Thus, 16 species of *Aegilips* were known in the Palearctic region when our study begun.

In this study, the Palaeartic species *A. atricornis, A. flavidicornis, A. kozlovi, A. longicellus, A. nitidulus, A. paucus, A. romseyensis, A. ustulatus* and *A. zaitzevi* are redescribed and the distribution area for some of them is expanded. *Aegilips curvipes, A. gemellus, A. laevis, A, montanus* and *A. punctatus* are established as synonyms of *A. nitidulus,* while *A. vena* is synonymized with *A. zaitzevi*. We describe *A. insularis* Mata-Casanova and Pujade-Villar **sp. n.** from Madeira. Diagnostic characters for these species are given, and data about morphological features, known distribution area and biology are discussed. *Aegilips notatus* Belizin, 1951 and *Aegilips punctulatus* Hedicke, 1928 are left as incertae sedis and are not included in the key because the original descriptions are insufficient and the type material has been apparently lost.

MATERIAL AND METHODS

The material studied is deposited in the Canadian National Collection of Insects, Arachnids and Nematodes (CNC, Ottawa), the Museum für Naturkunde (ZMHB, Berlin), the Muséum National d'Histoire Naturelle (MNHN, Paris), the Natural History Museum (NHMUK, London), the Universitat de Barcelona (UB, Barcelona) and the Zoological Institute of the Russian Academy of Sciences (ZIN, Saint Petersburg).

For this study 332 undetermined specimens were examined: 207 males and 125 females. Morphological terms used are those of Richards (1977), Ronquist (1995) and Ros-Farré et al. (2003). All measurements are relative except for the body length. Measurements and abbreviations include: F1–F12, first and subsequent flagellomeres; POL (post-ocellar distance) is the distance between the inner margins of the posterior ocelli; OOL (ocular-ocellar distance) is the shortest distance between the inner margin of the compound eye and the outer edge of the posterior ocellus; LOL (lateral–frontal ocellar distance) is the distance between the edges of the lateral and frontal ocelli. Antennal formula includes scape, pedicel and flagellomeres length and relative width in brackets.

The images included were made in 'Serveis Científico-Tècnics' of the University of Barcelona. The field-emission gun environmental scanning electron microscope (Quanta 200 ESEM, FEI, Hillsboro, OR, USA) was used for high-resolution imaging, under a low voltage (12.0 kV) and without gold-coating of the specimens in order to preserve the material.

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RESULTS

Key to the Eurasian species of *Aegilips*

1. Vein 2rm present (Fig. 1g). …..*A. zaitzevi* **Kovalev**
   Vein 2rm absent (Fig. 1f)..... 2

2. Scutellum completely smooth, scutellar foveae weakly impressed and not sharply delineated (Fig. 2a, 2b). ….....*A. insularis* **sp. n.**
   Scutellum from strongly alutaceous to heavily areolate, scutellar foveae may be basally defined or not, but always clearly distinguishable from the rest of the scutellar surface (Fig. 2e, 2f, 3b, 3c, 3d, 3f) ….....3

3. Notauli complete (Fig. 2e, 2f, 2g). ….....4
   Notauli incomplete, effaced in anterior mesoscutum. (Fig. 3b, 3c, 3d, 3f). ….....7

4. Notauli with clearly defined horizontal carinae (Fig. 2e, 2f); pronotum carinate across its surface (Fig. 2c). ….....5
   Notauli lacking horizontal carinae; if present, then very weak (Fig. 2g); pronotum smooth to coarse, at most with few ventral carinae (Fig. 2d) ….....6

5. Inter- notaular region strongly carinate, scutellum areolate (Fig. 2e). ….....*A. kozlovi* **Kovalev**
   Mesoscutal surface smooth and shiny; central scutellum smooth, only margins are areolate (Fig. 2f). ….....*A. romseyensis* **Fergusson**

6. Mesopleuron with some antero-basal carinae which can be anteroposteriorly extended but never covering most of mesopleural surface (Fig. 2d). ….....*A. nitidulus* **(Dalman)**
   Anterior to central mesopleuron densely wrinkled (Fig. 3a). ….....*A. ustulatus* **Belizin**

7. Scutellar foveae not defined posteriorly, interfoveal line incomplete (Fig. 3b). ….....*A. longicellus* **Belizin**
   Scutellar foveae defined posteriorly by a carina, which can be more or less apparent, but always distinguishable; interfoveal line complete (Fig. 3c, 3d, 3f). ….....7

8. ~~Scutellum~~ ~~alutaceous~~, short, blunt projection present posteriorly (Fig. 3c)…….....*A. flavidicornis* **(Kieffer)**

Scutellum areolate; round, not projecting posteriorly (Fig. 3d, 3f). 9

9. Notauli excavated and apparent, extending over 1/3 of mesoscutal total length, almost reaching the pronotum in some individuals (Fig. 3d); parascutal sulcus shallowly excavated but always present (Fig. 3e). ..... ***A. atricornis* Fergusson**
Notauli very superficial, extending less than 1/3 of mesoscutal total length (Fig. 3f); parascutal sulcus absent (Fig. 3g). ..... ***A. paucus* Belizin**

***Aegilips atricornis* Fergusson, 1985**
(Figures 3d, 3e)

Aegilips atricornis Fergusson, 1985: 813 (male)

Diagnosis. Species very similar to *A. nitidulus,* from which it can be distinguished by possessing incomplete notauli, the absence of median mesoscutal furrow and carinate sculpture on the mesoscutum (notauli complete, median mesoscutal furrow present and mesoscutum with some transverse carinae in *A. nitidulus*). It can be distinguished from *A. flavidicornis, A. longicellus, A. paucus* and *A. zaitzevi* (which also lack complete notauli) in despite having incomplete notauli, they are clearly excavated, almost complete in some individuals (notauli very superficial and never exceeding than one third of the scutellum length in *A. flavidicornis, A. longicellus, A. paucus* and *A. zaitzevi*).

Redescription.
Length. Body: 2.5-2.7 mm. Antennae: 2.8 mm (♂), 2.3 mm (♀). Wings: 2.4-2.7 mm.

Colouration. Head, mesosoma and metasoma black. Mandibles yellowish brown with darker teeth. Antennae dark brown. Legs dark yellow with darker metacoxa. Veins of wings brownish.

Head. Malar area expanded, head square-shaped in anterior view, 1.5 times broader than high. Face smooth and punctured, with short uniform pubescence. Malar area coriaceous, 0.8 times as long as compound eye. Clypeus smooth, glabrous, shortly projected; anterior tentorial pits small, indistinct. Transfacial distance 1.1 times as long as compound eye. Diameter of torulus larger than inter-toruli and torulus-eye distances. Frons, gena and occiput smooth and glabrous with few sparse setae; occipital and postocular carinae absents. In dorsal view 1.8 times as broad as long in dorsal view, broader than mesosoma. Compound eyes glabrous. POL: OOL: LOL is 8:4.5:2.5, diameter of lateral ocelus is 3.

Antennae. In males, antenna 14-segmented; flagellomeres cylindrical and pubescent, same width in all flagellomeres, placodeal sensilla abundant in all flagellomeres; F1 not modified; antennal formula: 9(3.5), 4(4), 10(3), 9(3), 9(3), 9(3), 9(3), 8(3), 8(3), 7.5(3), 7(3), 6(3), 6(3), 8(3). In females, antenna 13-segmented; flagellomeres cylindrical and pubescent, same width in all flagellomeres, placodeal sensilla starting at F2 but not abundant until F4; antennal formula: 9(3), 3.5(3), 10(2), 9(2.5), 8(2.5), 8(2.5), 7(3), 7(3), 6(3), 6(3), 5(3), 5(3), 8(3).

Mesosoma. Pronotal plate smooth. Pronotum smooth and punctured; pubescence uniformly distributed over its surface with some irregular ventral carinae. Mesoscutum as broad as long in dorsal view. Mesoscutum smooth and not punctured, short hyaline setae along notauli and anterior mesoscutum. Notaulus incomplete but apparent, usually effaced at anterior third, sometimes almost reaching pronotal margin, without horizontal carinae (Fig. 3d); median mesoscutal furrow absent. Lateral mesoscutum smooth and glabrous, except for some short hairs; parapsidal signum absent, parascutal sulcus very tenuous and not internally carinate (Fig. 3e). Scutellum strongly areolate and triangular-shaped, not apically rounded, 0.6 times of mesoscutal length; scutellar foveae square-shaped, large and smooth, posteriorly defined by carina; presence of superficial and narrow pit next to inner margin of scutellar foveae. Interfoveal line complete. Circumscutellar carina not projected to form tooth in lateral view. Anterior and ventral mesopleuron carinate, central and posterior mesopleuron smooth. Mesopleural triangle smooth except for an oblique sulcus near its anterior

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margin; short hyaline seta present. Metanotal troughs coarsely sculptured, almost glabrous. Lateral propodeum with strong coarse sculpture; central propodeum glabrous, coriaceous, divided in two symmetrical areas by median longitudinal carina; lower central region and rest of propodeal surface divided into smaller cells.

Forewings. Pubescent, marginal pubescence denser at apical third. Radial cell closed, 2.3 times longer than wide. Vein 2rm absent.

Metasoma. Shorter than head + mesosoma. Petiole as long as wide, shorter than metacoxa, coarsely sculptured, shiny. Third metasomal tergum 2 times longer than fourth in dorsal view. Metasomal terga smooth and glabrous; T5 to T7 punctured.

Type locality. United Kingdom, London.

Type material. Holotype ♂ (BMNH): "London: Bedford Park, July 1929, J. Waterson Coll." (white label); "Holotype of *Aegilips atricornis* N.D.M. Fergusson, 1982" (white label); "B.M. Type Hym 7.166" (white label). Paratype ♂ deposited in BMNH with the following labels: "London: Bedford Park, July 1929, J. Waterson Coll." (white label); "Paratype *A. atricornis* ♂ N.D.M. Fergusson, 1982" (white label).

Additional material examined. PORTUGAL: Madeira, 1951 (UB). MOROCCO: Anti-Atlas, 1 km N of Tiznit, 29.v.1992; no details, iv.1996; no details, 3-8.iv.1996; Ouirgane, 2000 m, 17.–23.x.1996; Marrakech, Ouirgane, 1000 m, 22-29.X.1996; no details, 19-26.I.1997; no details, 9-18.IV.1997 (all CNC). SPAIN: Sierra Nevada, 1650m, 27.VII.1960; Segovia, Siete Picos, Praderas de Navalazor, 1.VIII.1962; Madrid, Cercedilla, 8.VII.1974; Málaga, 6 km nr. Nerja, 6.V.1988 (all CNC); Catalunya, Vilassar de Dalt, 5-11.VI.1995; Teruel, Alcañiz, Salada Grande, no data specified (all UB). ANDORRA: Santa Coloma, VIII.1992; Santa Coloma, IX.1992; Santa Coloma, 16-30.VI.1992; Santa Coloma, 1-15.VII.1993; Santa Coloma, 16-31.VII.1993; Santa Coloma, 16-31.VIII.1993; Santa Coloma, 1-15.IX.1993; Santa Coloma, 16-30.IX.1993; Santa Coloma, 16-31.X.1993 (all UB). FRANCE: Vaucluset, Mont Ventoux, 1200 m, 24.VIII.1988 (CNC); Hautes Alpes, Arrieux, 1700m, 15.VII.1990 (BMNH); Montes Alps, Queyras, Arvieux, 18.VII.1990; Aveyron, Migne Lignas, Lac des Pises, 25.VIII.1990; Ardèche, Valgorge, Massif de Tarnague, 1370-1480m, 16.VIII.1991 (all CNC); Valdeblore, Col de Salèse, 10-24.VI.2009; Valdeblore, Col de Salèse, 13-27.VIII.2009 (all MNHN). SWITZERLAND: Pontresina, Engadin, 30.VIII.1964 (CNC). IRELAND: Rathgar, Mayfield, VII.1921; Rathgar, Mayfield, 9.IX.1921 (BMNH). UNITED KINGDOM: Staffordshire, Buynt Woods, 30.VII.1935; Staffordshire, Madeley, 3.IV.1936; Oxford, 3.V.1953; Denbighshire, Llangollen, 29.VI.1954; London, Wimbledon Com., 4.VI.1960; Staffordshire, Newcastle-u-Lyme, 4.VI.1960; Devon, Torquay, 15.VI.1960; Dorking, 17.VI.1960; Jersey, St. Brelades, 24.VII.1965; no details, VII.1974; Cambridgeshire, Duxford, 25.VII-1.VIII.1979 (all BMNH). AUSTRIA: Wienerland, Wien, 21.VIII.1960 (CNC). SLOVENIA: Postojne, 20.VII.1958 (CNC). HUNGARY: Mátra, 24.VII.1955; Mount Tátra, 23.VIII.1958; Vas, Kondorfa, 19.VI.1994 (UB). SLOVAKIA: Čachtice, 11.VIII.1981 (all CNC). SWEDEN: Eksharad, 23.VII.1960; Lund, Lund Zoological Museum grounds, VIII.1976; Vallentuna, 6.VIII.1991 (all BMNH). ROMANIA: Hargita Co., Kiruly Valley, 15.VIII.2000 (CNC). CYPRUS: Mt, Troodos, 9.VIII.1987 (BMNH). PAKISTAN: W. Pakistan, Chitral, Shenyak, 3350 m, VII-VIII.1984 (BMNH). INDIA: Kashmir, Ladakh, Leh, 11500 ft, 9.IX.1984 (BMNH).

Distribution. Palaearctic and Indomalayan. Known from United Kingdom (Fergusson, 1985), China (Mata-Casanova et al., 2015); first record for Portugal: Madeira, Morocco, Spain, Andorra, France, Switzerland, Ireland, Austria, Slovenia, Hungary, Slovakia, Sweden, Romania, Cyprus, Pakistan and India.

Biology. It attacks the Hemerobiidae *Wesmaelius betulinus* (Ström, 1788) and *W. subnebulosus* (Stephens, 1836) (Fergusson, 1985).

***Aegilips flavidicornis* (Kieffer, 1910)**
(Figures 3c)
Anacharis flavicornis Kieffer, 1909: 335 (male).
Anacharis flavidicornis Kieffer, 1911: 121.

Diagnosis. Species with incomplete notauli and smooth mesoscutum like *A. atricornis, A. longicellus, A. paucus* and *A. zaitzevi*, from which can be distinguished by having alutaceous scutellum slightly projected at the end (scutellum areolate and not dorsally projected in *A. atricornis, A. longicellus, A. paucus* and *A. zaitzevi*).

Redescription.

Measurements. Body: 2.4 mm. Antennae: 0.3 mm (♂, scape and pedicel only). Wings: 2.5 mm.

Colouration. Head, mesosoma and metasoma black. Mandibles yellowish brown with darker teeth. Antennae yellow. Legs yellow with brown coxae. Veins of wings yellowish.

Head. Triangular-shaped in anterior view, 1.2 times broader than high. Face smooth and punctured, with short uniform pubescence. Malar area coriaceous, 0.6 times as long as compound eye. Clypeus smooth, glabrous and shortly projected; anterior tentorial pits small, indistinct. Transfacial distance as long as compound eye. Diameter of torulus larger than inter-toruli and torulus-eye distances. Frons, gena and occiput smooth and glabrous with few sparse setae; occipital and postocular carinae absents. In dorsal view 1.7 times as broad as long in dorsal view, broader than mesosoma. Compound eyes glabrous. POL: OOL: LOL is 8:4.5:2.5, diameter of lateral ocelus is 3.5.

Antennae. In males, flagellomeres cylindrical and pubescent, same width in all flagellomeres, placodeal sensilla abundant in all flagellomeres; F1 not modified; antennal formula (flagellum lost): 6(3), 3.5(2.5).

Mesosoma. Pronotum smooth and punctured; slightly pubescent, some short irregular ventral carinae present. Mesoscutum 1.2 times as broad as long in dorsal view. Mesoscutum smooth to slightly alutaceous, shiny, glabrou. Notaulus incomplete but apparent, effaced at anterior mesoscutum and never internally carinate (Fig. 3c); median mesoscutal furrow short and narrow. Lateral mesoscutum smooth and punctured; parapsidal signum reduced to a short and narrow groove, parascutal sulcus very tenuous and not internally carinate, presence of a punctured band instead. Scutellum alutaceous and shiny, laterally coarse, 0.6 times of mesoscutal length; scutellar foveae trapezoidal, large, smooth, posteriorly defined by carina; presence of superficial and narrow pit next to inner margin of scutellar foveae. Interfoveal line complete. Circumscutellar carina shortly projected at apex of scutellum (Fig. 3c), triangular shape in dorsal view. Anterior and ventral mesopleuron carinate, central and posterior mesopleuron smooth. Mesopleural triangle heavily alutaceous, not pubescent. Metanotal troughs coarsely sculptured and almost glabrous. Lateral propodeum with strong coarse sculpture; central propodeum glabrous, coriaceous, divided in two symmetrical areas by median longitudinal carina; lower central region and rest of propodeal surface divided into smaller cells.

Forewings. Pubescent, marginal pubescence denser at apical third. Radial cell closed, 2.5 times longer than wide. Vein 2rm absent.

Metasoma. Shorter than head + mesosoma. Petiole slightly longer than wide, shorter than metacoxa, coarsely sculptured, shiny. Third metasomal tergum 2.9 times longer than fourth in dorsal view. Metasomal terga smooth and glabrous; T4 to T7 punctured.

Type locality. China, Xinjiang Uyghur Autonomous Region.

Type material. Holotype ♂ (ZMB): "Chinese Turkestan, Kora-Ssu b. Polu, 2115m, 6.6.90, Conradt S." (white label); "Type" (red label); "*A. flavidicornis*" (white label); "Zool.Mus. Berlin" (white label); "*Aegilips flavidicornis* ♂ (Kieffer, 1910), N. Mata-Casanova det, 2014" (white label).

Biology. Unknown.

Distribution. Palearctic. China: Xinjiang Uyghur Autonomous Region (Kieffer, 1910), Beijing (Mata-Casanova et al., 2015).

Comments. Kieffer described an American species of *Anacharis* as *A. flavicornis* (1909). One year after, another species of *Anacharis* was described from the Chinese Turkestan with the same denomination (Kieffer, 1910). The author changed the homonomy one year latter as part of a revision and correction on the names of different Cynipoidea and Evanoidea species (Kieffer, 1911),

thus resulting in one American species, *A. flavicornis* Kieffer, 1909, and one Palaearctic species, *A. flavidicornis* Kieffer, 1910.
When studying the type of *Anacharis flavidicornis,* it did not present the typical features of genus *Anacharis* but *Aegilips* instead, thus being renamed *Aegilips flavidicornis* (Mata-Casanova et al., in press).

Aegilips insularis **Mata-Casanova and Pujade-Villar sp. n.**
(Figures 2a, 2b)

Diagnosis. Species easily distinguishable from the rest of Palaearctic *Aegilips* species by having completely smooth scutellum with scutellar foveae present but not sharply delineated (scutellum from alutaceous to areolate in other *Aegilips* species from the Palaearctic region, scutellar foveae always noticeable).

Description.
Measurements. Body: 2.2-2.4 mm. Antennae: 1.8-2.1mm (♀), 2.8-3 mm (♂). Wings: 2.5-2.6 mm.

Colouration. Head, mesosoma and metasoma black. Mandibles yellowish brown with darker teeth. Antennae dark brown. Legs yellowish brown with darker coxae, metacoxa black. Veins of wings dark brown.

Head. Triangle-shaped in anterior view, 1.1 times broader than high. Face smooth and punctured, with short uniform pubescence. Malar area coriaceous, 0.7 times as long as compound eye. Clypeus smooth, glabrous, shortly projected; anterior tentorial pits small, indistinct. Transfacial distance 1.1 times as long as compound eye. Diameter of torulus larger than inter-toruli and torulus-eye distances. Frons, gena and occiput smooth and glabrous with few sparse setae; occipital and postocular carinae absents. In dorsal view 2 times as broad as long in dorsal view, broader than mesosoma. Compound eyes glabrous. POL: OOL: LOL is 5:4.5:2, diameter of lateral ocelus is 2.

Antennae. In males, antenna 14-segmented; flagellomeres cylindrical and pubescent, same width in all flagellomeres, placodeal sensilla abundant in all flagellomeres; F1 not modified; antennal formula: 6(3.5), 3(2.5), 9(3), 9(3), 8.5(3), 8.5(3), 8.5(2.5), 8.5(2.5), 8.5(2.5), 8(2.5), 7.5(2.5), 7(2.5), 7(2.5), 8(2.5). In females, antenna 13-segmented; flagellomeres cylindrical and pubescent, same width in all flagellomeres, placodeal sensilla starting at F3 but not abundant until F5; antennal formula: 8(3.5), 3.5(3), 8.5(2), 7(2), 6.5(2), 6(2), 5.5(2), 5(2), 4(2.5), 4(2.5), 4(2.5), 4(2), 6.5(2).

Mesosoma. Pronotum smooth, punctured, with some irregular ventral carinae. Mesoscutum 1.1 times as broad as long in dorsal view. Mesoscutum smooth, shiny, almost glabrous except for some scarce short hyaline pubescence (Fig. 2a, 2b); posteriorly carinate in males (Fig. 2b). Notaulus complete, with horizontal carina; median mesoscutal furrow absent. Lateral mesoscutum smooth and glabrous; parapsidal signum and parascutal sulcus absents. Scutellum completely smooth, 0.7 times of mesoscutal length; scutellar foveae rounded, large, slightly coarse, not posteriorly defined (Fig. 2a, 2b); presence of very tenuous and superficial narrow pit next to inner margin of scutellar foveae. Interfoveal line short, almost effaced (Fig. 2a, 2b). Circumscutellar carina complete but not projected to form tooth in lateral view. Anterior and ventral mesopleuron carinate, central and posterior mesopleuron smooth. Mesopleural triangle obliquely carinate. Metanotal troughs densely pubescent smooth except for some coarse sculpture in lower margin. Propodeum surface strongly alutaceous to coriaceous; central area defined from by two lateral ridges.

Forewings. Pubescent, marginal pubescence denser at apical third. Radial cell closed, 2.3 times longer than wide. Vein 2rm absent.

Metasoma. Shorter than head + mesosoma. Petiole as long as wide, shorter than metacoxa, coarsely sculptured, shiny. Third metasomal tergum 2.5 times longer than fourth in dorsal view. Metasomal terga smooth and glabrous; T4 to T7 punctured.
Type locality. Portugal, Madeira, Queimadas.

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Type material. Holotype ♂ (BMNH): "Madeira, Queimadas, 11.VIII.1982" (white label); "M. W. R. de V. Graham coll" (white label); "Anacharitinae, *Aegilips* sp. nr. *nitidulus* J. L. Nieves det" (white label); "Holotype of *Aegilips insularis* sp. n. ♂ desig. Mata-Casanova, 2014" (red label); "*Aegilips insularis* sp. n. ♂, det. Mata-Casanova, 2014" (white label). Paratypes (5♀ and 13♂): PORTUGAL: Madeira, Caramujo, 1250m, 9.VIII.1954; Madeira, Monte, XI.1960; Madeira, Curral dos Romeiros, 11.V.1980; Madeira, Curral dos Romeiros, 13.V.1980; Madeira, Queimadas, 14.V.1980; Madeira, Pousada dos Vinhaticos, 18.V.1980; Madeira, Curral dos Romeiros, 20.VII.1982; Madeira, Curral dos Romeiros, 23.VII.1982; Madeira, 3km E. of Posio, 1.VIII.1982; Madeira, Montado dos Pecequietos, 3.VII.1982; Madeira, 3km E. of Posio, 5.VIII.1982; Madeira, 3km E. of Posio, 7.VIII.1982; Madeira, Calderas Verde, 9.VIII.1982; Madeira, Queimadas, 11.VIII.1982 (all BMNH).
Etymology. The specific name comes from the island of Madeira, the only known location of the species.
Biology. Unknown.
Distribution. Palearctic. Known only from Madeira (Portugal).

***Aegilips kozlovi* Kovalev, 1974**
(Figures 2e)

Aegilips kozlovi Kovalev, 1974: 283 (male)

Diagnosis. Species with strongly horizontal carinae in mesoscutum and notauli. Morphologically similar to *A. romseyensis*, from which it can be distinguished by having horizontal carinate sculpture in the mesoscutum and areolate scutellum (mesoscutum and scutellum smooth in *A. romseyensis*).

Redescription.
Measurements. Body: 2.5-2.9 mm. Antennae: 2.4 mm (♀), 2.5 mm (♂). Wings: 2.3-2.4 mm.

Colouration. Head, mesosoma and metasoma black. Mandibles yellowish brown with darker teeth. Legs yellowish brown with darker coxae. Veins of wings dark brown.

Head. Malar area expanded, head square-shaped in anterior view, 2 times broader than high. Face smooth and punctured, with short uniform pubescence. Malar area coriaceous, 0.8 times as long as compound eye. Clypeus smooth, glabrous and shortly projected; anterior tentorial pits small, indistinct. Transfacial distance 1.1 times as long as compound eye. Diameter of torulus as long as inter-toruli distance but larger than torulus-eye distance. Frons, gena and occiput smooth and glabrous with few sparse setae; occipital and postocular carinae absents. In dorsal view 2 times as broad as long in dorsal view, broader than mesosoma. Compound eyes glabrous. POL: OOL: LOL is 7:4:3, diameter of lateral ocelus is 2.

Antennae. In males, antenna 14-segmented; flagellomeres cylindrical and pubescent, same width in all flagellomeres, placodeal sensilla abundant in all flagellomeres; F1 not modified; antennal formula: 10(3), 3(3), 9(3), 8(3), 8(3), 7(3), 7(3), 7(3), 7(3), 7(3), 7(3), 6(3), 5(3), 7(3). In females, antenna 13-segmented; flagellomeres cylindrical and pubescent, same width in all flagellomeres, placodeal sensilla starting at F2, abundant from F3 onwards; antennal formula: 11(3), 3.5(4), 8(2.5), 6(2.5), 6(2.5), 6(3), 5(3), 5(3), 5(3), 5(3), 4(3), 5(3), 7(3).

Mesosoma. Pronotum covered by strongly coarse sculpture and obliquely carinated in its entire surface. Mesoscutum 1.2 times as broad as long in dorsal view. Mesoscutum shiny, slightly alutaceous, inter- notaular region heavily carinate (Fig. 2e). Notaulus complete with horizontal carinae; median mesoscutal furrow present but not strong. Lateral mesoscutum smooth, punctured, with short hyaline pubescence; parapsidal signum present, parascutal sulcus deeply excavated and carinate. Scutellum areolate (Fig. 2e), 0.7 times of mesoscutal length; scutellar foveae rounded, small, smooth, posteriorly defined by carina; presence of large and elongated pit next to inner margin of scutellar foveae. Interfoveal line complete. Circumscutellar carina complete but not

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projected to form tooth in lateral view. Anterior and ventral mesopleuron carinate with rugose microsculpture, central and posterior mesopleuron smooth. Mesopleural triangle densely pubescent. Metanotal troughs glabrous, almost smooth except for some weak coarse sculpture. Propodeum coriaceous, densely pubescent, divided in large cells; central area defined by two strong lateral carinae, median longitudinal carina unconspicuous.

Forewings. Pubescent, marginal pubescence denser at apical third. Radial cell closed, 2.4 times longer than wide. Vein 2rm absent.

Metasoma. Shorter than head + mesosoma. Petiole as long as wide, shorter than metacoxa, coarsely sculptured, shiny. Third metasomal tergum 2.2 times longer than fourth in dorsal view. Metasomal terga smooth and glabrous; T4 to T7 punctured.

Type locality. Mongolia, Uvs aimag, Tes sum.

Type material. Holotype ♂ (ZIN): "Mongolia, Dzab., 30 km SSE Somona Tes, step, rastitelnost po sajru, 3-4.VII.1968: M. Ke." (white label); "Holotype ♂ *Aegilips kozlovi* O. Kovalev det" (red label).

Additional material examined. HUNGARY: Lilafüred, 2.IX.1962; Vas, Örség, Rikkagahaza Kétvölgy, 22.VI.1994; Vas, Szakonyfalú, 24.VI.1994; Vas, Szalafö Felsözer, 1.VII.1994; Vas, Szalafö Felsözer, 2.VII.1994; Vas, Cák, 4.VII.1994; Vas, Celdörmölk, 5.VII.1994; Vas, Cák, 8.VII.1994 (all UB); Veszprém Co., Kolontár, 10.VII.1999; Veszprém Co., Zomlóvásárhely, 14.VII.1999:; Veszprém Co., Máriahalom, 1.IX.1999; Veszprém Co., Bakonygyepes, 2.VII.2000 (all UB). ROMANIA: Hargita Co., Kiruly Valley, 10.VIII.2000 (all UB).

Biology. Unknown.

Distribution. Palearctic. Mongolia (Kovalev, 1974); first record for Hungary and Romania.

***Aegilips longicellus* Belizin, 1951**
(Figures 2b)

Aegilips longicellus Belizin, 1951: 372 (female).

Diagnosis. Species with incomplete notauli like *A. atricornis, A. flavidicornis, A. paucus* and *A. zaitzevi*. It can be distinguished from all these species by not having posteriorly defined carinae in the scutellar foveae and possessing incomplete interfoveal line (scutellar foveae always defined by a posterior carina and interfoveal line complete in *A. atricornis, A. flavidicornis, A. paucus* and *A. zaitzevi*).

Redescription.

Measurements. Body: 2.7 mm. Antennae: 1.8 mm (♀, from scape to F8). Wings: 2.9 mm.

Colouration. Head, mesosoma and metasoma black. Mandibles yellowish brown with darker teeth. Antennae yellowish. Legs dark yellowish with dark brown metacoxa. Veins of wings yellow.

Head. Triangle-shaped in anterior view, 1.1 times broader than high. Face smooth and punctured, with short uniform pubescence. Malar area coriaceous, 0.6 times as long as compound eye. Clypeus smooth, glabrous and shortly projected; anterior tentorial pits small, indistinct. Transfacial distance 1.1 times as long as compound eye. Diameter of torulus larger than inter-toruli distance, same than torulus-eye distance. Frons, gena and occiput smooth and glabrous with few sparse setae; occipital and postocular carinae absents. In dorsal view 1.6 times as broad as long in dorsal view, broader than mesosoma. Compound eyes glabrous. POL: OOL: LOL is 6:5.5:2.5, diameter of lateral ocelus is 2.

Antennae. In females, flagellomeres cylindrical and pubescent, same width in all flagellomeres, placodeal sensilla starting at F2; antennal formula (from scape to F8): 8(3.5), 4(3), 9(2.5), 9(2.5), 9(2.5), 8(2.5), 7.5(2.5), 7(2.5), 6(3), 6(3).

Mesosoma. Pronotum smooth and punctured, scarcely pubescent, with some irregular ventral carinae. Mesoscutum 1.3 times as broad as long in dorsal view. Mesoscutum smooth, shiny,

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scarce short anterior white setae, central mesoscutum glabrous. Notaulus weak, incomplete, without horizontal carinae; median mesoscutal furrow absent. Lateral mesoscutum smooth and glabrous; parapsidal signum absent; parascutal sulcus reduced to few weakly impressed cells. Scutellum alutaceous; central scutellum smooth while strongly areolate at margins; 0.6 times of mesoscutual length; scutellar foveae rounded, large, alutaceous, not posteriorly defined by carina (Fig. 2b); presence of small pit next to inner margin of scutellar foveae. Interfoveal line incomplete (Fig. 2b). Circumscutellar carina complete but not projected to form tooth in lateral view. Anterior and ventral mesopleuron carinate with rugose microsculpture, central and posterior mesopleuron smooth. Mesopleural triangle weakly carinate, short hyaline pubescence uniformly distributed. Metanotal troughs glabrous, almost smooth except for some weak coarse sculpture. Propodeum strongly alutaceous, densely pubescent, divided in large cells; central area divided in two symmetrical areas by median longitudinal carina; these two large areas are also asymmetrically divided by some weaker and irregular transverse carinae.

Forewings. Pubescent, marginal pubescence denser at apical third. Radial cell closed, 2.3 times longer than wide. Vein 2rm absent.

Metasoma. Shorter than head + mesosoma. Petiole as long as wide, shorter than metacoxa, coarsely sculptured, shiny. Third metasomal tergum 2 times longer than fourth in dorsal view. Metasomal terga not punctured.

Type locality. Tadjikistan, Avzob.

Type material. Holotype ♀ (ZIN): "Avzob, 3000m, 31.VIII.1946: V. Gussakovskij" (white label); "Holotype *Aegilips longicellus* ♀ V. Belizin det" (red label).

Biology. Unknown.

Distribution. Palaearctic. Tajikistan (Belizin, 1951), Chelyabinsk oblast (Belizin, 1961).

***Aegilips nitidulus* (Dalman, 1823)**
(Figures 1e, 2d, 2g)

Cynips nitidulus Dalman, 1823
Aegilips nitidulus Dahlbom, 1842
Aegilips fumipennis Westwood, 1833. Synonymized by Fergusson (1985).
Aegilips rufipes Westwood, 1833. Synonymized by Fergusson (1985).
Aegilips dalmani Reinhard, 1860. Synonymized by Fergusson (1985).
Aegilips rugicollis Reinhard, 1860. Synonymized by Fergusson (1985).
Aegilips ruficornis Cameron, 1883. Synonymized by Fergusson (1985).
Aegilips striolata Cameron, 1883. Synonymized by Fergusson (1985).
Aegilips bicolorata Cameron, 1887. Synonymized by Fergusson (1985).
Aegilips curvipes Giraud, 1860 **syn. n.**
Aegilips gemellus Belizin, 1961 **syn. n.**
Aegilips laevis (Hedicke, 1914) **syn. n.**
Aegilips montanus Belizin, 1951 **syn. n.**
Aegilips punctatus Belizin, 1951 **syn. n.**

Diagnosis. Species with higher variability than other Palaearctic *Aegilips*. It is morphologically similar to *A. atricornis,* from which it can be distinguished by the presence of complete notauli, excavated median mesoscutal furrow, carinate mesoscutum and rugose dorsal pronotum (notauli incomplete, median mesoscutal furrow absent and smooth mesoscutum and dorsal pronotum in *A. atricornis*). It can be distinguished from *A. kozlovi* and *A. romseyensis* – which also present complete notauli - by possessing weak horizontal carinae in the notauli and not having dorsal carinae in the pronotum (notauli with strong horizontal carinae and pronotum areolate in its entire surface in *A. kozlovi* and *A. romseyensis*).

Redescription.

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Measurements. Body: 2.5-2.8 mm. Antennae: 2.5-3 mm (♂), 2.3 mm (♀). Wings: 2.3-2.8 mm.

Colouration. Head, mesosoma and metasoma black. Mandibles yellowish brown with darker teeth. Antennae yellowish. Legs yellowish with brown coxae, black metacoxa. Veins of wings yellow.

Head. Malar area expanded, head square-shaped in anterior view, 1.4 times broader than high. Face smooth and punctured, with short uniform pubescence. Malar area coriaceous, 0.7 times as long as compound eye. Clypeus smooth, glabrous, shortly projected; anterior tentorial pits small, indistinct. Transfacial distance 1.1 times as long as compound eye. Diameter of torulus larger than inter-toruli distance, same than torulus-eye distance. Frons, gena and occiput smooth and glabrous with few sparse setae; occipital and postocular carinae absents. In dorsal view 2 times as broad as long in dorsal view, broader than mesosoma. Compound eyes glabrous. POL: OOL: LOL is 7:4.5:3, diameter of lateral ocelus is 3.

Antennae. In males, antenna 14-segmented; flagellomeres cylindrical and pubescent, same width in all flagellomeres, placodeal sensilla abundant in all flagellomeres; F1 not modified; antennal formula: 9(3.5), 3(3), 9(3.5), 8(3.5), 8(3.5), 8(3.5), 8(3.5), 8(3.5), 8(3.5), 7(3), 6.5(3), 6(3), 6(3), 9(3). In females, antenna 13-segmented; flagellomeres cylindrical and pubescent, same width in all flagellomeres, placodeal sensilla starting at F3 but not abundant until F5; antennal formula: 9(3.5), 3.5(3), 11(2.5), 9.5(3), 8.5(3), 8(3), 7.5(3), 7(3), 7(3.5), 7(3), 6.5(3), 6(3), 8(3).

Mesosoma. Ventral and anterior pronotum carinate; pronotal surface rugose, smoother near tegula (Fig. 2d). Mesoscutum 1.1 times as broad as long in dorsal view. Mesoscutum lightly rugose, punctured, almost glabrous except for short hyaline pubescence scattered across surface; transverse carinae variably extended: they range from covering entire mesoscutal surface to being only present in posterior mesoscutum. Notaulus weak but complete, with tenuous horizontal carinae (Fig. 3g); median mesoscutal furrow present but not strong. Lateral mesoscutum smooth and punctured; parapsidal signum absent; parascutal sulcus reduced to coarse band. Scutellum alutaceous, shiny; central scutellum smooth while strongly areolate at margins; 0.8 times of mesoscutal length; scutellar foveae rounded, large, alutaceous, posteriorly defined by carina; presence of large and elongated pit next to inner margin of scutellar foveae. Interfoveal line complete, effacing in some individuals. Circumscutellar carina complete but not projected to form tooth in lateral view. Anterior and ventral mesopleuron carinate with rugose microsculpture, central and posterior mesopleuron smooth. Mesopleural triangle alutaceous, almost glabrous except for some short hyaline pubescence. Metanotal troughs glabrous, almost smooth except for some weak coarse sculpture. Propodeum smooth, divided in large cells; almost glabrous except for two densely pubescent areas below metanotal troughs; central propodeum divided in two symmetrical cells by median longitudinal carina; lateral propodeum heavily areolate.

Forewings. Pubescent, marginal pubescence denser at apical third. Radial cell closed, 2.3 times longer than wide. Vein 2rm absent (Fig. 1e).

Metasoma. Shorter than head + mesosoma. Petiole as long as wide, shorter than metacoxa, coarsely sculptured, shiny. Third metasomal tergum 2.5 times longer than fourth in dorsal view. Metasomal terga smooth and glabrous; T4 to T7 punctured.

Type locality. Stockholm, Sweden.

Type material. *Aegilips nitidulus* Holotype lost (D. G. Notton *pers. com.*). *Aegilips curvipes* holotype ♂ (MNHN): "Muséum Paris, J. Giraud coll." (white label); "*Aegilips nitidulus* (Dalman, 1823), det. Mata-Casanova, 2014" (white label). *Aegilips gemellus* holotype ♂ (ZIN): "Miass, Cheljabinsk obl., 15.VII.1958: V. Tobias" (white label); "Holotype *Aegilips gemellus* ♂ V. Belizin det" (red label); *"Aegilips nitidulus* (Dalman, 1823) det. Mata-Casanova" (white label). *Aegilips laevis* holotype ♂ (MNHN): "Laurier sauce, Frèchain, 13 sep. 10" (white label); "det. Hedicke" (white label); "Muséum Paris coll. Cauro" (white label); "*Omalaspis laevis* Hedicke nouvelle espèce" (white label); "Holotype *Omalaspis laevis* Hedicke, 1914" (red label); "*Xyalaspis laevis* (Hedicke), det. Ros-Farré, 2012" (white label); "*Aegilips laevis* (Hedicke), det. J. P-V, 2013" (white label); "*Aegilips nitidulus* (Dalman, 1823), det. Mata-Casanova, 2014" (white label). *Aegilips montanus* holotype ♂ (ZIN): "Georgian SSR, valley of river Ancal-or, 1600m, 17.VII.1913: A.

Mlokosevich" (white label); "Holotype *Aegilips montanus* ♂ V. Belizin det" (red label); "*Aegilips nitidulus* (Dalman, 1823), det. Mata-Casanova, 2014" (white label). *Aegilips punctatus* holotype ♂ deposited in ZIN with the following labels: "Yakutia, Lutej-komo, 17.VII.1875: A. Chekanovskij" (white label); "Holotype *Aegilips punctatus* ♂ V. Belizin det" (red label); "*Aegilips nitidulus* (Dalman, 1823), det. Mata-Casanova, 2014" (white label).

Additional material examined. SPAIN: Ciudad Real, Puerto Lápice, 27.VI.1973; Madrid, Cercedilla, 22.X.1978 (all CNC); Barcelona, Matadepera, 20.V.1987; Castellón, Gatora, comarcal km 9, 11.V.1989; Alicante, Torremanzanas, 28.VI.1989 (all UB); Val d'Aran, Montgarri, 1650m, 29.VII.1989; Barcelona, Collserola, Mt. Montbau, 30.VIII.1993 (BMNH); Fontaneda, 7.V.1997 (UB). ANDORRA: Santa Coloma, VIII.1992; Santa Coloma, IX.1992; Santa Coloma, XI.1992; Santa Coloma, 16-30.IV.1993; Santa Coloma, 16-31.VII.1993; Santa Coloma, 1-15.X.1993 (all UB). FRANCE: Vauclus nr. Bèdoin, 14.VII.1980; Peyrecear, 12.VI.1984; Brôme, Col de l'Homme Mort, 15.VIII.1988; Corsica, 3 km S Ghisonaccia, 11.VII.1991 (all BMNH); Valdeblore, le Boréon, 24.VI-9.VII.2009; Saint-Dalmas-le-Selvage, Vallon de Saint-Dalmas, 30.VI-10.VII.2009; Saint-Dalmas-le-Selvage, Vallon de Saint-Dalmas, 23.VII-7.VIII.2009; Valdeblore, Col de Salèse, 24.VII-13.VIII.2009; Valdeblore, Col de Salèse, 13-27.VIII.2009; Saint-Dalmas-le-Selvage, Vallon de Saint-Dalmas, 18.VIII-5.X.2009; Valdeblore, le Boréon, 27.VIII-18.IX.2009; Valdeblore, Col de Salèse, 27.VIII-18.IX.2009; Valdeblore, Col de Salèse, 27.VIII-18.IX.2009; Valdeblore, le Boréon, 5-15.X.2009; Saorge, Fôret de Caïros, 1-16.VII.2010; Saorge, Fôret de Caïros, 31.VII-16.VIII.2010; Saorge, Fôret de Caïros, 16-30.VIII.2010; Saorge, Fôret de Caïros, 30.IX-15.X.2010 (all MNHN). UNITED KINGDOM: Rathgar, Mayfield, 1924, A. W. Stelfox leg; London, Bedford Park, 4.VI.1928; Nottinghamshire, Barton, 29.VII.1940; Wembley, 5.VIII.1946; Whitmore, 19.IX.1949; Maer Woods, 5.VII.1950; Thorpa Cloud, 9.VII.1950; Maer Woods, 12.VII.1950; Tetford Hill, 17.VII.1951; Rugby, 18.V.1952; Rugby, 31.VIII.1952; Rugby, 21.VIII.1952; Dorset, Swyre, 30.VI.1953; Newcastle, 24.VI.1954; Rugby, 30.V.1955; Rugby, 27.VI.1955; Rugby, 12.VIII.1955; England, Toraguay, 25.VI.1960; Middlesex, Southgate, Grovelands Park, 16.VI.1966; Jersey, St. Aubin, 12-19.IX.1966; Surrey, Kew, 28.VI.1975; Northamptonshire, Spratton, MT, VII.1975; Surrey, Kew, 2.VIII.1975; England, Northamptonshire, Statton IX.1975; Surrey, Kew, 5.VI.1977; Wales, Pembs, Mynachlog-ddu, 23.VI.1977: J. S. Noyes and Z. Bouček leg"; "1♂, Scotland, Angus Airlie Castle, 19.VII.1977; Surrey, Kew, 17.VI.1979; England, Hampshire, Romsey, Awbridge, VII.1981; England, Surrey, Richmond Park, 14.VIII.1982; England, Surrey, Barnes Common, 12.IX.2009; Surrey, Queen Mary Reservoi nr. Laleham, 9-23.VII.2011 (all BMNH). IRELAND: Agherlow 28.IX.1943 (BMNH). ITALY: Abruzza, Gran Sasso, Monte Cristo, 1350m, 21.VI.1992 (CNC). GERMANY: Mainz, 26.VIII-3.IX.1965; Hessen, Gelnhausen, IX.1967 (all CNC). USTRIA: Reichenau, Semmeringgebeit, 25.V-6.VI.1957; Semmeringgebeit, Hollenthal, 31.V.1957 (all CNC). CZECH REPUBLIC: Moravia, Lednice, 7-9.VIII.1991; Moravia, Lanahot Ranspuik, 7-9.VIII.1991; Moravia, 16 km N Blansko, 8.VIII.1991; Moravia, Palava nr. Mikulov, 400m, 9.VIII.1991 (all CNC). SLOVENIA: Postojne, 18.VII.1958; Pivka, 26.VII.1958 (all CNC). BOSNIA AND HERZEGOVINA: Prenj Mountains, Crno Polje, 1300-1700m, 15.VIII.1936 (BMNH). HUNGARY: Sopron, 31.VII.1952; Lilafüred, 2.IX.1962 (all BMNH); Köszeg Kálvánia, 14.VI.1994; Zsida-Patak, Vas, 17.VI.1994; Kondorfa, Vas, 19.VI.1994; Celdömölk, 5.VII.1994; Vas, Hörmann, sweep, 27.VII.1996 (all UB). NORWAY: Hordaland, Osterøy, 4-15.X.1972; Oppdall, Kongsvoll, Raubekken, 900 m, 14.VIII.1980; Oppdall, Kongsvoll, Raubekken, 900 m, 4.IX.1980; Drammen, Underlin, V.1992; Alta, Detsika, Buolamalia, 24.VI-16.VII.1996 (CNC). SWEDEN: Lund, Zoological Museum grounds, VIII.1976 (BMNH). ROMANIA: Görgényi, 25.VIII.1942 (BMNH); Hargita Co., Kiruly Valley, 10.VIII.2000; Hargita Co., Kiruly Valley, 15.VIII.2000 (all CNC). RUSSIA: 170km E Vladivostok, Lazovski Zapovednik, Primorskii krai, 43°30'30"N 134°6'58"E, 1353m, 3.VII-13.VIII.2001 (CNC).

Biology. Known to attack *Wesmaelius betulinus* and *W. subnebulosus* (Fergusson, 1986).

Distribution. Palaearctic. Sweden (Dalman, 1823), United Kingdom (Cameron, 1883), Austria, France (Giraud, 1860), Germany and Romania (Hedicke in Cavro, 1914), Ukraine and Russia (Belizin, 1951), Armenia and Georgia (Belizin, 1961), China (Mata-Casanova et al., 2015); first

record for Spain, Andorra, Ireland, Italy, Czech Republic, Slovenia, Bosnia and Herzegovina, Hungary, Norway and Romania.
Comments. The study of *A. nitidulus* was based on specimens deposited in the BMNH identified as belonging to that species by Fergusson due to the loss of the type material. These specimens present the morphological traits mentioned in the original description of the species.

***Aegilips notatus* Belizin, 1951**
Incertae sedis

Aegilips notatus Belizin, 1951: 571 (female)

Type material of *Aegilips notatus*. Lost according to S. Belokobylskij (pers. comm.).
Comments. The original description of the species mentions the presence of ridges in ventral pronotum and mesopleuron, laterally wrinkled scutellum and distinct scutellar foveae, among characters regarding its colouration. The first are not useful enough to properly distinguish it from other similar species, and the characters regarding colouration are mostly useless when talking about Cynipoidea. Thus, it is impossible to determine if *Aegilips notatus* is a separate and valid species. Because of this, we placed it under the designation of incertae sedis.

***Aegilips paucus* Belizin, 1961**
(Figures 3f, 3g)

Aegilips paucus Belizin, 1961: 153 (male)

Diagnosis. Species with incomplete notauli like *A. atricornis, A. flavidiornis* and *A. zaitzevi*. Unlike *A. flavidicornis* and *A. zaitzevi* it presents areolate scutellum (scutellumn smooth in *A. flavidicornis* and *A. zaitzevi*). It is morphologically close to *A. atricornis*; however, *A. paucus* has almost effaced notauli and posterior carina of scutellar foveae weakening in its central area (in *A. atricornis* the notauli though incomplete are strongly apparent and basal carina of scutellar foveae is strong in all its extension).

Redescription.
Measurements. Body: 2.4 mm. Antennae lost. Wings: 2.5 mm.

Colouration. Head and mesosoma black. Mandibles yellowish brown with darker teeth. Legs yellowish brown with darker coxae. Veins of wings yellowish.

Head. Triangular-shaped in anterior view, 1.1 times broader than high. Face smooth and punctured, with short uniform pubescence. Malar area coriaceous, 0.6 times as long as compound eye. Clypeus smooth, glabrous, shortly projected; anterior tentorial pits small, indistinct. Transfacial distance as long as compound eye. Diameter of torulus larger than inter-toruli and torulus-eye distances. Frons, gena and occiput smooth and glabrous with few sparse setae; occipital and postocular carinae absents. In dorsal view 1.3 times as broad as long in dorsal view, broader than mesosoma. Compound eyes glabrous. POL: OOL: LOL is 6:5:2, diameter of lateral ocelus is 2.

Antennae. Lost.

Mesosoma. Pronotum smooth and punctured; ventral pronotum carinate, presence of some short and weak ridges at the edges of the pronotal plate, not extended into the rest of the pronotal surface. Mesoscutum 1.3 times as broad as long in dorsal view. Mesoscutum smooth, shiny and glabrous except for some scarce hyaline hairs. Notaulus incomplete and very tenuous, hard to notice, reduced to posterior mesoscutum (Fig. 3f); median mesoscutal furrow short and weakly excavated, almost unnoticeable. Lateral mesoscutum smooth, punctured; parapsidal signum and parascutal sulcus absents (Fig. 3g). Scutellum heavily areolate, 0.6 times of mesoscutal length; scutellar foveae rounded, large, alutaceous, posteriorly defined by carina weakening in central scutellum; presence of small pit next to inner margin of scutellar foveae. Interfoveal line complete.

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Circumscutellar carina complete but not projected to form tooth in lateral view. Anterior and ventral mesopleuron carinate, central and posterior mesopleuron smooth; ventral carinae reaching metapleura. Mesopleural triangle with weak coarse sculpture, covered by dense short pubescence. Metanotal troughs glabrous, almost smooth except for some weak coarse sculpture. Propodeum coriaceous, densely pubescent, divided in large cells; central area longitudinally divided by median carina, with some transverse weak carination.

Wings. Pubescent, marginal pubescence denser at apical third. Radial cell closed, 2.6 times longer than wide. Vein 2rm absent.

Metasoma. Lost.

Type locality. Kazakhstan, Karkhantay.

Type material. Holotype ♂ (ZIN): "Kazakhstan, Su-Singana River Valley, 6.VIII.1939: Obukhova leg" (white label); "Holotype *Aegilips paucus* ♂ V. Belizin det" (red label); "*Aegilips paucus* Belizin, 1951, N. Mata-Casanova det" (white label).

Biology. Unknown.

Distribution. Palaearctic. Kazakhstan (Belizin, 1961); Mongolia (Kovalev, 1974).

***Aegilips punctulatus* Hedicke, 1928**

Incertae sedis

Type material of *Aegilips punctulatus*. Lost according to H. Rajaei (pers. comm.).

Comments. The original description of the species does not provide enough information to correctly distinguish it from other similar species, thus making it impossible to properly identify it. This has made us taking the decision of considering it as incertae sedis.

***Aegilips romseyensis* Fergusson, 1985**

(Figures 1f, 2c, 2f)

Aegilips romseyensis Fergusson, 1985: 815 (female)

Diagnosis. Species with the entire surface of the pronotum strongly carinate and notauli with strong transverse carinae, like *A. kozlovi* (pronotal carinae only present in the lower pronotum and notauli not internally carinate or only weakly carinate in the other species of *Aegilips*). It can be distinguished from *A. kozlovi* due to its smooth mesoscutum and central scutellum (in *A. kozlovi,* mesoscutum transversely carinate in its entire surface and central scutellum areolate).

Redescription.

Measurements. Body: 2.4-2.5 mm. Antennae: 2.2 mm (♀), 2.4 mm (♂). Wings: 2.4-2.5 mm.

Colouration. Head, mesosoma and metasoma black. Mandibles yellowish brown with darker teeth. Legs yellowish brown with darker coxae. Veins of wings yellowish.

Head. Malar area expanded, head square-shaped in anterior view (Fig. 1f), 1.4 times broader than high. Face smooth and punctured, with short uniform pubescence. Malar area coriaceous, 0.8 times as long as compound eye. Clypeus smooth, glabrous, shortly projected; anterior tentorial pits small, indistinct. Transfacial distance 1.2 times as long as compound eye. Diameter of torulus shorter than inter-toruli distance but larger than torulus-eye distance. Frons, gena and occiput smooth and glabrous with few sparse setae; occipital and postocular carinae absents. In dorsal view 2.3 times as broad as long in dorsal view, broader than mesosoma. Compound eyes glabrous. POL: OOL: LOL is 7:4:3, diameter of lateral ocelus is 2.

Antennae. In males, antenna 14-segmented; flagellomeres cylindrical and pubescent, same width in all flagellomeres, placodeal sensilla abundant in all flagellomeres; F1 not modified; antennal formula: 9(4), 3.5(3), 9(3.5), 8.5(3), 7(3), 7(3), 7(3), 7(3), 7(3), 7(3), 7(3), 7(3), 6(3), 8(3).

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In females, antenna 13-segmented; flagellomeres cylindrical and pubescent, same width in all flagellomeres, placodeal sensilla starting at F3 but not abundant until F4; antennal formula: 9(3), 3(3), 9(2.5), 7(2.5), 6(2.5), 6(3), 5(3), 5(3), 4(3), 4(3), 4(3), 4(3), 7(3).

Mesosoma. Pronotum covered by strongly coarse sculpture in its entire surface (Fig. 2c). Mesoscutum 1.2 times as broad as long in dorsal view. Mesoscutum shiny, from smooth to slightly alutaceous, never carinate; short hyaline pubescence uniformly distributed across its surface. Notaulus complete with horizontal carinae (Fig. 2f); median mesoscutal furrow present but not strong. Lateral mesoscutum smooth, punctured; parapsidal signum short, parascutal sulcus deeply excavated and internally carinate. central scutellum smooth while strongly areolate at margins (Fig. 2f), 0.8 times of mesoscutal length; scutellar foveae rounded, small, smooth, posteriorly defined by carina weakening in central scutellum; presence of large and elongated pit next to inner margin of scutellar foveae. Interfoveal line complete. Circumscutellar carina complete but not projected to form tooth in lateral view. Anterior and ventral mesopleuron carinate with rugose microsculpture, central and posterior mesopleuron smooth. Mesopleural triangle smooth with two short sulcus in its anterior margin, glabrous. Metanotal troughs glabrous, almost smooth except for some weak coarse sculpture. Propodeum coriaceous, densely pubescent, divided in large cells; central area longitudinally divided by median carina, with some transverse weak carination.

Forewings. Pubescent, marginal pubescence denser at apical third. Radial cell closed, 2.5 times longer than wide. Vein 2rm absent.

Metasoma. Shorter than head + mesosoma. Petiole as long as wide, shorter than metacoxa, coarsely sculptured, shiny. Third metasomal tergum 2.8 times longer than fourth in dorsal view. Metasomal terga smooth and glabrous; T4 to T7 punctured.

Type locality. United Kingdom, Hamspshire, Romsey, Awbridge.

Type material. Holotype ♀ (BMNH): "Malaise trap 0-5m in dead Larix" (white label); "ENGLAND: Hams. Romsey, Awbridge, 14-31.VI.1980: C. and M. Vardy" (white label); "Holotype of *Aegilips romseyensis* ♀ N. D. M. Fergusson, 1982" (white label); "B.M. Type Hym 7.165" (white label). Paratype ♂ (BMNH): "Malaise trap 2-5m in dead Larix" (white label); "ENGLAND: Hants. Romsey, Awbridge, 3-31.VIII.1980: C. and M. Vardy" (white label); "Paratype of *Aegilips romseyensis* ♂ N. D. M. Fergusson, 1982" (white label).

Additional material examined. UNITED KINGDOM: England, Cornworthy, 13.VII.1939; England, Bricket Wood, 14.VIII.1939; England, Bricket Wood, 25.VIII.1939; Waverley Wd. 5.VI.1952; Rugby, 7.IX.1954; Bagley, Wd. BK, 5.VII.1956; Jersey, St. Aubins, 12-19.IX.1966; Wales, Pembs, Mynachlog-ddu, 23.VI.1977; England, Cambridgeshire, Peterborough, Castor Hanglands, 18-28.VII.1978; Cambridgeshire, Duxford, 25.VII-1.VIII.1979; Hampshire, Romsey, Awbridge, X.1981; Kent, Canterbury, 6.X.1985; England, Surrey, Barnes Common, 12.IX.2009 (all BMNH). FRANCE: Gard, Causse de Blandas, 9.VIII.1984; Cahors, 20.VIII.1989; Cahors, 22.VIII.1989; Laurouz, Hérault, 31.X.1989 (all BMNH). ITALY: Rocchetta di Vara, 3.V.1965 (BMNH); Abruzzo, L'Aquila, Loc. Coppito, 20.VI.1992 (CNC). CZECH REPUBLIC: Moravia, R. V. Dyje nr. Zrojmo, 12.IX.1991 (CNC). SLOVAKIA: Cachtice env., 11.VIII.1991 (CNC). HUNGARY: Budapest, 1929; Kalocsa, 19.V.1939; Baranya, Beremend, 24.IV-9.V.1963 (all BMNH); Vas, Köszeg Kálvaria, 14.VI.1994; Vas, Kërvölgy, 18.VI.1994; Vas, Kondoria, 19.VI.1994; Vas, Szakonyfalú, 24.VI.1994; Vas, Celdörmölk, 5.VII.1994; Vas, Cák, 8.VII.1994; Veszprém Co., Zomlóvásárhely, 14.VII.1999; Veszprém Co., Bakonygyepes, 2.VII.2000 (all UB). ROMANIA: Hargita Co., Kiruly Valley, 15.VIII.2000 (all UB).

Biology. Unknown.

Distribution. Palearctic. United Kingdom (Fergusson, 1985); first record for France, Italy, Austria, Czech Republic, Slovakia, Hungary and Romania.

***Aegilips ustulatus* Belizin, 1973**
(Figures 3a)

Aegilips ustulatus Belizin, 1973: 31 (male)

Diagnosis. Species with complete and not internally carinate notauli and smooth mesoscutum, similar tu *A.nitidulus*. However, most of the mesopleural surface is completely wrinkled, a character exclusive of this species (other Palaeartic *Aegilips* species present some antero-ventral carinae in the mesopleuron but they never get to central mesopleuron).

Redescription.
Measurements. Body: 2.3 mm. Antennae: 3 mm (♂). Wings: 3 mm.

Colouration. Head, mesosoma and metasoma black. Mandibles yellowish brown with darker teeth. Legs yellow with darker coxae. Veins of wings dark brown.

Head. Malar area expanded, head square-shaped in anterior view, 1.4 times broader than high. Face smooth, punctured, with short pubescence except in central rostrum, which is glabrous. Malar area coriaceous, 0.7 times as long as compound eye. Clypeus smooth, glabrous and shortly projected; anterior tentorial pits small, indistinct. Transfacial distance 1.3 times as long as compound eye. Diameter of torulus larger than inter-toruli distance and torulus-eye distance. Frons, gena and occiput smooth, glabrous except for few sparse setae; occipital and postocular carinae absents. In dorsal view 1.7 times as broad as long in dorsal view, broader than mesosoma. Compound eyes glabrous. POL: OOL: LOL is 6.5:5:3, diameter of lateral ocelus is 2.

Antennae. In males, antenna 14-segmented; flagellomeres cylindrical and pubescent, same width in all flagellomeres, placodeal sensilla abundant in all flagellomeres; F1 not modified; antennal formula: 9(3.5), 3(3), 10(3), 10(3), 10(3), 9(3), 9(3), 9(3), 9(3), 9(3), 9(3), 9(3), 8(3), 10(3).

Mesosoma. Pronotum covered by short pubescence, ventral pronotum densely wrinkled (Fig. 3a). Mesoscutum almost as broad as long in dorsal view (25:24). Mesoscutum shiny, smooth; short hyaline pubescence uniformly distributed across its surface. Notaulus complete, not internally carinate, coarse margins; median mesoscutal furrow present. Lateral mesoscutum smooth and punctured; parapsidal signum absent; parascutal sulcus absent, presence of coarse band instead. Scutellum smooth with rugose margins, 0.6 times of mesoscutal length; scutellar foveae rounded, smooth, posteriorly defined by carina weakening in central scutellum; presence of large and elongated pit next to inner margin of scutellar foveae. Interfoveal line complete. Circumscutellar carina complete but not projected to form tooth in lateral view. Mesopleural surface densely wrinkled except for dorso-posterior margin (Fig. 3a). Mesopleural triangle strongly coarse. Metanotal troughs glabrous, almost smooth except for some weak coarse sculpture. Propodeum coriaceous, densely pubescent, divided in large cells; central area longitudinally divided by median carina, with some transverse weak carination.

Forewings. Pubescent, marginal pubescence denser at apical third. Radial cell closed, 3 times longer than wide. Vein 2rm absent.

Metasoma. Shorter than head + mesosoma. Petiole as long as wide, shorter than metacoxa, coarsely sculptured, shiny. Third metasomal tergum 3.2 times longer than fourth in dorsal view. Metasomal terga smooth and glabrous; T4 to T7 punctured.

Type locality. Kyrgyzstan, Osh oblast, Ak-Bosogo.

Type material. Holotype ♂ (ZIN): "*Aegilips ustulatus* Belizin" (red label); "Kirgiziya, Akbosaga, 5.VIII.1964 (V. Tobias)" (white label).

Biology. Unknown.

Distribution. Palearctic. Kyrgystan (Belizin, 1973).

***Aegilips zaitzevi* Kovalev, 1974**
(Figures 1d, 1g, 2h)

Aegilips zaitzevi Kovalev, 1974: 284 (male)
Aegilips vena Fergusson, 1985 **syn. n.**

Diagnosis. It shares the presence of incomplete notauli with *A. atricornis, A. flavidicornis,* and *A. paucus*. However, it can be easily distinguished due to its absence of mesoscutal and scutellar sculpture (other *Aegilips* species present some degree of sculpture in the scutellum) and the presence an elongated 2rm vein, a character that casts it apart from the rest of Palaearctic species of *Aegilips* (vein 2rm absent in the rest of Palaearctic *Aegilips* species).

Redescription.

Measurements. Body: 2.4-2.6 mm. Antennae: 2.3-2.8 mm (♀), 2.3-2.6 mm (♂). Wings: 2.8-3.1 mm.

Colouration. Head, mesosoma and metasoma black. Mandibles yellowish brown with darker teeth. Legs yellowish brown with darker coxae. Veins of wings yellowish.

Head. From triangular to sub-square-shaped in anterior view (Fig. 1d); 1.3 times broader than high. Face smooth, punctured, with short uniform pubescence. Malar area coriaceous, 0.7-0.8 times as long as compound eye. Clypeus smooth, glabrous to sparcely pubescent, shortly projected; anterior tentorial pits small, indistinct. Transfacial distance 1.3 times as long as compound eye. Diameter of torulus equal to inter-toruli distance, slightly larger than torulus-eye distance. Frons, gena and occiput smooth and glabrous with few sparse setae; occipital and postocular carinae absents. In dorsal view 2.3 times as broad as long in dorsal view, broader than mesosoma. Compound eyes glabrous. In males POL: OOL: LOL is 6:5:3, diameter of lateral ocelus is 2.5; in females POL: OOL: LOL is 7:6:2.5, diameter of lateral ocelus is 2.

Antennae. In males, antenna 14-segmented; flagellomeres cylindrical and pubescent, same width in all flagellomeres, placodeal sensilla present in all flagellomeres but scarce from F1 to F3; F1 not modified; antennal formula: 9(4), 3.5(3), 9(3), 9(3), 8(3), 8(3), 8(3), 7(3), 6.5(3), 6.5(3), 6.5(2.5), 6(2.5), 6(2.5), 8(2.5). In females, antenna 13-segmented; flagellomeres cylindrical and pubescent, same width in all flagellomeres, placodeal sensilla starting at F3 but scarce; antennal formula: 8(3.5), 3.5(3), 10(2.5), 10(2.5), 9(3), 9(3), 8(3), 8(3), 6.5(3), 6(3), 6(3), 9(3).

Mesosoma. Pronotum covered by long hyaline pubescence; ventrally carinate, dorsally smooth and punctuated. Mesoscutum 1.1-1.2 times as broad as long in dorsal view. Mesoscutum shiny, smooth, almost glabrous except for scarce short hyaline pubescence. Notaulus weak, effaced in anterior mesoscutum (Fig. 2h). Lateral mesoscutum smooth, glabrous; parapsidal signum and parascutal sulcus absents. Scutellum smooth, shiny (Fig. 2h), 0.7 times of mesoscutal length; scutellar foveae rounded, large, slightly coarse, posteriorly defined by carina; presence of tenuous elongated pit next to inner margin of scutellar foveae. Interfoveal line complete. Circumscutellar carina complete but not projected to form tooth in lateral view. Anterior and ventral mesopleuron carinate. Mesopleural triangle strongly coarse, pubescent. Metanotal troughs densely pubescent, smooth except for some coarse sculpture in its lower margin. Propodeum alutaceous, covered with dense pubescence in laterals; central area glabrous defined by two longitudinal carinae, furtherly divided in smaller cells by weak carinae.

Forewings. Pubescent, marginal pubescence denser at apical third. Radial cell closed, 2.3-2.4 times longer than wide. Vein 2rm present, projected downwards (Fig. 1g).

Metasoma. Shorter than head + mesosoma. Petiole as long as wide, shorter than metacoxa, coarsely sculptured, shiny. Third metasomal tergum 2.3 times longer than fourth in dorsal view. Metasomal terga smooth and glabrous; T4 to T7 punctured.

Type locality. Mongolia, Arkhangai aimag, Egin-Daba.

Type material of *Aegilips zaitzevi*. Holotype ♂ (ZIN): "*Aegilips zaitzevi* Kovalev" (red label); "Ara-Khangaskiy aimak: 15 km NE rep. Egin-Daba, 27-28.VIII.1967: Zaitsev & Kerzhner" (white label).

Type material of *Aegilips vena*. Holotype ♀ (BMNH): "SCOTLAND: Aviemore, 4.VI.1952: R. B. Benson. B. M. 1952-447" (white label); "Holotype of *Aegilips venus* sp. n. ♀ N. D. M. Fergusson, 1982" (white label); "B.M. Type Hym 7.164" (white label). Paratype ♂ deposited in BMNH with the following labels: "ENGLAND: Aviemore, 4.VI.1952: R. B. Benson. B. M. 1952-447" (white label); "Paratype of *Aegilips venus* ♂ N. D. M. Fergusson, 1982" (white label).

Additional material examined. UNITED KINGDOM: Maer Woods, ST, 23.VI.1950; Burnt

Woods, ST, 11.VII.1954 (all BMNH). RUSSIA: Primorskiy Krai, Lazovski Zapovednik, 170km E Vladivostok, 43°30'30"N 134°6'58"E, 1853m, 3.VII-13.VIII.2001 (BMNH).
Biology. Unknown.
Distribution. Palearctic. Mongolia (Kovalev, 1974), United Kingdom (Fergusson, 1986); first record for Russia: Primorskiy Krai.

DISCUSSION

The present work introduces important changes in our knowledge about the status of the Palaeartic species of *Aegilips*. The previously valid species *A. curvipes*, *A. gemellus*, *A. laevis*, *A. montanus* and *A. punctatus* have been considered falling within the morphological diversity range of *A. nitidulus*, and are thus synonymized with it; *A. vena* has also been discovered to be a junior synonym of *A. zaitzevi*. Taking those new synonyms and the description of *A. insularis* Mata-Casanova and Pujade-Villar **sp. n.**, the number of *Aegilips* species diminishes to 22 species, 13 of them being found in the Palaearctic region: *A. atricornis, A. flavidicornis, A. insularis* Mata-Casanova and Pujade-Villar **sp. n.**, *A. kozlovi, A. longicellus, A. nitidulus, A. notatus, A. paucus, A. punctulatus, A. romseyensis, A. ustulatus* and *A. zaitzevi*. One species - *A. atricornis* - is also present in the Indomalayan region. The types of *A. notatus* and *A. punctulatus* have not been studied because they are lost, so the validity of both species is uncertain and they have been designated as incertae sedis.

Aegilips atricornis, A. romseyensis and *A. vena* were recorded for the first time by Fergusson (1985) and were restricted to the United Kingdom. The study of large series of undetermined material has extended their known distribution area. While the distribution area of *A. romseyensis* is reduced to Western and Central Europe, ranging from France to Romania, the other two species present a much broader distribution. *A. atricornis* is well represented in the Western Palaearctic region, ranging from North Africa and the Iberian Peninsula to Scandinavia and Cyprus, also being present in Madeira. Specimens of *A. atricornis* have also been found in northern regions of Pakistan and India, thus being the first citation of the genus in the Indomalayan region and extending the distribution area of the species to the Eastern Eurasia. In the case of *A. vena,* after being synonymized with *A. zaitzevi,* its known distribution area is divided in two separate zones, being recorded at United Kingdom on one side and Mongolia and the Russian Far East on the other.

A. nitidulus was previously known from Western Europe, but the new synonymies and new records found when studying undetermined material have shown a distribution pattern of known records similar to *A. zaitzevi,* divided in two areas: one area extended across all Europe and most of the Western Palaearctic region, from the Iberian Peninsula in the west and the Caucasus mountain range as its easternmost location, while having another smaller distribution area in the Russian Far East. The splitted pattern in their records we see in *A. atricornis, A. kozlovi, A. nitidulus* and *A. zaitzevi* suggests a wide distribution across Eurasia, probably a collection artifact if we take into account the scarce Central Asian record.

The other Palaearctic species of the genus present a more restricted recorded area: *A. flavidicornis, A. longicellus, A. paucus* and *A. ustulatus* are only recorded from Central Asia, recorded from China, Tajikistan, Kazakhstan and Kyrgystan respectively, with no new records added. The newly described species *A. insularis* Mata-Casanova and Pujade-Villar **sp. n.** has also only been recorded from Madeira.

The Eurasian species of *Aegilips* are as morphologically diverse as those belonging to *Xyalaspis*. The main differences are related to the length and appearance of notauli and the sculpture of the scutellum. Regarding the notauli, two features should be mentioned: its extension and the presence

of internal sculpture. The notauli in *Aegilips* can reach the anterior edge of the mesoscutum or be incomplete. In *A kozlovi* and *A. romseyensis* the notauli are complete and deeply excavated (Fig. 2e, 2f), while *A. insularis, A. nitidulus* and *A. ustulatus* also have complete notauli, but these are not as deeply excavated (Fig. 2a, 2b, 2g). *A. atricornis* (Fig. 3d) and *A. flavidicornis* (Fig. 3c) represent the transitional state between complete and incomplete notauli: both species posess long notauli, almost reaching the anterior edge of mesoscutum in some individuals in *A. atricornis* (Fig. 3d), but those are always incomplete. The notauli in *A. zaitzevi* are shorter, disappearing in the anterior third of mesoscutum (Fig. 2h), while *A. longicellus* and *A. paucus* notauli present the shortest ones in the Palaearctic *Aegilips* range (Fig. 3b, 3f), reaching only 1/3 of the mesoscutum total length and being almost unnoticeable in some specimens - specially in *A. paucus*. The horizontal carinae of the notauli shows less variation: in *A. kozlovi* and *A. romseyensis* the notauli are internally divided by strong carinae (Fig. 2e, 2f), but in *A. nitidulus* and *A. insularis* the carinae are smooth (Fig. 2a, 2g). The other species of *Aegilips* studied have no trace of notaular sculpture.

Scutellar sculpture similarly has a wide range of variation, from a completely smooth scutellum without a trace of scutellar foveae, to a strongly areolate scutellum. *A. insularis* represents the smoothest appearance the scutellum can have, with very tenuous scutellar foveae and without any other sculpture feature (Fig. 2a, 2b). *A. flavidicornis, A. ustulatus* and *A. zaitzevi* have the central mesoscutum smooth or weakly coarse while having the margins areolate and the scutellar foveae clearly defined (Fig. 2h, 3c). *A. longicellus* and *A. nitidulus* represent the next step in scutellar sculpture, both having strong areolate sculpture at the margins of the scutellum while having the central scutellum tenuously coarse to strongly areolate; however, in *A. longicellus* the interfoveal line is very short and the scutellar foveae are not basally defined by a carina (Fig.3b), a state of characters not seen in *A. nitidulus* (which has complete interfoveal line and a strong carina basally defining the scutellar foveae) (Fig. 2g). The closely related *A. kozlovi* and *A. romseyensis* (Fig. 2e, 2f) greatly differ in the scutellar sculpture: *A. romseyensis* presents alutaceous central scutellum (Fig. 2f) similar to *A. longicellus* and *A. nitidulus* while in *A. kozlovi* the scutellum is heavily areolate (Fig. 2e). Finally, *A. atricornis* and *A. paucus* present a strongly areolate scutellum in its entire surface (Fig. 3d, 3f). A noteworthy feature that should be mentioned is the presence of the 2rm vein in *A. zaitzevi* (Fig. 1r), a character not seen in neither *Xyalaspis* nor in other *Aegilips* species. This character makes the species easily distinguishable from the rest of the Palaearctic species of the genus.

Regarding the biology of the Palaearctic species of *Aegilips*, only *A. atricornis* and *A. nitidulus* have known hosts belonging to Hemerobiidae (Fergusson, 1986). Both species have been cited as attacking the larvae of *Wesmaelius betulinus* and *W. subnebulosus*. *Wesmaelius* seems to be a common host for Palaearctic anacharitines: *Anacharis eucharioides* and *Xyalaspis petiolata* have been also described as parasitoids of *W. betulinus* and *W. subnebulosus* (Fergusson, 1986). However, the hosts of most of the Palaearctic species of *Aegilips* and other Anacharitinae from this region are still unknown, so more research should be done in order to fully comprehend their biology.

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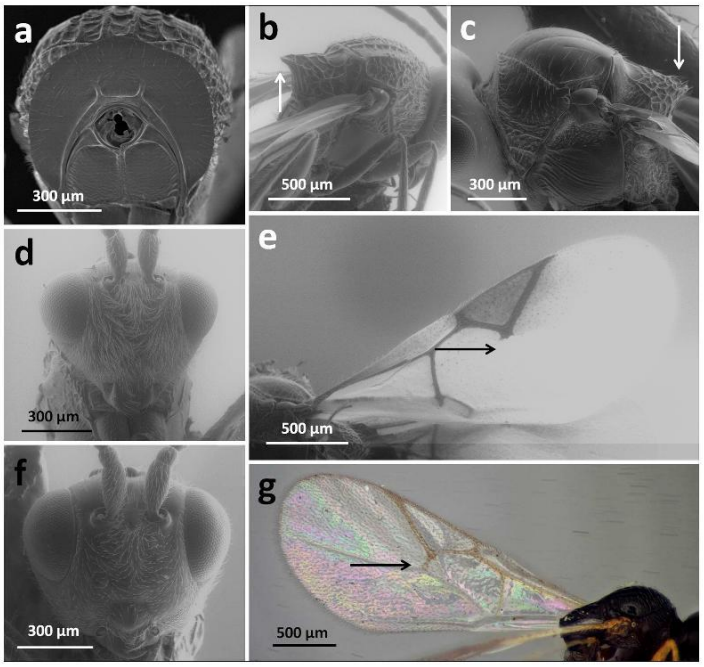
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For Peer Review



Caption : Figure 1. a) Pronotal plate of Acanthaegilopsis sp. in anterior view; b) Xyalaspis sp. mesoscutum in lateral view; c) Aegilips sp. mesoscutum in lateral view. d) Aegilips zaitzevi head in anterior view. e) Aegilips nitidulus forewing venation. f) Aegilips romseyensis head in anterior view. g) Aegilips zaitzevi forewing venation.

207x195mm (300 x 300 DPI)

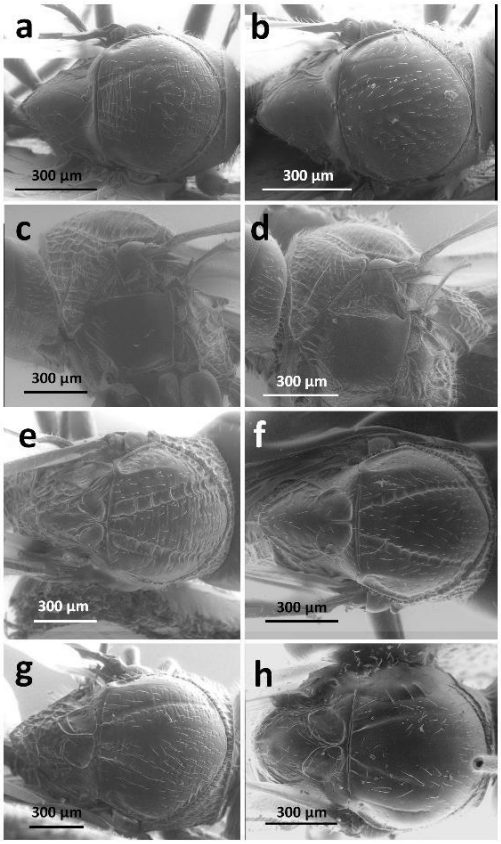


Figure 2. Mesosoma in dorsal view of Aegilips insularis: a) male, b) female. Mesosoma in lateral view of: c) A. romseyensis; d) A. nitidulus. Mesosoma in dorsal view of: e) A. kozlovi, f) A. romseyensis, g) A. nitidulus, h) A.zaitzevi.

250x422mm (300 x 300 DPI)

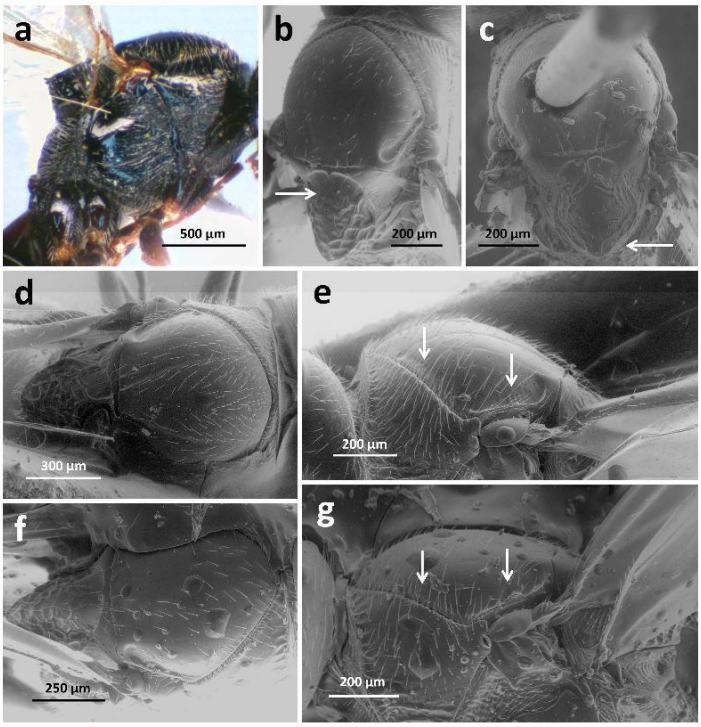


Figure 3. a) Mesosoma in lateral view of Aegilips ustulatus. Mesosoma in lateral view of: b) A. longicellus; c) A. flavidicornis. A. atricornis: d) mesosoma in dorsal view; e) mesoscutum in lateral view. A. paucus: f) mesosoma in dorsal view; g) mesoscutum in lateral view.

335x345mm (300 x 300 DPI)

4.2.16. Revision of North American *Aegilips*

Description of two new of species of *Aegilips* Haliday, 1835 (Hymenoptera: Figitidae: Anacharitinae) and updated status of the previously known species in North and Central America

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Noel Mata-Casanova 2

ABSTRACT

Two new species of *Aegilips* Haliday, 1835, *A. cardinalae* **sp. n.** and *A. huberi* **sp. n.** are described for North America. The previously known *Aegilips clarimontis* Kieffer, 1907, *Aegilips rugata* Kieffer, 1907, *Aegilips trisecta* Kieffer, 1907 and *Aegilips victoriae* Ashmead, 1896 are redescribed; their biology and distribution area are discussed. *Aegilips zaitzevi* is mentioned for the first time in the Nearctic region. *Aegilips reticulata* Kieffer, 1908 is synonymized with *A. trisecta*; the previously known *Aegilips nevadensis* Kieffer, 1908 is transferred to *Anacharis.* An identification key for the North American *Aegilips* species is given. Finally, *Aegilips obtusilobae* Osten-Sacken, 1863 is considered in this study as 'nomen dubium', and the reasons for this are commented on.

Key words: *Aegilips*, North America, new species, taxonomy.

INTRODUCTION

Anacharitinae is one of the 12 subfamilies of cynipoid parasitic wasps included in Figitidae (Paretas-Martínez *et al.* 2011). According to Ros-Farré *et al.* (2000), the anacharitines can be easily identified by three main synapomorphies: (1) rounded and continuous pronotal plate, (2) triangle-shaped head in anterior view – although it is more quadrangular-shaped in *Acanthaegilopsis* and *Proanacharis* and some species of *Aegilips* and *Xyalaspis* (Kovalev, 1996; Mata-Casanova & Pujade-Villar, 2013; Mata-Casanova *et al.,* 2014a, 2014b, 2014c, 2015a) – and (3) broadly overlapping mandibles. They can also be characterized for being the only subfamily of Figitidae known to parasitize the aphid-feeding larvae of the families Chrysopidae and Hemerobiidae (Neuroptera) (Díaz, 1979; New, 1979; Kyerich, 1984; Miller and Lamdin, 1985; Fergusson, 1986;

Cave and Miller, 1987; Ronquist, 1999; Mata-Casanova *et al.,* 2014d).

Anacharitinae includes nine genera (Mata-Casanova & Pujade-Villar, 2013): *Acanthaegilips* Ashmead, 1896, *Acanthaegilopsis* Pujade-Villar, 2013, *Aegilips* Haliday, 1835, *Anacharis* Dalman, 1823, *Calofigites* Kieffer, 1909, *Hexacharis* Kieffer, 1907, *Proanacharis* Kovalev, 1996, *Solenofigites* Díaz, 1979, and *Xyalaspis* Hartig, 1843. According to morphological (Ros-Farré *et al.,* 2000) and molecular (Buffington *et al.,* 2012) approaches, *Aegilips* and *Xyalaspis* are closely related. The recently described *Acanthaegilopsis* also shares some common traits with these genera: a mesopleuron without an excavated groove, a short and carinate petiole and a sturdy body – the petiole is short and metasoma is never longer than mesosoma and head together, unlike other Anacharitinae *Acanthaegilopsis* and *Anacharis*. The main difference between *Aegilips* and the other two genera – *Acanthaegilopsis* and *Xyalaspis* – is the lack of a scutellar spine derived from the circumscutellar carina in *Aegilips* (Restrepo-Ortiz & Pujade-Villar, 2010; Mata-Casanova & Pujade-Villar, 2013).

Aegilips is the most diverse Anacharitinae genus, with 27 described species prior to our study. Eight species were known to occur in North America: *Aegilips aciculatus* Provancher, 1881; *Aegilips clarimontis* Kieffer, 1907; *Aegilips nevadensis* Kieffer, 1908; *Aegilips obtusilobae* Osten-Sacken, 1863; *Aegilips reticulata* Kieffer, 1908; *Aegilips rugata* Kieffer, 1907; *Aegilips trisecta* Kieffer, 1907 and *Aegilips victoriae* Ashmead, 1896. Existing knowledge of North American *Aegilips* species is lacking; since Kieffer's works (1907, 1908), no other studies on the subject have been published, and no hosts are known. For Central America, no species were recorded. As previously seen with genus *Xyalaspis* (Mata-Casanova et al., 2014a), the Anacharitinae fauna of both North and Central America present a similar composition; hence the decision to extend the range of this study to Central America.

67

68 The study of the type material showed that *Aegilips nevadensis* has a transverse groove in the
69 mesopleuron, a character absent in *Aegilips* and exclusive to *Anacharis.* Thus, we moved the
70 species to *Anacharis,* resulting in *Anacharis nevadensis* **n. comb**. *A. aciculata* does not even belong
71 to Anacharitinae but to Figitinae: it lacks the previously mentioned Anacharitinae synapomorfies
72 and has wrinkled pronotum, mesopleuron and second and third metasomal tergites, characters
73 present on genus *Figites* Latreille, 1802. Two new species, *Aegilips cardinalae* **sp. n.** and *Aegilips*
74 *huberi* **sp. n.**, are described. Diagnostic characters for these species are given, and data on
75 morphological features, distribution area and biology are discussed.

76

77 **MATERIAL AND METHODS**

78

79 The type material of *Aegilips aciculate, A. clarimontis, clarimontis, A, nevadensis, A.*
80 *obtusilobae, A. reticulata, A. rugata, A. trisecta* and *A. victoriae* deposited in CAS (California
81 Academy of Sciences) Harvard University, and USNM (United States National Museum,
82 Smithsonian Institution) has been studied. The undetermined material mentioned in this study
83 belongs to Canadian National Collection of Insects, Arachnids and Nematodes (CNC) and it is
84 deposited at CNC and University of Barcelona (UB, Col. J. Pujade-Villar).

85

86 For this study, 196 undetermined specimens were examined: 122 males and 74 females. The
87 morphological terms used are those of Richards (1977), Ronquist (1995) and Ros-Farré *et al.*
88 (2003). All measurements are relative except for body length. Measurements and abbreviations
89 include: F1–F12 refers to the first and subsequent flagellomeres; POL (post-ocellar distance) is the
90 distance between the inner margins of the posterior ocelli; OOL (ocular-ocellar distance) is the
91 shortest distance between the inner margin of the compound eye and the outer edge of the posterior

ocellus; LOL (lateral–anterioral ocellar distance) is the distance between the edges of the lateral and anterioral ocelli. Antennal formula includes scape, pedicel and flagellomeres length and relative width in brackets.

The images included were made in 'Serveis Científico-Tècnics' of the University of Barcelona. The field-emission gun environmental scanning electron microscope (Quanta 200 ESEM, FEI, Hillsboro, OR, USA) was used for high-resolution imaging, under a low voltage (12.0 kV) and without gold-coating of the specimens in order to preserve the material.

RESULTS

Aegilips aciculata Provancher, 1881 *incertae sedis*

Type material of *Aegilips clarimontis*. Holotype ♀ deposited in UL with the following labels: "*Figites inermis* Provancher" (white label); "Lectotype 6 *Aegilips aciculata* Provancher; Comeau, 1941" (red label); "Lectotype 916 *Aegilips aciculata* Provancher; Grahan and Rohwer 1915; Barron, 1971" (red label)

Comments. When examining the type material of *A. aciculatus*, we realized that it did not belong to *Aegilips* but to *Figities* Latreille, 1802. Moreover, Provancher's original labels name them as *F. inermis* (Provancher, 1887), a species originally described as *Onychia inermis* by Provancher himself. According to the labelling, the specimens were designated as the type series of *A. aciculatus* by Comeau, the former curator of Provancher's collection, in 1941. No paper was published justifying the reason for that designation. Comeau's type designation was repeated in Barron's revision of Provancher material, who also didn't examine the material of *A. aciculata*

(Barron, 1971). It is clear that the material labelled as *A. aciculatus* is not the type material of that species, but instead belongs to *Figities inermis*. Provancher's original description, albeit not exhaustive, explicitly mentions differences between *Aegilips* and *Figites,* which makes us presume that the specimens described really did belong to *Aegilips*. The description, however, is not useful enough to separate this species from other North American species of *Aegilips*. The lack of original material labeled as *A. aciculata* and the insufficient data provided in the description make it impossible to determine the identity of the species, and so we treat *Aegilips aciculatus* as an *incertae sedis*.

***Aegilips clarimontis* Kieffer, 1907**

(Figures 1c, 1d, 1g, 1h)

Type material of *Aegilips clarimontis*. Holotype ♀ deposited in CAS with the following labels: "Claremont, California, Baker" (white label); "*Aegilips clarimontis* Kieffer (red label); "California Academy of Sciences Type No: 10518" (white label).

Additional material (8♀ & 4♂). CANADA: "1♀, nr Ancaster, Newton, ON, MT, 1-10.viii.1986: B. DeJonge leg". USA: "1♀, Stockton, San Joaquin Co., CA, 21.iii-24.iv.1988: L. Wallace leg"; "1♀, nr Portales, Roosevelt Co., NM, 4000ft, MT, 24-30.vi.1991: J.E. O'Hara & Jorgensen leg". MEXICO: "2♀ & 3♂, Cerro Zontehuitz, Chiapas, 9500ft, 25.vi.1969: W.R.M. Mason leg"; "3♀ & 1♂, Cerro Zontehuitz, Chiapas, 9500ft, 25.vi.1969: W.R.M. Mason leg".

Diagnosis. Species with smooth body: notauli effaced in anterior mesoscutum, absence of micro or

142 macrosculpture in mesoscutum and scutellum. This characters are shared with *Aegilips zaitzevi*
143 Kovalev, 1974; however, *A. clarimontis* does not possess 2rm vein extended (vein 2rm present in
144 *Aegilips zaitzevi*).
145
146 **Redescription.**
147 **Length.** Body: 2.2-2.8 mm. Antennae: 2.1-2.3 mm (♀), 2.5-2.8 mm (♂). Wings: 2.8-3.1
148 mm.
149 **Coloration.** Head, mesosoma and metasoma black. Mandibles yellowish brown with darker
150 teeth. Antennae yellow. Legs yellowish with brown coxae.
151 **Head.** Sub-quadrangular-shaped in anterior view. Face smooth, covered with sparse white
152 setae. Width of the head 1.7 times its length in dorsal view while 1.3 times its height in anterior
153 view. Malar sulcus coriaceous, thin, 0.7 times height of compound eye. Transfacial line 1.5 times
154 height of compound eye. Diameter of toruli larger than inter-toruli distance and torulus to
155 compound eye distance. Clypeus smooth, glabrous, shortly convex. Occipital and postocular carinae
156 absents. Compound eyes glabrous. POL:OOL:LOL ratio = 6:3:4 in both sexes, ocelli diameter being
157 1.5. Frons and gena smooth; occiput smooth, shiny, glabrous except for a few sparse setae..
158 **Antennae.** Cylindrical flagellomeres covered with pubescence. Female antennal formula:
159 7(3), 2.5(2.5), 9(2), 7.5(2), 7(2), 7(2), 6(2), 5(2.5), 5(3), 5(3), 5(3), 5(3), 8(3). Male antennal
160 formula: 10(3.5), 3.5(3), 10(3), 10(3), 9(3), 9(3), 9(3), 9(3), 8(3), 7.5(3), 7(3), 7(2.5), 7(2.5),
161 10(2.5). Placodeal sensilla starting at F1 in males and abundant in all flagellomeres; in females,
162 placodeal sensilla starting at F3 but not abundant until F6.
163 **Mesosoma.** Pronotum smooth, surface punctate; two short strong carinae with minor carinae
164 in ventral region (Fig. 1f). Mesoscutal width 1.1 times its length in dorsal view. Mesoscutum
165 smooth, shiny, glabrous; never carinate but rugate at margins of notauli in some individuals. Notauli
166 effaced, shorter than ½ of mesoscutal length (Fig. 1e); median mesoscutal furrow absent. Lateral

region of mesoscutum smooth, punctate; parapsidal signum short, narrow; parascutal sulcus absent. Scutellar length 0.7 times of mesoscutal length in dorsal view (Fig. 1e). Scutellum smooth, shiny, never areolate. Scutellar foveae trapezoidal, alutaceous, posterior margin inconspicuous to tenuous, but never defined by carina; lateral pits of the scutellar foveae absent. Interfoveal line incomplete. Circumscutelar carina complete, clearly defined, slightly projected at scutellar apex. Mesopleuron smooth, glabrous, shiny, with weak transverse carinae in ventral region. Mesopleural triangle smooth and glabrous. Metanotal troughs coarse and glabrous. Propodeum coriaceous, divided in large cells; central area glabrous, laterally pubescent, defined by two lateral carinae and divided into two symmetrical areas by median longitudinal carina, weak transverse carinae present.

Wings. Sparsely pubescent. Radial cell of fore wing closed, 2.3 times longer than wide. Vein 2rm absent. Marginal pubescence of fore wing denser at apical third.

Metasoma. Shorter than head + mesosoma. Petiole as long as wide but shorter than metacoxa; coarsely sculptured, shiny, dorsally smooth. Third metasomal tergum 2.3 times longer than fourth tergum in dorsal view. Fifth, sixth and seventh metasomal terga visible in dorsal view. Metasomal terga smooth, glabrous, from T4 to T7 punctate.

Hosts and distribution. Host unknown. Nearctic and Neotropical distribution; known from USA (California) (Kieffer, 1907); collected from Canada (Ontario), USA (New Mexico), Mexico (Chiapas), new records.

Comments. The holotype lacks malar sulcus, a character present in all *Aegilips* species. However, after examining the undetermined material, we found specimens sharing the same morphological traits present in *A. clarimontis* holotype except for the lack of malar sulcus (Fig. 1g). Variability in the sculpture of malar area is known to appear in closely related genus *Xyalaspis* (Mata-Casanova *et al.,* 2014a). This has leaded us to conclude that the holotype is an aberrant specimen, and the malar sulcus is a character present in *A. clarimontis* (Fig. 1h), as in other *Aegilips* species (Fig. 1i).

192

193

194 ***Aegilips obtusilobae* Osten-Sacken, 1863 *incertae sedis***

195

196 **Comments.** Photographs sent by Dr. Jignasha Rana (Harvard University, USA) of Type Material (1
197 specimen, Holotype) have been examined. Unfortunately, the specimen lacks its head and has its
198 mesoscutum seriously damaged due to pinning. The state of the material makes it impossible to
199 assert wether it is the same species that *A. clarimontis,* or it is a different species. Thus, we consider
200 *A. obtusilobae* as as a *nomen dubium*.

201

202 ***Aegilips rugata* Kieffer, 1907**

203 **(Figures 2c, 2d)**

204

205 **Type material.** Holotype ♀ deposited in CAS with the following labels: "*Aegilips rugata* Kieffer
206 (red label); "California Academy of Sciences Type No: 10901" (white label).

207

208 **Additional material (17♀ & 25♂).** CANADA: "1♂ Whitehorse, YT, 7.viii.1948: Mason & Hughes
209 leg"; "1♀ & 1♂, Oldman River, Lethbridge, AB, 22.vi.1956: O. Peck leg"; "1♀, Summit Lake, mi
210 392 Alaska Hwy, BC, 11-14.vii.1959: E.E. MacDoughall leg"; "1♀, Summit Lake, mi 392 Alaska
211 Hwy, BC, 4200ft, 19-21.viii.1959: R.E. Leech leg"; "1♀, Jumping Pd. Cr., 20mi W calgary, AB,
212 19.vi.1962: W.R.M. Mason leg"; "1♂, 14mi E Dawson, YT, 1300ft, 3.viii.1962: P.J. Skitsko leg";
213 "1♂, North West Territory, Kovaluk River, 69°11' N 131° W, 6-10.vii.1971: W. R. Mason leg"; "1♀,
214 Thwartway Is., St. Lawrence Is. Nat. Prk., ON, 1.x.1976: Reid leg"; "1♀, Kouchibouguac Nat. Prk.,
215 NB, 3.viii.1977: S.J. Miller leg"; "1♀ & 1♂, British Columbia, Cassiar Highway, Boyar Lake to
216 Strikine R., 5.viii.1988: Peck leg"; 1♀, Vineland, ON, 5.vi.1992: E.A.C. Hagley leg". "USA: "2♂ ,

Paxton Lodge, Gulkana, AK, 4.viii.1951: W.R.M. Mason leg"; "1♂, King Salmon, Riv., AK, 5.viii.1952: W.R.M. Mason leg"; "1♂, King Salmon, Naknek Riv., AK, 23.viii.1952: W.R.M. Mason leg"; "1♂, Mt. Evans, Doolittle Ranch, CO, 9800ft, 25.vii.1961: R.W.M. Mason leg"; "1♂, Cottonwood Pass, Gunnison Co., 12100ft, CO, 29.vii.1961: B.H. Poole leg"; "1♀, Loveland Pass W slope, CO, 9850ft, 7.viii.1961: B.H. Poole leg"; "1♀, Loveland Pass W slope, CO, 9850ft, 8.viii.1961: B.H. Poole leg"; "2♀ & 11♂, Colorado, Teller, 7 mi. N. Woordland Park, South Meadows Camp, 21-28.vii.1977: S. Peck leg"; "1♀ & 1♂, Alaska, Cantwell Denali Highway, 24.vii.1984: S. & J. Peck leg"; "1♀, Yosemite National Park, 1220m, 2.vii.1985: L. Masner leg"; "2♀, Washington, Rainier National Park, Van Trump Park, 1500-1800m, 29.vii.1985: L. Masner leg"; "1♂, Virginia, Page Co., Shenandoah Nat. Park, 1300m, 8.vii.1987: L. Du Mouchel leg"; "1♂, Arizona, Santa Cruz Co., Patagonia, MT, 1-5.v.1994: B. Brown & E. Wilk leg"; "1♂, Arizona, Santa Cruz Co., Patagonia, 31°53' N 10°77' W, MT, 16.vi.1994: B. Brown & E. Wilk leg". GUATEMALA: "1♀, Zacapa, San Lorenzo, 13.vii.1986: L. La Sage leg".

Diagnosis. Species very similar to *Aegilips victoriae*, as both species share smooth notauli and an areolate scutellum. However, *Aegilips rugata* always has complete notauli and a coriaceous scutellum, never areolate (scutellum completely areolate without a central coriaceous area and notauli effaced in anterior third of mesoscutum in *A. victoriae*).

Redescription.

Length. Body: 2.4-2.8 mm. Antennae: 2.3 mm (♂); 1.7 mm (♀). Wings: 2.5-2.8 mm.

Coloration. Head, mesosoma and metasoma black. Mandibles yellowish brown with darker teeth. Antennae dark yellowish. Legs dark yellowish with brown coxae and upper femur. Veins of wings brownish.

Head. Triangular-shaped in anterior view. Face smooth, covered with sparse white setae.

Width of head 1.8 times its length in dorsal view and 1.2 times its height in anterior view. Malar sulcus coriaceous, 0.5 times of compound eye height. Transfacial line as long as compound eye height. Diameter of toruli same as inter-toruli distance and shorter than torulus to compound eye distance. Clypeus smooth, glabrous, shortly convex. Occipital and postocular carinae absents. Compound eyes glabrous. POL:OOL:LOL ratio = 7:6:3 in both sexes, being the ocelli diameter 2.5. Frons and gena smooth; occiput smooth, shiny and glabrous except for a few sparse setae.

Antennae. Cylindrical flagellomeres covered with pubescence. Male antennal formula: 9(3.5), 3(2.5), 9(3), 9(3), 8(3), 7.5(3), 7.5(3), 7.5(2.5), 7.5(2.5), 7.5(2.5), 7.5(2.5), 7(2.5), 6(2.5), 7(2.5). Female antennal formula: 9(3), 3(2.5), 7(2), 6(2), 5.5(2), 5(2), 5(2), 5(2), 4.5(2.5), 4(3), 4(3), 4(3), 7(3). Placodeal sensilla starting at F1 in males; starting at F3 in females but not abundant until F4.

Mesosoma. Surface strongly alutaceous; presence of oblique carinae in ventral region and anterior margin of pronotum (Fig. 2d). Mesoscutal width 1.2 times its length in dorsal view. Mesoscutum smooth, shiny; scarce long hairs denser in anterior region. Notauli complete, tenuous, never internally carinate (Fig. 2c); median mesoscutal furrow absent. Lateral region of mesoscutum smooth, punctate; parapsidal signum and parascutal sulcus absents. Scutellar length 0.8 times of mesoscutum length in dorsal view. Scutellum strongly alutaceous, shiny, areolate (Fig. 2c). Scutellar foveae oval, alutaceous, posteriorly defined by carina; lateral pits of scutellar foveae present. Interfoveal line present. Circumscutelar carina complete, not projected at scutellar apex. Mesopleuron smooth, glabrous, shiny; presence of weak antero-ventral carinae. Mesopleural triangle tenuously alutaceous, pubescent. Metanotal troughs alutaceous, glabrous. Propodeum coriaceous, divided in large cells; central area glabrous, laterally pubescent; defined by two lateral carinae, divided into two symmetrical areas by median longitudinal carina, some weak transverse carinae present.

Wings. Sparsely pubescent. Radial cell of fore wing closed, 2.3 times longer than wide. Vein

2rm absent. Marginal pubescence of fore wing denser at apical third.

Metasoma. Shorter than head + mesosoma. Petiole longer than wide but shorter than metacoxa, coarsely sculptured, shiny, dorsally smooth. Third metasomal tergum 3 times longer than fourth tergum in dorsal view. Fifth, sixth and seventh metasomal terga visible in dorsal view. Metasomal terga smooth, glabrous, from T4 to T7 punctate.

Hosts and distribution. Host unknown. Nearctic and Neotropical distribution; known from USA (Colorado) (Kieffer, 1907); collected from Canada (Alberta, British Columbia, Northwest Territory and Ontario), USA (Alaska, Arizona, California, Virginia and Washington) and Guatemala, new records.

***Aegilips trisecta* Kieffer, 1907**

(Figures 2e, 2f)

Type material of *Aegilips trisecta*. Holotype ♂ deposited in CAS with the following labels: "*Aegilips trisecta* Kieffer (red label); "California Academy of Sciences Type No: 10618" (white label).

Type material of *Aegilips reticulata*. Holotype ♂ deposited in CAS with the following labels: "Santa Clara Co., California, Baker" (white label); "*Aegilips reticulata* Kieffer (red label); "California Academy of Sciences Type No: 10592" (white label).

Additional material (31♀ & 73♂). CANADA: "1♀, Ottawa, ON, 18.ix.1911: collector unknown"; "1♂, Robson, BC, 6-31.vi.1947: H.R. Foxlee leg"; "1♂, Lac Brule, QC, 21.viii.1947: O. Peck leg"; "2♂ & 2♀, Cultus Lake, BC, 1.vii.1948: H.R. Foxlee leg"; "4♂, Cultus Lake, BC, 13-17.vii.1948: H.R. Foxlee leg"; "1♂, Dry Creek, YT, 25.vii.1948: Mason & Hughes leg"; "1♂, Shag, YT,

25.vii.1948: W.R.M. Mason & Hughes leg"; "1♀, Yellowknife, YT, 17.viii.1949: R.R. Hall leg"; "1♂, Yellowknife, YT, 18.viii.1949: R.R. Hall leg"; "1♂, Yellowknife, YT, 19.viii.1949: R.R. Hall leg"; "1♂, Tampart House, YT, 19.vii.1951: J.E.H. Martin leg"; "1♂, Rampart House, YT, 22.vii.1951: J.E.H. Martin leg"; "1♂, Sudbury, ON, 18.vi.1952: collector unknown leg"; "1♂, Nickel Plate, Hedley, BC, 12.ix.1953: J.E.H. Martin leg"; "1♂, Atlin, BC, 4.vi.1955: H. Huckel leg"; "1♂, Atlin, BC, 6.vi.1955: H. Huckel leg"; "2♂, Port Edward, BC, 18.vii.1955: B. Herming leg"; "1♂, Cap Rouge, QC, 3.viii.1955: O. Peck leg"; "1♂, Summit Lk., mi 392 Alaska Hwy, BC, 4200ft, 16.viii.1959: R.E. Leech leg"; "1♂, Summit Lk., mi 392 Alaska Hwy, BC, 4200ft, 28.viii.1959: R.E. Leech leg"; "1♂, Summit Lk., mi 392 Alaska Hwy, BC, 4200ft, 30.viii.1959: R.E. Leech leg"; "2♂, Summit Lake, mi 392, Alaska Hwy, BC, 28.vii.1959: E.E. MacDougall leg"; "2♀, Summit Lake, mi 392, Alaska Hwy, BC, 31.vii.1959: E.E. MacDougall leg"; "1♀, Summit Lk., mi 392 Alaska Hwy, BC, 4200ft, 19-21.viii.1959: R.E. Leech leg"; "1♀, Gagnon Rd., 6km W of Terrace, BC, 8.vi.1960: J.G. Chillcott leg"; "1♂, Queen Charlotte City, Q.C.I., BC, 9.vii.1960: G.E. Shewell leg"; "1♂, Mt. Thrornhill, nr., Terrace, BC, 29.vii.1960: W. R. Richards leg"; "1♀ & 2♂, Mt. Thornbill, nr. Terrace, BC, 30.vii.1960: W.R. Richards leg"; "1♂, 14mi E Dawson, YT, 1300ft, 3.viii.1962: P.J. Skitsko leg"; "1♀, Gravel Lk., 58mi E Dawson, YT, 2050ft, 10.viii.1962: P.J. Skitsko leg"; "1♂, Grave Lake, 58mi E Dawson, YT, 2050ft, 11.viii.1962: R.E. Leech leg"; "1♂, Haines Jet. 10Km S, 800m, YT, MT: S. & J. Peck leg"; "1♂, Kouchibougac Nat. Prk., NB, 20.ix.1977: S.J. Miller leg"; "1♀, Merivale Rd., Nepean, ON, PT, 20-18.x.1984: L. Masner leg"; "1♀ & 1♂, , Merivale Grdns., Nepean, ON, PT, 1-11.xi.1984: L. Masner leg"; "1♂, St. Alphonse, QC, MT, 21.vi.1987: Génier & Bertrand leg"; "1♀, British Columbia, Cassiar Highway, Boyar Lake to Strikine R., 5.viii.1988: Peck leg"; "1♂, Alberta, Writing-on-Stone Provincial Park, 21-28.vi.1990: D.B. McCorquadale leg". "USA: "2♂, Big Delta, AK, 3.vii.1951: W.R.M. Mason leg"; "5♀, Isabella Pass, Summit Lake, AK, 3.viii.1951: W.R.M. Mason leg"; "1♂, Naknek, AK, 2.viii.1952: W.R.M. Mason leg"; "1♂, Naknek, AK, 9.viii.1952: W.R.M. Mason leg"; "1♂ & 1♀,

Lakes of the Clouds, Mt. Washington, NH, 5000ft, 9.viii.1954: Becker, Munroe & Mason leg"; "1♂, Highlands Co., NC, 3800ft, 27.v.1957: W.R.M. Mason leg"; "1♀, Unalakleet, AK, 10.vii.1961: B.S. Heming leg"; "1♂, Chicago Cr., Clear Cr. Co., CO, 8800ft, 5.viii.1961: B.H. Poole leg"; "1♂, Loveland Pass, CO, 12000ft, 7.viii.1961: C.H. Mann leg"; "1♂, Loveland Pass, W slope, CO, 9850ft, 8.viii.1961: B.H. Poole leg"; "1♂, West Chicago Cr., Clear Creek Co., CO, 9800ft, 11.viii.1961: B.H. Poole leg"; "1♀, Unalakleet, AK, 13.viii.1961: R. Madge leg"; 1♂, Shenandoah Nat. Prk., Madison Co., VA, 3000ft, 7.vi.1962: J.R. Vockeroth leg"; "1♀, Mt. Fairplay, mi 32 Taylor Hwy, AK, 3600ft, 10.vii.1962: R.E. Leech leg"; "1♂, Agric. Exp. Sta., St. John's, NF, 7.vii.1967: J.F. McAlpine leg"; "1♂, Deering, AK, MT, 16-20.viii.1968: J. Matthews leg"; "1♀, Deering, AK, MT, 22-31.viii.1968: J. Matthews leg"; "1♂, Deering, AK, MT: 28-31.viii.1968: J. Matthews leg"; "1♀ & 1♂, Deering, AK, MT, 24-27.viii.1968: J. Matthews leg"; "1♀ & 1♂, Deering, AK, MT: 28-31.viii.1968: J. Matthews leg"; "2♀ & 6♂, Strawberry Canyon, Berkeley Hills, CA, MT, 30.viii.1968: D.D. Munroe leg"; "1♂, Lily Pond, Alpine Lk., Marin Co., CA, 1500ft, MT, 10.v.1969: D.D. Munroe leg"; "1♂, Lily Pond, Alpine Lk., Marin Co., CA, 1500ft, MT, 9.v.1977: D.D. Munroe leg"; "1♂, Colorado, Teller, 7 mi. N. Woordland Park, South Meadows Camp, 21-28.vii.1977: S. Peck leg"; "1♂, Seward, AK, 25.VI-18.vii.1984: S. & J. Peck leg"; "2♀, Yosemite National Park, 1220m, 2.vii.1985: L. Masner leg"; "1♀ & 3♂, Washington, Rainier National Park, Van Trump Park, 1500-1800m, 29.vii.1985: L. Masner leg"; "1♂, Washington, Callam Co., Olympic National Park, 15.viii.1985:Finnamore & Thormin leg"; "1♀ & 5♂, North Carolina, McDowell Co., 9.vii-17.ix.1987: Brc. Hym. Team leg"; "1♂, Whiteside Mt. nr. Highlands, Jackson Co., NC, 1600m: 10.vii-13.ix.1987: BRC Hym. Team leg"; "1♂, Big Meadow, Shenandoah Nat. Prk., VA, 1300m, MT, 20.viii.1987: BRC Hym Team leg"; "1♀, 18mi NW Cuxama, Santa Barbara Co., CA, 23.ii-2.iii.1988: W.E. Wahl leg".

Diagnosis. Similar to species with internally carinate notauli, such as Nearctic species *A. huberi* and

342 the Palaearctic *A. romseyensis* Fergusson, 1985. However, the species presents alutaceous sculpture
343 and has carinate mesoscutum (mesoscutum smooth or only slightly carinate at the base of notauli in
344 *A. huberi* and *A. romseyensis*). These characters are also seen in the Palaearctic *A. kozlovi* Kovalev,
345 1974; though *A. trisecta* does not possess a heavily areolate pronotum like *A. kozlovi* but coarse
346 sculpture instead, with some ventral carinae.
347
348 **Redescription.**
349 **Length.** Body: 2.5-2.7 mm. Antennae: 2.8 mm (♂); 2.1 mm (♀). Wings: 2.4-2.5 mm.
350 **Coloration.** Head, mesosoma and metasoma black. Mandibles yellowish brown with darker
351 teeth. Antennae dark yellowish; lighter in females. Legs yellow with black coxae. Veins of wings
352 dark yellowish; lighter in females.
353 **Head.** Triangular-shaped in anterior view. Face smooth, covered with sparse white setae.
354 Width of head 2 times its length in dorsal view and 1.1 its height in anterior view. Malar sulcus
355 coriaceous, 0.7 times of compound eye height. Transfacial line 1.3 times of compound eye height.
356 Diameter of toruli larger than inter-toruli distance and torulus to compound eye distance. Clypeus
357 smooth, glabrous, shortly convex. Occipital and postocular carinae absents. Compound eyes
358 glabrous. POL:OOL:LOL ratio = 7:5:2.5 in both sexes, being the ocelli diameter 3. Frons and gena
359 smooth; occiput smooth, shiny and glabrous except for a few sparse setae.
360 **Antennae.** Cylindrical flagellomeres covered with pubescence. Male antennal formula:
361 7(3.5), 3(3), 8(3), 8(3), 8(3), 7(3), 6(3), 6(3), 6(3), 6(3), 6(3), 6(3), 6(3), 7(3). Female antennal
362 formula: 9(3.5), 3(3), 11(2), 10(2), 7(2.5), 7(2.5), 7(2.5), 6(2.5), 6(3), 5(3), 5(3), 5(3), 7(3).
363 Placodeal sensilla starting at F1 in males; at F3 in females but not abundant until F5.
364 **Mesosoma.** Pronotum coriaceous and rugate except for smooth area near tegulae; ventral
365 oblique carinae present (Fig. 2f). Mesoscutal width 1.1 times its length in dorsal view. Mesoscutum
366 smooth to slightly alutaceous, shiny, glabrous; transverse carinae more or less extended across its

surface (Fig. 2e), stronger at base of notauli. Notauli complete and internally carinate (Fig. 2e); median mesoscutal furrow short and narrow, not always defined at apex. Lateral region of mesoscutum smooth and punctate; parapsidal signum short and narrow; parascutal sulcus excavated and internally carinate. Scutellar length 0.6 times of mesoscutum length in dorsal view. Scutellum strongly alutaceous, shiny, areolate; scutellar apex rounded. Scutellar foveae oval, smooth to slightly alutaceous; posteriorly defined by carina, lateral pits of scutellar foveae present. Interfoveal line present. Circumscutelar carina complete, not projected at scutellar apex. Mesopleuron smooth, glabrous, shiny; presence of weak antero-ventral carinae. Mesopleural triangle strongly alutaceous and glabrous. Metanotal troughs alutaceous and glabrous. Propodeum coriaceous, divided in large cells; central area glabrous, laterally pubescent; central area defined by two lateral carinae, divided into two symmetrical areas by a median longitudinal carina, weak transverse carinae present.

Wings. Sparsely pubescent. Radial cell of fore wing closed, 2.5 times longer than wide. Vein 2rm absent. Marginal pubescence of fore wing denser at apical third.

Metasoma. Shorter than head + mesosoma. Petiole longer than wide but shorter than metacoxa, coarsely sculptured, shiny, dorsally smooth. Third metsomal tergum 2.4 times longer than fourth tergum in dorsal view. Fifth, sixth and seventh metasomal terga visible in dorsal view. Metasomnal terga smooth, glabrous, from T4 to T7 punctate.

Hosts and distribution. Host unknown. Nearctic distribution; known from USA (Wisconsin) (Kieffer, 1907); USA (California) (Kieffer, 1908); collected from Canada (Alberta, British Columbia, Ontario, Yukon Territory) and USA (Alaska, California, Colorado, New Hampshire, North Carolina,Virginia, Washington), new records.

***Aegilips victoriae* Ashmead, 1896**

(Figures 2g, 2h)

392

393 **Type material.** Holotype ♀ deposited in USNM with the following labels: "Victoria, Vancouver"
394 (white label); "USNM Type No. 23286" (red label); "*Aegilips victoriae* ♀ type Ashmead" (white
395 label).

396

397 **Diagnosis.** Species without internally carinate notauli, like *A. cardinalae* **sp. n.**, *A. clarimontis* and
398 *A. rugata.* Unlike *A. cardinalae* **sp. n.** and *A. clarimontis, A. victoriae* presents areolate scutellum.
399 This character makes it close to *A. rugata*; however, *A. victoriae* does not have complete notauli
400 unlike *A. rugata.*

401

402 **Additional material (4♀ & 16♂).** CANADA: "1♀, Victoria, BC, 8.ii.1936: W. Downes leg"; "1♂,
403 Churchill, MB, 2.viii.1949: C.D. Bird leg"; "1♂, Yellowknife, NT; 19.viii.1949: E.F. Cashman leg";
404 "1♂, Elkwater, AB, 10.vi.1956: O. Peck leg"; "1♂ & 1♀, Summit Lake, mi 392 Alaska Hwy, BC,
405 4200ft, 19-21.vii.1959: R.E. Leech leg"; "1♂, Snow Cr. Pass, Banff Nat. Prk., 7400ft, AB,
406 28.vi.1962: W.R.M. Mason leg"; "1♂, Point Lake, NT, 65°16'N, 113°21'W, 26.viii.1966: G.E.
407 Shewell leg"; "1♀, nr. Nemptville, 24.x-2.xi.1983: J. Denis leg". USA: "1♀, Naknek, AK,
408 2.viii.1952: W.R.M. Mason leg"; "1♂, Mt. Evans, CO, 700ft, 22.vii.1961: S.M. Clark leg"; "2♂,
409 Mt. Evans, CO, 29.vii.1961: S.M. Clark leg"; "1♀ & 1♂, Cottonwood Pass, Gunnison Co., CO,
410 12100ft, 29.vii.1961: B.H. Poole leg"; "1♂, Loveland Pass, CO, 12000ft, 7.viii.1961: C.H. Mann
411 leg"; "3♂, Loveland Pass, W slope, 9850ft, 8.viii.1961: B.H. Polle leg"; "1♀, Deering, AK, MT,
412 28-31.viii.1968: J. Matthews leg"; "1♂, South Meadow Camp, 7mi N Woodland Prk., Teller Co.,
413 CO, 8000ft, 21-29.vii.1977: S. Peck leg"; "1♂, Redstone Trail, Bursum Rd., Mongolion Mts.,
414 Catron Co., NM, 33°22'12"N, 108°53'24"W, 8710ft, 12-13.viii.2011: J.E. O'Hara leg".

415

416 **Redescription.**

Length. Body: 2.6-2.8 mm. Antennae: 2.2 mm (♀), 2.6 mm (♂). Wings: 2.8-3.3 mm.

Coloration. Head, mesosoma and metasoma black. Mandibles yellowish brown with darker teeth. Antennae dark yellow. Legs and coxae dark yellow, junction between femur and tibia lighter.

Head. Quadrangular-shaped in anterior view. Face smooth, covered with sparse white setae. Width of head 2.2 times its length in dorsal view. Malar sulcus coriaceous, 0.7 times of compound eye height. Transfacial line 1.2 times of compound eye height. Diameter of toruli larger than inter-toruli distance and torulus to compound eye distance. Clypeus smooth, glabrous and shortly convex. Occipital and postocular carinae absents. Compound eyes glabrous. POL:OOL:LOL ratio = 7:4:3 in both sexes, being the ocelli diameter 2. Frons and gena smooth; occiput smooth, shiny and glabrous except for a few sparse setae.

Antennae. Cylindrical flagellomeres covered with pubescence. Female antennal formula: 4(3), 3.5(2.5), 7(2), 5.5(2), 5(2), 5(2), 5(2), 4.5(2.5), 4(2.5), 4(2.5), 5(2.5), 8(2.5). Male antennal formula: 5(3), 3.5(2.5), 8(2.5), 8(2.5), 7.5(2.5), 7(2.5), 6(2.5), 5(2.5), 5(2.5), 5(2.5), 5(2.5), 6(2.5), 8(2.5). Placodeal sensilla starting at F1 in males; at F3 in females but not abundant until F3.

Mesosoma. Rugose and areolate pronotum (Fig. 2h). Mesoscutum as wide as long in dorsal view. Mesoscutum smooth to slightly alutaceous, shiny and glabrous; may present transverse carinae at base of notauli (Fig. 2g). Notauli complete and weakly carinate (Fig. 2g); median mesoscutal furrow short and narrow, not defined at apex. Lateral region of mesoscutum smooth, punctate; parapsidal signum absent; parascutal sulcus tenuous but internally carinate. Scutellar length 0.6 times of mesoscutal length in dorsal view. Scutellum strongly alutaceous, shiny, laterally areolate but lacking dorsal carinate sculpture in some specimens. Scutellar foveae trapezoidal and alutaceous, posteriorly defined by carina, lateral pits of scutellar foveae present but very tenuous. Interfoveal line present. Circumscutelar carina complete, clearly defined, not projected at scutellar apex. Mesopleuron smooth, glabrous, shiny, anterior mesopleuron coriaceous in some specimens; mesopleural anterior carinae effaced in some specimens. Mesopleural triangle weakly alutaceous,

glabrous except for some short hairs. Metanotal troughs tenuously coriaceous, glabrous. Propodeum alutaceous; central area defined by two lateral carinae, divided into two symmetrical areas by median longitudinal carina, no transverse carinae present.

Wings. Sparsely pubescent. Radial cell of fore wing closed, 2.6 times longer than wide. Vein 2rm absent. Marginal pubescence of fore wing denser at apical third.

Metasoma. Shorter than head + mesosoma. Petiole longer than wide but shorter than metacoxa, coarsely sculptured, shiny, dorsally smooth. Third metasomal tergum 2.45 times longer than fourth tergum in dorsal view. Fifth, sixth and seventh metasomal terga visible in dorsal view. Metasomal terga smooth, glabrous, from T4 to T7 punctate.

Hosts and distribution. Host unknown. Nearctic distribution; known from Canada (British Columbia) (Ashmead, 1896); collected from Canada (Alberta and Northwest Territories) and USA (Alaska, Colorado and New Mexico), new records.

***Aegilips zaitzevi* Fergusson, 1985**

(Figure 1a)

Studied material (1♀). CANADA: "1♀, Thwartway Is., St. Lawrence Is. Nat. Prk., ON, 28.vii.1976: W. Reid leg"; USA: "1♀, Alaska, Mile 315 Richard Highway, 7.vi.1952: W.R.M. Mason leg".

Diagnosis. It shares the presence of incomplete notauli with *A. cardinalae* **sp. n.**, *A. clarimontis,* and *A. rugata.* However, it can be easily distinguishable from the rest of *Aegilips* species by the presence of an elongated 2rm vein (2rm vein absent in other species of *Aegilips*).

Hosts and distribution. Host unknown. Holarctic distribution; known from Mongolia (Kovalev,

1974), United Kingdom (Fergusson, 1986) and Russia (Primorskiy Krai) (Mata-Casanova *et al.*, 2017); first record from USA (Alaska).

Comments. The type material of *A. zaitzevi* (1♀ and 2♂, deposited in ZIN, Saint Petersburg) and *A. vena* (1♂ and 1♀, deposited in NHM, London) had already been examined (Mata-Casanova *et al.*, 2017).

***Aegilips cardinalae* sp. n. Mata-Casanova & Pujade-Villar**

(Figures 1c, 1d)

Type material of *Aegilips cardinalae*. Holotype ♀ deposited in CNC with the following labels: "USA, Lakes of the Clouds, Mt. Washington, NH, 5000ft, 9.viii.1954: Becker, Munroe & Mason leg" (white label); "Holotype of *Aegilips cardinalae* n. sp. ♀ desig. Mata-Casanova, 2014" (red label). Paratypes (7♀ and 1♂ deposited in CNC; 3♀ deposited in UB): CANADA: "1♀, Ottawa, ON, 16.vii.1956: J.R. Vockeroth leg"; "1♀, Liard Hot Spg., mi 496 Alaska Hwy., BC, 1500ft, 9-10.vii.1959: E.E. MacDougall leg"; "1♀, Poste Chics-Chocs, Parc Gaspésle, QC, 24-27.vii.1991: Lumière leg". USA: "1♀, mi 315 Richard Hwy., AK, 7.vi.1951: W.R.M. Mason leg"; "1♀, Birch Lake, nr Fairbanks, AK, 10.vii.1951: W.R.M. Mason leg"; "1♀, Indian Gap, Great Smoky Mts. Nat. Pk., NC, 5200ft, 23.v.1957: W.R.M. Mason leg"; "1♀, Rainier National Park, Van Trump Park, WA, 1500-1800m, 29.vii.1985: L. Masner leg"; "1♀, Wayne Co., Williamsville, MO, MT, 20.ix-20.x.1988: J. T. Becker leg". GUATEMALA: "1♀, Zacapa, San Lorenzo, 12.vii.1986: L. La Sage leg"; "1♂, Zacapa, San Lorenzo, 7.viii.1986: L. La Sage leg". COSTA RICA: "1♀, Puntarenas, Monte Verde, Finca Canadá Reserva, PT, 2.viii-1.ix.1992: D. Currie leg".

Diagnosis. This species has tenuous notauli, like *A. clarimontis, A. rugata* and *A. victoriae*. It can be easily distinguished because of having effaced posterior carina in scutellar foveae (scutellar foveae posteriorly defined by a strong carina in *A. rugata* and *A. victoriae*). The mesoscutum is dorsally flat and smooth but laterally carinate, a character absent in *A. clarimontis* (which has a completely smooth scutellum) but present in *A. huberi*; however, *A. cardinalae* lacks the complete and internal carinate notauli of the former.

Description.

Length. Body: 2.4-2.7 mm. Antennae: 2.7 mm (♂); 1.8 mm (♀). Wings: 2.2-2.5 mm.

Coloration. Head, mesosoma and metasoma black. Mandibles yellowish brown with darker teeth. Antennae dark yellowish. Legs dark yellowish. Veins of wings yellowish.

Head. Triangular-shaped in anterior view. Face smooth, covered with sparse white setae. Width of head 1.4 times its length in dorsal view and 1.3 times its height in anterior view. Malar sulcus coriaceous, 0.6 times of compound eye height. Transfacial line 1.1 times of compound eye height. Diameter of toruli to inter-toruli distance but bigger than torulus to compound eye distance. Clypeus smooth, glabrous and shortly convex. Occipital and postocular carinae absents. Compound eyes glabrous. In males, POL:OOL:LOL ratio = 7:4:3, being the ocelli diameter 2.5; in females, POL:OOL:LOL ratio = 6:4:2.5, being the ocelli diameter 2. Frons, gena and occiput smooth, shiny and glabrous except for a few sparse setae..

Antennae. Cylindrical flagellomeres covered with pubescence. Male antennal formula: 9(4), 3(3), 9(3.5), 9(3.5), 9(3.5), 9(3.5), 8.5(3.5), 8.5(3.5), 8(3), 7.5(3), 7.5(3), 7.5(3), 7.5(3), 8.5(3). Female antennal formula: 8.5(3), 3(2.5), 8(2.5), 8(2.5), 6(2.5), 5(2.5), 4.5(2.5), 4.5(2.5), 4(3), 4(3), 4(3), 4(3), 6(3). Placodeal sensilla starting at F1 in males; at F3 in females but not abundant until F4.

Mesosoma. Pronotum coriaceous; ventrally carinate, dorsally smooth, glabrous (Fig. 1d).

Mesoscutal width 1.1 times its length in dorsal view. Mesoscutum completely smooth, shiny, without any traces of transverse carinae; glabrous, except for some short hyaline hairs along notauli and anterior margin. Notauli incomplete; very tenuous, almost effaced in some individuals (Fig. 1c); median mesoscutal furrow absent. Lateral region of the mesoscutum smooth, not punctate; parapsidal signum short, narrow; parascutal sulcus absent. Scutellar length 0.7 times of mesoscutal length in dorsal view. Scutellum alutaceous, shiny, areolate (Fig.1c). Scutellar foveae trapezoidal, alutaceous, not posteriorly defined by carina; lateral pits of scutellar foveae absent. Interfoveal line incomplete. Circumscutelar carina complete and defined, not projected at scutellar apex. Mesopleuron smooth, glabrous, shiny, with weak anterior carinae. Mesopleural triangle coarse, covered with short hyaline pubescence. Metanotal troughs coarse, glabrous. Propodeum coriaceous, divided in large cells; central area glabrous while laterally pubescent; central area defined by two lateral carinae, divided into two symmetrical areas by median longitudinal carina.

Wings. Sparsely pubescent. Radial cell of fore wing closed, 2.4 times longer than wide. Vein 2rm absent. Marginal pubescence of fore wing denser at apical third.

Metasoma. Shorter than head + mesosoma. Petiole as long as wide but shorter than metacoxa, coarsely sculptured, shiny, dorsally smooth. Third metasomal tergum 2.3 times longer than fourth tergum in dorsal view. Fifth, sixth and seventh metasomal terga visible in dorsal view. Metasomal terga smooth, glabrous, from T4 to T7 punctate.

Etymology. The species is named after Dr. Sophie Cardinal from CNC, for the loan of the material which have helped in our revision of subfamily Anacharitinae and her kindness and attention during the three-month stay of the first author at CNC.

Hosts and distribution. Host unknown. Nearctic and Neotropical distribution; collected from Canada (British Columbia, Ontario, Quebec), USA (Alaska, New Hampshire, North Carolina, Missouri, Washington), Mexico (Durango), Guatemala and Costa Rica.

542

543 ***Aegilips huberi* n.sp. Mata-Casanova & Pujade-Villar**

544 **(Figure 2a, 2b)**

545

546 **Type material of *Aegilips huberi*.** Holotype ♀ deposited in CNC with the following labels:
547 "Canada, Kouchibouguac Nat. Pk., NB, 3.viii.1977: S. J. Miller leg" (white label); "Holotype of
548 *Aegilips huberi* n. sp. ♀ desig. Mata-Casanova, 2014" (red label). Paratypes (3♀ & 7♂ deposited in
549 CNC, 2♀ & 2♂ deposited in UB). CANADA: "1♀, Cultus Lake, BC, 14.vii.1948: H.R. Foxlee
550 leg"; "1♂, Summit Lake, Alaska Hwy., B, 4200ft, 16.vii.1959: R. E. Leech leg"; "2♂, Summit
551 Lake, Alaska Hwy., BC, 4200ft, 19-21.vii.1959: E. E. McDougall leg"; "1♂, Summit Lake, Alaska
552 Hwy., B, 4200ft, 21.vii.1959: R. E. Leech leg"; "1♀, Summit Lake, Alaska Hwy., B, 4200ft,
553 28.vii.1959: R. E. Leech leg"; "1♀, Cowichan L., BC, 28.ix.1966: J.A. Chapman leg"; "1♂,
554 Grenadier L., St. Lawrence Is. Nat. Pk., ON, 30.vii.1975: E. Sigler leg"; "1♂, NW Richardson
555 Dempster Highway, YT, 18.iii.1984: S. & J. Peck leg". "USA: "1♀, Summit Lake, Isabella Pass,
556 AK, 3.vii.1951: W.R.M. Mason leg"; "1♂, Birch Lake, nr Fairbanks, AK, 10.vii.1951: W.R.M.
557 Mason leg"; "1♀ & 1♂, Rainier National Park, Van Trump Park, WA, 1500-1800m, 29.vii.1985: L.
558 Masner leg"; "1♂, Santa Cruz Co., Patagonia, AZ, MT, 1-5.v.1994: B. Brown & E. Wilk leg".

559

560 **Diagnosis.** Similar to pecies with a strongly areolate scutellum, lacking posteriorly defined scutellar
561 foveae Palaearctic species *Aegilips longicellus* Belizin, 1951 and *A. paucus* Belizin, 1961. However,
562 it has complete and internally carinate notauli, a character absent in the two Palaearctic species
563 (both *A. longicellus* and *A. paucus* have incomplete and tenuously excavated notauli).

564

565 **Redescription.**

566 **Length.** Body: 2.1-2.8 mm. Antennae: 2.4 mm (♂); 2 mm (♀). Wings: 2.2-2.9 mm.

Coloration. Head, mesosoma and metasoma black. Mandibles yellowish brown with darker teeth. Antennae dark yellowish. Legs yellow with darker coxae. Veins of wings dark yellowish.

Head. Triangular-shaped in anterior view. Face smooth, covered with sparse white setae. Width of head 1.7 times its length in dorsal view and 1.1 its height in anterior view. Malar sulcus coriaceous, 0.7 times of compound eye height. Transfacial line 1.3 times of compound eye height. Diameter of toruli larger than inter-toruli distance and torulus to compound eye distance. Clypeus smooth, glabrous and shortly convex. Occipital and postocular carinae absents. Compound eyes glabrous. In males, POL:OOL:LOL ratio = 6:5:3, being the ocelli diameter 2.5; in females, POL:OOL:LOL ratio = 7:5:4, being the ocelli diameter 1.5. Frons, and gena smooth; occiput smooth, shiny and glabrous except for a few sparse setae..

Antennae. Cylindrical flagellomeres covered with pubescence. Male antennal formula: 10(3), 3(2.5), 8(3), 7(3), 7(3), 6(3), 6(3), 6(3), 6(3), 6(2.5), 5.5(2.5), 5(2.5), 5(2.5), 7(2.5). Female antennal formula: 11(4), 3(3), 11(2.5), 9(2.5), 8.5(2.5), 7.5(3), 6.5(3), 6(3), 6(3), 5(3), 5(3), 5(3), 7.5(3). Placodeal sensilla starting at F1 in males; starting at F2 in females.

Mesosoma. Ventral pronotum coriaceous with transverse carinae, dorsal pronotum smooth with long hyaline pubescence (Fig. 2b). Mesoscutum as wide as long in dorsal view. Mesoscutum smooth, shiny, glabrous; weak carinate sculpture at base of notauli and anterior mesoscutum. Notauli complete but weakly carinate (Fig. 2a); median mesoscutal furrow short and narrow, absent in some specimens. Lateral region of mesoscutum smooth, punctate; parapsidal signum short and tenuous; parascutal sulcus excavated and internally carinate. Scutellar length 0.6 times of mesoscutal length in dorsal view. Scutellum alutaceous and shiny, areolate. Scutellar foveae open, not posteriorly defined by carina (Fig. 2a); lateral pits of scutellar foveae tenuous. Interfoveal line incomplete, effaced in some individuals. Circumscutellar carina complete and defined, not projected at scutellar apex. Mesopleuron smooth, glabrous, shiny, with weak anterior carinae. Mesopleural triangle alutaceous, covered with dense but short hyaline pubescence. Metanotal troughs alutaceous,

glabrous. Propodeum coriaceous, divided in large cells; central area glabrous, laterally pubescent; divided into two cells by an irregular longitudinal carinae, both cells are furtherly divided by weaker transverse carinae.

Wings. Sparsely pubescent. Radial cell of fore wing closed, 2.5 times longer than wide. Vein 2rm absent. Marginal pubescence of fore wing denser at apical third.

Metasoma. Shorter than head + mesosoma. Petiole longer than wide but shorter than meta-coxa, coarsely sculptured, shiny, dorsally smooth. Third metasomal tergum 2 times longer than the fourth tergum in dorsal view. Fifth, sixth and seventh metasomal terga visible in dorsal view. Metasomal terga smooth, glabrous, from T4 to T7 punctate.

Etymology. The species is named after Dr. John T. Huber from CNC, for the loan of the material which have helped in our revision of subfamily Anacharitinae and his kindness and attention during the three-month stay of the first author at CNC.

Hosts and distribution. Host unknown. Nearctic distribution; collected from Canada (British Columbia, New Brunswick, Ontario and Yukon Territory) and USA (Alaska, Arizona and Washington).

KEY TO NORTH AND CENTRAL AMERICAN *AEGILIPS*

1. Vein 2rm present (Fig. 1a). …..... ***A. zaitzevi* Kovalev**

   Vein 2rm absent (Fig. 1b)..... 2

2. Notauli complete, with strong transverse carinae (Fig. 2a, 2e). …..... 3

– Notauli, if present, not complete. In case they present transverse carinae, those are part of mesoscutum carinae (Fig. 1c, 1e, 2c, 2g). …..... 4

3. Dorsal scutellum smooth, posterior margin of scutellar foveae difuminated, in some cases no distinction between foveae and central scutellum; interfoveal line length variable (Fig. 2a). Dorsal pronotum smooth and punctate, ventral pronotum obliquely carinate. ..... ***A. huberi* sp. n.**
Dorsal scutellum areolate, scutellar foveae posteriorly defined by carina, interfoveal line complete. Pronotum irregularly carinated in all its surface (2e)..... ***A. trisecta* Kieffer**

4. Scutellum smooth or only laterally weakly carinate; notauli shorter than ½ of total length of mesoscutum and tenuous (Fig. 1c, 1e). ……..... 6
Scutellum strongly areolate; notauli longer than ½ total length of mesoscutum and clearly distinguishable (Fig. 2c, 2g). ……..... 7

5. Scutellum laterally areolate; mesoscutal furrow absent (Fig. 1c)…….... ***A. cardinalae* sp. n**
Scutellum completely smooth; mesoscutal furrow absent (Fig. 1e). ……..... ***A. clarimontis* Kieffer**

6. Notauli always complete, mesoscutum weakly carinate (2c). ……..…..... ***A. rugata* Kieffer**
Notauli effaced in anterior mesoscutum, mesoscutum surface smooth. (Fig. 2g). ……..... ***A. victoriae* Ashmead**

DISCUSSION

As stated in the introduction, eight species of *Aegilips* were cited in North America before this study was conducted. From these species, *A. nevadensis* has been found to belong in *Anacharis* and has been removed, and *A. aciculate* and *A. obtusilobae* is designed as a *incertae sedis*. Two new

642 species have been described: *A. cardinalae* **sp. n.** from North and Central America, and *A. huberi*
643 **sp. n.** from North America. The number of *Aegilips* species in North America is reduced to seven,
644 making it the second most diverse region containing the genus after Eurasia (Mata-Casanova *et al.*
645 2017).
646
647 The bulk of North American *Aegilips* species are concentrated on the Western portion of the
648 continent: all species have been collected in the area comprised between the Western Coast and the
649 Rocky Mountains, and *A. reticulata* and *A. victoriae* are only found in this area. *A. huberi* **sp. n.** and
650 *A. trisecta* are also restricted to North America, but they have been found as far as North Carolina,
651 Virginia and New Hampshire. The distribution areas of *A. cardinalae* **sp. n.**, *A. clarimontis* and *A.*
652 *rugata* extend southward, reaching Southern Mexico (Chiapas) in the case of *A. clarimontis* and as
653 far as Guatemala and Costa Rica in Central America in the case of *A. cardinalae* **sp. n.** and *A.*
654 *rugata*. The Palaearctic species *A. zaitzevi* was previously only known in the Palearctic, but has now
655 been recorded from Alaska; we hypothesize, due to its presence in the Russian Far East, this species
656 has migrated across the Bering Strait. Thus, *A. zaitzevi* is the first case of a Holarctic species among
657 Anacharitinae.
658
659 The main morphological differences between the North American *Aegilips* species are those
660 related to the mesoscutal and scutellar sculpture, as are seen in Eurasian *Aegilips* (Mata-Casanova *et*
661 *al.* 2017). The length, appearance, and sculpture of notauli are also key characters for distinguishing
662 between species.
663
664 The North American *Aegilips* can be roughly divided between those with internally carinate
665 notauli and those lacking internal sculpture. *Aegilips huberi* **sp. n.** and *A. trisecta* belong to the first
666 group; all of them present complete and internally carinate notauli (Fig. 2a, 2e respectively).

667 Regarding those species without internal carinae in the notauli, we can observe considerable
668 variability. On one side, *A. rugata* has complete notauli (Fig. 2c), albeit not as strongly excavated as
669 those of the carinate species previously mentioned. The notauli of *Aegilips victoriae* are very
670 similar to those of *A. rugata,* but weaken and are not visible in the anterior third of mesoscutum
671 (Fig. 2g). Finally, *A. cardinalae* **sp. n.** and *A. clarimontis* have very tenuously impressed and
672 incomplete notauli, never reaching the anterior half of the mesoscutum (Fig. 1c, 1e respectively),
673 and are almost indistinguishable in some cases.
674
675 Regarding the scutellum, a degree of variability can be seen across species. *Aegilips*
676 *clarimontis* represents one extreme of the variation scale, with a completely smooth scutellum,
677 lacking any trace of areolate sculpture (Fig. 1e). *Aegilips cardinalae* **sp. n.** represents the next step:
678 though it has a smooth mesoscutum, it has some areolate sculpture in the margins (Fig. 1c, 1d).
679 Finally, we see a completely areolate scutellum in *A. huberi* **sp. n.**, *A. rugata, A. trisecta* and *A.*
680 *victoriae* (Fig. 2a, 2c, 2e, 2g, respectively). Another important feature regarding the scutellum are
681 the scutellar foveae. While most North American *Aegilips* have a carina posteriorly defining the
682 scutellar foveae, in *A. huberi* **sp. n.,** this feature is absent (Fig. 2a).
683
684 Little is known regarding the biology of *Aegilips*. Fergusson (1986) described the hosts of
685 *Aegilips atricornis* and *Aegilips nitidula:* both species were cited as attacking the larvae of
686 *Wesmaelius betulinus* (Strom, 1788) and *Wesmaelius subnebulosus* (Stephens, 1836) (Neuroptera:
687 Hemerobiidae). Although no hosts for North American *Aegilips* have been described, the region is
688 rich in suitable hosts: just in Western North America, where most of the *Aegilips* species occur,
689 eight genera and 40 species of Hemerobiidae have been described, 12 of them belonging to genus
690 *Wesmaelius* (Nakahara 1965). Further research should be carried out on the biology of North
691 American *Aegilips*.

692

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694

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698 *reticulata, A. rugata, A. trisecta* and *A. victoriae* type material and Jignasha Rana (Harvard
699 University) for the images of the *A. obtusilobae* type specimen. This study was funded by project
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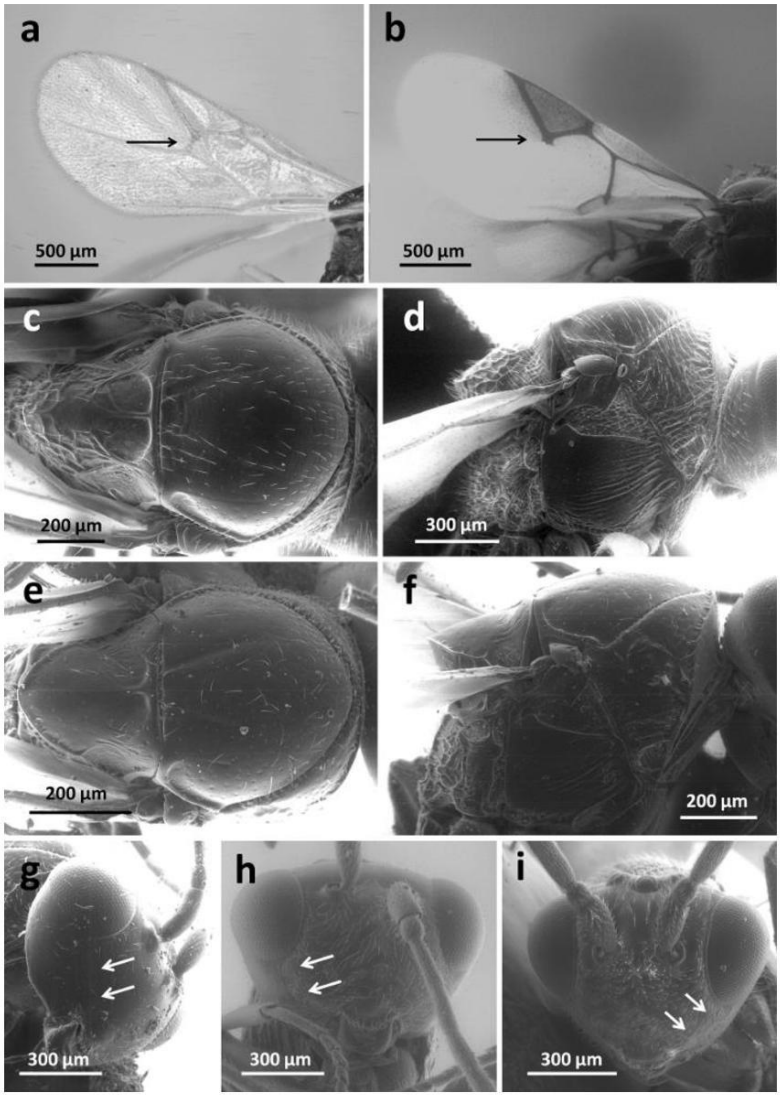
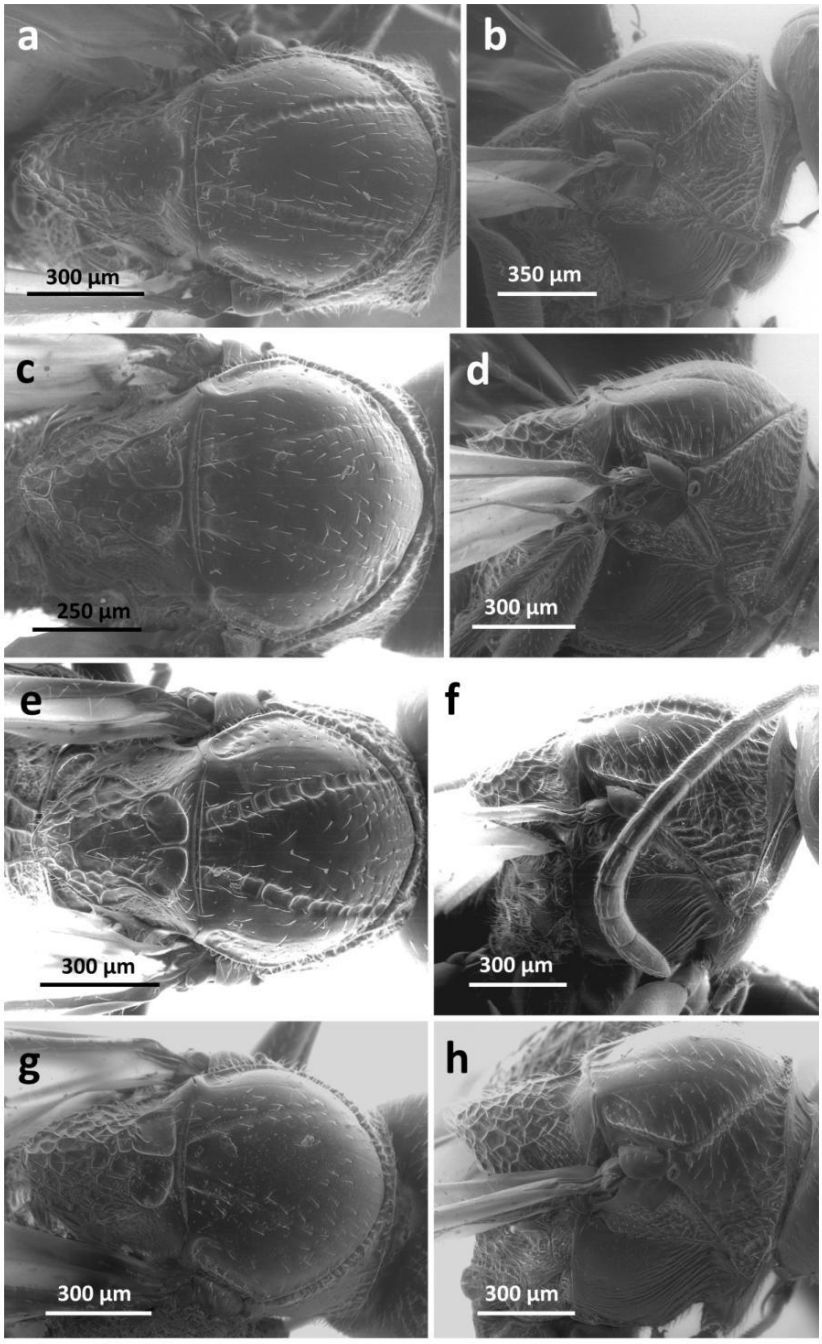


Figure 1. Forewing venation of: a) *Aegilips zaitzevi*; b) *A. nitidulus* (Dalman, 1823). *Aegilips cardinalae* **sp.n.**: c) mesosoma in dorsal view; d) mesosoma in lateral view. *Aegilips clarimontis*: e) mesosoma in dorsal view; f) mesosoma in lateral . Head of: g) *Aegilips clarimontis* holotype; h) *A. clarimontis;* i) *A. trisecta.*

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806

807 **Figure 2.** *Aegilips huberi*: a) mesosoma in dorsal view; b) mesosoma in lateral view. *Aegilips*
808 *rugata*: c) mesosoma in dorsal view; d) mesosoma in lateral view. *Aegilips trisecta*: e) mesosoma in
809 dorsal view; f) mesosoma in lateral view. *Aegilips victoriae*: g) mesosoma in dorsal view; h)
810 mesosoma in lateral view.

4.2.17. Revision of American *Anacharis*

Mata-Casanova et al.: Review of American *Anacharis*

Journal of Insect Science

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Anacharis Dalman, 1823 (Hymenoptera: Figitidae, Anacharitinae) in the New World; new species and new synonyms

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Abstract

A review of the American species of *Anacharis* Dalman, 1823 is presented. Two new American species are described: *Anacharis luciae* Mata-Casanova and Pujade-Villar **n. sp.** and *Anacharis mantocephala* Mata-Casanova and Pujade-Villar **n. sp.**. *Aegilips nevadensis* Kieffer, 1908 is transferred to genus *Anacharis,* while *Anacharis subcompressa* (Provancher, 1881) is transferred to genus *Figites* Latrielle, 1802, resulting in *Figites subcompressa* (Provancher, 1881) **n. comb** The previously known species *A. flavicornis* Kieffer, 1909*, A. levifrons* Kieffer, 1907*, A. mellipes* (Provancher, 1888) and *A. nevadensis* (Kieffer, 1908) are synonymized with *Anacharis marginata* Provancher, 1888. Diagnostic characters of each species are illustrated and data on the biology, distribution and taxonomical affinities of the American *Anacharis* species are discussed. An identification key for the American species of the genus is presented.

Key words: *Anacharis,* Nearctic, Neotropical, Hemerobiidae parasitoids, new species, taxonomy.

Anacharitinae is one of the 12 subfamilies included in Figitidae (Paretas-Martínez et al. 2011). The subfamily currently includes nine genera: *Acanthaegilips* Ashmead, 1897; *Acanthaegilopsis* Pujade-Villar, 2013; *Aegilips* Haliday, 1835; *Anacharis* Dalman, 1823; *Calofigites* Kieffer, 1909; *Hexacharis* Kieffer, 1907; *Proanacharis* Kovalev, 1996; *Solenofigites* Díaz, 1979; and *Xyalaspis* Hartig, 1843. The anacharitines can be easily distinguished from the rest of Figitidae by three synapomorphies (Ros-Farré et al., 2000): (1) rounded and continuous pronotal plate, (2) triangle-shaped head in anterior view – although it is more quadrangular-shaped in *Acanthaegilopsis* and *Proanacharis* and some species of *Aegilips* and *Xyalaspis* (Mata-Casanova et al., 2014b) – and (3) broadly overlapping mandibles. According to literature, Anacharitinae are known to attack the aphid-feeding larvae of Hemerobiidae (Neuroptera) (Wegenek, 1950; Selhime and Kanavel, 1968; Díaz, 1979; New, 1979; Miller and Lambdin, 1985; Fergusson, 1986; Cave and Miller, 1987; Ronquist, 1999; Mata-Casanova et al., 2014a) and Chrysopidae (Ronquist, 1999); the inclusion of Chrysopidae as Anacharitinae hosts should be carefully considered: Ronquist (1999) gives no further information on the exact species or genera for both host and parasite and has no references supporting this statement.

In the case of *Anacharis* in the New World, there are described hosts for two species: *Anacharis melanoneura* Ashmead, 1887, known to attack the brown-lacewings *Hemerobius stigma* Stephens, 1835 (Miller and Lambdin, 1985) and *Micromus posticus* (Walker, 1835) (Cave and Miller, 1987), and the Neotropical species *A. tucumana*, known to attack genus *Sympherobius* Banks, 1904 (Díaz, 1979). Although there are other species of *Hemerobius* Linnaeus, 1758 and *Micromus* Rambur, 1842 cited as being attacked by genus *Anacharis* (Wegenek, 1950; Selhime and Kanavel, 1968), the exact parasitic species remain unknown.

Anacharitinae presents a cosmopolitan distribution, being collected in all continents except for

Antarctica. Its highest known diversity is found in the Neotropical region, with six genera present: *Acanthaegilips, Aegilips, Anacharis, Calofigites, Solenofigites* and *Xyalaspis* (Mata-Casanova et al., 2014b), three of them – *Acanthaegilips, Calofigites* and *Solenofigites* – being endemic. The Neotropical region also hosts the highest known diversity at the specific level, with 27 described species prior to our study. The Nearctic region comes second: the genera *Aegilips, Anacharis, Hexacharis* and *Xyalaspis* are known to occur in this region – *Hexacharis* being endemic –, comprising 24 species before our study.

Both morphological and molecular data (Buffington et al., 2007, 2012) show that *Anacharis* is closely related to *Hexacharis,* with whom it shares the lack of heavy carinate sculpture in the mesoscutum, third metasomal tergum maximum two times longer than the fourth metasomal tergum and the presence of a longitudinal groove in the mesopleuron; this last character, however, is highly variable within *Hexacharis*, being effaced in some individuals (Restrepo-Ortiz and Pujade-Villar, 2010a), and never presents the internal carinate sculpture we can easily perceive in *Anacharis*. The smooth malar area in *Anacharis* was also considered a character to distinguish between both genera (Restrepo-Ortiz and Pujade-Villar, 2010a), but this has been discovered to be untrue, as most species of *Anacharis* present a coriaceous malar area like *Hexacharis*. The presence of an elongated petiole, at least as long as the metacoxa and usually longer, has also been considered a character useful to separate *Anacharis* from other Anacharitinae genera (Restrepo-Ortiz and Pujade-Villar, 2010a; 2010b). Despite the elongated petiole being a character exclusive of genus *Anacharis,* not all species present it, so its validity as a key character for identification is doubtful. Taking into account the previously mentioned considerations, the most useful character to distinguish *Anacharis* from *Hexacharis* and the rest of Anacharitinae genera is the strongly impressed and internally carinate transverse mesopleural groove (in those genera in which the transverse mesopleural groove is also present – *Calofitiges* and *Hexacharis* – it is never so deeply

excavated and lacks the strong internal carination we can see in *Anacharis*).

Anacharis has the second highest known diversity among Anacharitinae, comprising 25 species before this study was conducted. In the New World, 12 species were known before this study was carried out: *Anacharis ashmeadi* Dalla-Torre and Kieffer, 1910, *A. flavicornis* Kieffer, 1909, *A. levifrons* Kieffer, 1907, *A. marginata* Provancher, 1887, *A. melanoneura*, *A. mellipes* (Provancher, 1888), *A. osceolus* (Ashmead, 1887), *A. punctatifrons* Kieffer, 1907, *A. subcompressa* Provancher, 1881, *A. tripartita* Kieffer, 1907 for the Nearctic region and *A. mexicana* (Cameron, 1884) and *A. tucumana* (Díaz, 1979) for the Neotropical region.

In this work, we describe *Anacharis luciae* Mata-Casanova and Pujade-Villar **n. sp.**, and *Anacharis mantocephala* Mata-Casanova and Pujade-Villar **n. sp.** The previously known species *A. marginata, A. melanoneura, A. mexicana, A. punctatifrons, A. tripartita* and *A. tucumana* are redescribed and new information about their biology and distribution area is given, while *A. flavicornis, A. levifrons,* and *A. mellipes* are made synonyms of *A. marginata*. *Aegilips nevadensis* is transferred to genus *Anacharis*, and also synonymized with *A. marginata*. The previously known *A. subcompressa* is revealed to lack the previously mentioned Anacharitinae synapomorphies, and is transferred to genus *Figites* Latreille, 1802 due to presenting the oval-shaped head and striated mesopleuron which define that genus. Diagnostic characters, morphological features, distribution area and biology of collected *Anacharis* species in the New World are discussed; an identification key for them is given.

Material and Methods

The undetermined specimens examined in this study belong to the Canadian National Collection of Insects, Arachnids and Nematodes (CNC, Ottawa, Canada), Instituto Alexander von Humboldt

(IAvH; Villa de Leiva, Colombia) and the Natural History Museum (NHM, London, United Kingdom); the type material of the newly described species are deposited in the CNC, IAvH and Universitat de Barcelona (UB, Barcelona, Spain). The holotypes of *A. flavicornis, A. levifrons, A. marginata, A. melanoneura, A. mellipes, A. mexicana, A. pediculata, A. punctatifrons, A. subcompressa, A. tripartita* and *A. tucumana* are deposited in the NHM, the California Academy of Sciences (CAS, San Francisco, USA), the Instituto Fundación Miguel Lillo (IFML, Tucumán, Argentina), the Université Laval (UL, Québec, Canada) and the United States National Museum Smithsonian Institution (USNM, Washington DC, USA).

For carrying this study 1277 specimens were examined: 578 males and 699 females. Morphological terms used are those of Richards (1977), Ronquist (1995) and Ros-Farré et al. (2003). All measurements are relative except for the body length. Measurements and abbreviations include: F1–F12, first and subsequent flagellomeres; POL (post-ocellar distance) is the distance between the inner margins of the posterior ocelli; OOL (ocular-ocellar distance) is the shortest distance between the inner margin of the compound eye and the outer edge of the posterior ocellus; LOL (lateral–frontal ocellar distance) is the distance between the edges of the lateral and frontal ocelli. Antennal formula includes scape, pedicel and flagellomeres length and relative width in brackets.

The SEM images included were made in 'Serveis Científico-Tècnics' of the University of Barcelona. The field-emission gun environmental scanning electron microscope (FEI Quanta 200 ESEM, FEI, Hillsboro, OR, USA) was used for high-resolution imaging, under a low voltage (12.0 kV) and without gold-coating of the specimens in order to preserve the material.

Results

Anacharis Dalman, 1823

Megapelmus Hartig, 1840

Key to the American species of genus *Anacharis*

1. Strongly triangular head in anterior view: almost 2 times longer than wide (Fig. 1a, 1b).
…… …… ***A. mantocephala*** **Mata-Casanova and Pujade-Villar n. sp.**

Triangular head in anterior view: less than 1.5 times longer than wide (Fig. 1c). 2

2. Petiole elongated, at least 1.3x the length of the metacoxa (Fig. 1e); notauli complete (Fig. 2). . 3

Petiole short, as long as metacoxa (Fig. 1d); notauli tenuous, sometimes effaced in anterior mesoscutum (Fig. 3). 8

3. Malar area smooth (Fig. 1b), petiole about 2-2.5x the length of metacoxa. …..... 4

Malar area coriaceous (Fig. 1c), petiole about 1.3-2x the length of metacoxa sometimes shorter. 5

4. Notauli complete and internally carinate (Fig. 2a)..... …… ***A. luciae*** **Mata-Casanova and Pujade-Villar n. sp.**

Notauli incomplete and not internally carinate (Fig. 2b). ..... ***A. tucumana*** **Díaz**

5. Mesoscutum and notauli smooth (Fig. 2e). ..... ***A. punctatifrons*** **Kieffer**

Mesoscutum carinate, some coriaceous sculpture at base of notauli, notauli internally carinate (Fig. 2c, 2d, 2f). 6

6. Scutellum strongly areolate (Fig. 2c, 2d). ..... ***A. melanoneura*** **Ashmead**

Scutellum smooth to lightly carinate (Fig. 2f). ..... ***A. tripartita*** **Kieffer**

8. Scutellum strongly areolate (Fig. 3a, 3b). ..... ***A. marginata*** **Provancher**

Scutellum smooth or with tenuous areolate sculpture giving the impression of an alutaceous surface (Fig. 3c, 3d). ..... ***A. mexicana*** **Cameron**

Anacharis luciae **Mata-Casanova and Pujade-Villar n. sp.**

(Figures 1e, 2a)

Diagnosis. Species with smooth malar area without any traces of coriaceous sculpture or sulcus, like *A. mantocephala* and *A. tucumana.* It can be distinguished from the former by not having an elongated face in anterior view but a triangular face (face as long as wide and taking the shape of an isosceles triangle in *A. mantocephala*). It is also morphologically close to *A. tucumana*; however, it presents a long metasoma and complete and internally carinate notauli (metasoma shorter than head + mesosoma and notauli effaced, weakly excavated and not internally carinate in *A. tucumana*).

Type material of *Anacharis luciae*. Holotype ♀ deposited at CNC with the following labels: "Brazil, Nova Teutonia, 27º11'S, 52º23'W, 300-500m, VI.1971: F. Plaumann leg" (white label); "Holotype ♀ *Anacharis luciae* Mata-Casanova and J. P-V." (red label). Paratypes (3♀ deposited at CNC, 4♀ and 1♂ deposited at IAvH, 1♀ deposited at UB): DOMINICAN REPUBLIC: "1♀, Las Abejas, Sierra de Bahoruco, 1300m, 17-19.I.1989: L. Masner leg". COLOMBIA: "2♀, Qda. Carrizal, SFF Iguaque, Boyacá, 5º25'N, 73º27'W, 3350m, MT, 1-23.IX.2000: P. Reina leg"; "1♂, Setor La Romelia, PNN Munchique, Cauca, 2º38'N, 76º54'W, 2640m, MT, 25.IV-9.V.2004: H. Pino leg". VENEZUELA: "1♀, Mucui nr Tabay, Mérida, 8º38'8"N, 4º35'W, 2300m, 2.V.1981: L. Masner

leg"; "1♀, Rancho Grande env., H. Pittier Nat. Pk., Aragua, 1100m, YPT, 10-14.IV.1994: L. Masner leg"; "1♀, Portachuello Pass, H. Pittier Nat. Pk., Aragua, 1000m, YPT, 13.IV.1994: L. Masner leg".

Description.

Length. Body: 2.7-3.1 mm. Antennae: 2.1-2.5 mm (♀), 3.1 mm (♂). Wings: 2.6-3.0 mm.

Coloration. Head, mesosoma and metasoma black. Mandibles yellowish brown with darker teeth. Antennae brownish with darker first segment. Legs yellowish brown with darker coxae. Veins of wings brownish.

Head. Triangular-shaped in anterior view. Face smooth and shiny, almost glabrous except for some scarce white setae. Head almost as high as wide (28:31) in anterior view, width of head 2.3 times its length in dorsal view. Malar area glabrous and smooth. Transfacial line as long as height of compound eye. Diameter of toruli equal to torulus to compound eye distance and larger than inter-toruli distance. Clypeus shortly defined, smooth, glabrous and slightly convex. Occipital and postocular carinae absents. Compound eyes glabrous. In females, POL:OOL:LOL ratio = 5:4:2, ocelli diameter being 2.5; in males, POL:OOL:LOL ratio = 5:5:2, ocelli diameter being 2.5;. Frons and occiput smooth and shiny with sparse setae; gena smooth with some posterior alutaceous sculpture.

Antennae. Cylindrical flagellomeres covered with pubescence. Female antennal formula: 9(3), 4(2.5), 10.5(2), 9(2), 8.5(2), 8(2), 8(2.5), 7.5(2.5), 6.5(2.5), 6(2.5), 6(2.5), 5.5(2.5), 9(2.5). Male antennal formula: 9(3), 3.5(2.5), 12(2.5), 11(2.5), 11(2), 10(2), 10(2), 10(2), 9(2), 8.5(2), 8(2), 8(2), 7(2), 9(2). Placodeal sensilla starting at F1 and abundant in all flagellomeres in both sexes.

Mesosoma. Pronotal plate smooth. Pronotum alutaceous and carinate, covered by sparse hyaline setae. Mesoscutal width 1.3 times its length in dorsal view. Mesoscutum smooth and shiny; almost glabrous except for few short setae around notauli. Notauli complete, excavated and internally carinate (Fig. 2a); median mesoscutal furrow absent. Parapsidal signum absent; parascutal

sulcus superficial. Scutellar length 0.8 times of mesoscutum length in dorsal view. Scutellum tenuously areolate; divided in few big cells by carinae (Fig. 2a) almost effaced in some individuals. Scutellar foveae big (almost half of scutellar surface) and smooth, without any internal carinae, basally defined by a carina; lateral pits of scutellar foveae absent. Interfoveal line present. Circumscutellar carina complete, horizontally projected forming a tooth at scutellar apex. Mesopleuron glabrous and shiny except for some alutaceous sculpture in anterior third; crossed by internally carinate transverse groove. Mesopleural triangle alutaceous and pubescent. Propodeum coriaceous and heavily pubescent, divided in large cells; central area divided in three cells by transverse carinae, lower cells being split in two cells by a median longitudinal carina.

Forewings. Pubescent. Radial cell of fore wing closed, 2.9 times longer than wide. Marginal pubescence of fore wing denser at apical third.

Metasoma. Longer than head + mesosoma. Petiole two times longer than metacoxa (Fig. 1e), sometimes even longer, smooth and shiny. Third metasomal tergum 1.3 times longer than fourth tergum in dorsal view. Fifth, sixth and seventh metasomal terga visible in dorsal view. Metasomal terga smooth and glabrous.

Etymology. The specific name is dedicated to Lucía Sánchez Martínez, close friend and partner of the first author, for all her support.

Biology. Unknown.

Distribution. Neotropical. Recorded from Brazil, Colombia, Dominican Republic and Venezuela.

Anacharis mantocephala Mata-Casanova and Pujade-Villar n. sp.

(Figures 1a, 1b)

Diagnosis. Species easily distinguishable from the rest of *Anacharis* species by having a strongly

triangular head in anterior view, as long as wide, and smooth malar area (most *Anacharis* species present coriaceous sculpture in the malar area and head wider than long in anterior view).

Type material of *Anacharis mantocephala.* Holotype ♂ deposited at CNC with the following labels: "Yungas, Chapare, Bolivia, 2200m, 28.I.1976: L.E. Peña leg" (white label); "Holotype ♂ *Anacharis mantocephala* Mata-Casanova and J. P-V." (red label). Paratypes (4♀ and 5♂ deposited at CNC, 1♀ and 3♂ deposited at IAvH, 1♀ and 1♂ deposited at UB): USA: "1♀, Francis Beidler For., 20km NE Harleyville, Dorchester Co., SC, FIT, 23.VI-6.VIII.1987: collector unknown". COSTA RICA: "1♀ and 1♂, Volcán Brava, 2400m, 6.IX.1986: L. Masner leg"; "1♀, Cerro de la Muerte, San José, 3200m, FIT, 7-9.VI.1996: Ashe and R. Brooks leg". COLOMBIA: "1♂, Lagunillas, Iguaque SFF, Boyacá, 5º25'N, 73º27'W, 3380m, MT, 9-28.III.2001: P. Reina leg"; "1♀, Cabaña Carrizal, Iguaque SFF, Boyacá, 5º25'N, 73º27'W, 2850m, MT, 28.VI-18.VII.2001: P. Reina leg"; "1♂, Cabaña Los Cedros, Cueva de los Guácharos Nat. Pk., Huila, 1º37'N, 76º6'W, 2100m, MT, 4-18.II.2002: C. Cortés leg"; "1♂, Sector La Romelia, Munchique Nat. Pk., Huila, 2º38'N, 76º54'W, 2640m, MT, 9-24.V.2004: H. Pino leg". BOLIVIA: "1♀, Incacha, Cochabamba, 25-31.VIII.1958: L.E. Peña leg"; "4♂, Yungas, Chapare, 2200m, 28.I.1976: L.E. Peña leg"

Description.

Length. Body: 3-3.2 mm. Antennae: 2.4-2.8 mm (♀), 3.3-3.5 mm (♂). Wings: 2.7-3.2 mm.

Coloration. Head, mesosoma and metasoma black. Mandibles yellowish brown with darker teeth. Antennae yellowish brown with darker first segment. Legs yellowish brown with darker coxae. Veins of wings brownish.

Head. Strongly triangular-shaped in anterior view (Fig. 1a, 1b). Face smooth, covered with sparce white setae. Width of head 1.9 times its length in dorsal view, head as wide as high in anterior view. Malar area smooth and glabrous. Transfacial line as long as compound eye height.

Diameter of toruli larger than inter-toruli distance and torulus to compound eye distance. Clypeus smooth, glabrous and shortly convex, almost unnoticeable. Occipital and postocular carinae absents. Compound eyes glabrous. POL:OOL:LOL ratio = 5:6:2 in both sexes, ocelli diameter being 2. Frons and gena smooth, shiny and glabrous; occiput smooth and shiny with sparse setae.

Antennae. Cylindrical flagellomeres covered with pubescence. Female antennal formula: 9(3), 4(3), 13(2.5), 11(2.5), 10(2.5), 10(2.5), 9(2.5), 9(3), 8.5(3), 8(3), 7(3), 6(3), 8(3). Male antennal formula: 9(3.5), 4.5(3), 14(3), 12(3), 11(2.5), 11(2.5), 10.5(2.5), 10(2.5), 9(2.5), 8(2.5), 8(2.5), 8(2.5), 8(2.5), 9(2). Placodeal sensilla starting at F1 in females but scarce; abundant from F2; in males, starting at F1 and abundant in all flagellomeres.

Mesosoma. Pronotum alutaceous and pubescent, with oblique carinae in its lower region which can be effaced in some specimens; glabrous, smooth and shiny close to tegula. Mesoscutal width 1.3 times its length in dorsal view. Mesoscutum smooth and shiny; almost glabrous except for a few setae. Notauli complete with transverse carinate sculpture; median mesoscutal furrow short and tenuous. Lateral mesoscutum smooth and punctate; parapsidal signum absent; parascutal sulcus only present in anterior mesoscutum and internally carinate. Scutellar length 0.7 times mesoscutum length in dorsal view. Scutellum smooth and shiny. Scutellar foveae rounded, big and smooth, basally defined by carina; lateral pits of the scutellar foveae present but weakly excavated. Interfoveal line present. Circumscutellar carina complete and clearly defined, dorsally projected at scutellar apex. Mesopleuron smooth, glabrous and shiny, with internally carinate transverse groove. Mesopleural triangle smooth and glabrous, with some internal vertical carinae. Propodeum smooth and heavily pubescent, divided in large cells; central area divided into two clearly defined large superior cells by longitudinal carina and some less-defined smaller lower cells.

Forewings. Pubescent. Radial cell of fore wing closed, 3.0-3.2 times longer than wide. Marginal pubescence of fore wing denser at apical third.

Metasoma. Longer than head + mesosoma. Petiole between 2.0 to 2.5 times as long as

metacoxa, smooth and shiny. Third metasomal tergum 2.0 times longer than fourth tergum in dorsal view. Fifth, sixth and seventh metasomal terga visible in dorsal view. Metasomal terga smooth and glabrous, punctate in anterior region of each tergum, more distinct from T4 to T7.

Etymology. The specific name makes reference to the similarity of the head in anterior view to those of Mantodea, with compressed malar area and elongated head, a character that easily distinguishes this species from other *Anacharis* species.

Biology. Unknown.

Distribution. Nearctic and Neotropical. Recorded from Bolivia, Colombia, Costa Rica and South Carolina (USA).

Anacharis marginata Provancher, 1889

(Figures 1c, 3a, 3b)

Anacharis marginata Provancher, 1889: 168 (male)

Acothyreus mellipes Provancher, 1889: 438 (male) **n. syn.**

Anacharis mellipes; Restrepo-Ortiz and Pujade-Villar, 2010b: 435-436 (male)

Anacharis levifrons Kieffer, 1907: 143 (female) **n. syn.**

Aegilips nevadensis Kieffer, 1908: 57-58 (male) **n. syn.**

Anacharis flavicornis Kieffer, 1909: 80 (male) **n. syn.**

Diagnosis. Species with strongly alutaceous scutellum, lightly sculptured mesoscutum and coriaceous malar , characters also present in *A. melanoneura.* Despite also having complete and internally carinate notauli like *A. melanoneura,* it can be distinguished because those same notauli being more tenuous and having weak internal carinae - in some specimens, notauli are so weak they are difficult to distinguish in its anterior third – and a short petiole barely exceeding metacoxa total

length (notauli always strongly excavated and carinate, while petiole twice as long as metacoxa in *A. melanoneura*).

Type material of *Anacharis marginata.* Lectotype ♂ deposited in UL with the following labels: "*Anacharis marginata* Provancher" (white label); "Lectotype 38 *Anacharis marginata* Provancher; Comeau, 1941" (red label); "Lectotype 1318 *Anacharis marginata* Provancher; Grahan and Rohwer 1915; Barron, 1971" (red label).

Type material of *Anacharis mellipes.* Lectotype ♂ deposited in UL with the following labels: "*Acothyreus mellipes* Provancher" (white label); "Lectotype 5 *Acothyreus mellipes* Provancher; Comeau, 1941" (red label); "Lectotype 1320 *Acothyreus mellipes* Provancher; Grahan and Rohwer 1915; Barron, 1971" (red label); *"Anacharis mellipes* ♂ (Provancher, 1888), det. J.P-V" (white label); "*Anacharis marginata* Provancher, 1889, det. Mata-Casanova 2016" (white label).

Type material of *Anacharis levifrons.* Holotype ♂ deposited in CAS with the following labels: "Jeannette, PA. H. G. Klages" (white label); "*Anacharis levifrons* Kieffer" (red label); "California Academy of Sciences, Type no. 10553" (white label); "*Anacharis marginata* Provancher, 1889, det. Mata-Casanova 2016" (white label).

Type material of *Aegilips nevadensis.* Holotype ♂ deposited in CAS with the following labels: "Ormsby Co., NE, July. Baker" (white label); "*Aegilips nevadensis* Kieffer" (red label); "California Academy of Sciences, Type no. 10564" (white label); "*Anacharis marginata* Provancher, 1889, det. Mata-Casanova 2016" (white label).

Type material of *Anacharis flavicornis*. Holotype ♂ deposited in CAS with the following labels: "*Anacharis flavicornis*" (white label); "California Academy of Sciences, Type no. 10533" (white label); "*Anacharis marginata* Provancher, 1889, det. Mata-Casanova 2016" (white label).

Additional material (246♀ and 182♂). CANADA: "1♀, Aylmer, QC, 8.VIII.1924: C.H. Curran

leg"; "1♀, Dunrobin, ON, 24.VIII.1924: H.R. Viereck leg"; "1♂, Vineland, ON, 2.VI.1928: W. Putman leg"; "1♀, Chathan, ON, 8.VII.1928: A.B. Baird leg"; "1♂, Miner's Bay, ON, 26.V.1931: G.S. Walley leg"; "1♀, Belleville, ON, 10.VI.1932: Wooler leg"; "1♂, Mine Hedley Nat. Prk., BC, 7.VIII.1934: A.N. Gartrell leg"; "1♂, Blueberry Cr., Castlegard Dist., BC, 10.VIII.1943: F.I. Survey leg"; "1♀, Weston Lake, Salt Spring Is., BC, 21.VII.1945: F.I. Survey leg"; "1♂, Robson, BC, 29-30.VI.1947: H.R. Foxlee leg"; "1♂, Eton, NB, 13.VII.1947: N.R. Brown leg"; "1♀ and 1♂, Ottawa, ON, 23.VIII.1947: O. Peck leg"; "2♀, Robson, BC, 17.IX.1947: H.R. Foxlee leg"; "1♀, Robson, BC, 1-30.V.1947: H.R. Foxlee leg"; "4♀, Cultus Lake, BC, 1.VII.1948: H.R. Foxlee leg"; "1♀, Cultus Lake, BC, 13-17.VII.1948: H.R. Foxlee leg"; "1♀, Robson, BC, 20-30.V.1949: H.R. Foxlee leg"; "2♀, Robson, BC, 21.VII-8.VIII.1949: H.R. Foxlee leg"; "1♀, Robson, BC, 1-10.VIII.1949: H.R. Foxlee leg"; "1♀, Robson, BC, 8-24.VIII.1949: H.R. Foxlee leg"; "1♀, Robson, BC, 13-31.VIII.1949: H.R. Foxlee leg"; "3♀, 26-31.VIII.1949: H.R. Foxlee leg"; "1♀, Robson, BC, 3.IX.1949: H.R. Foxlee leg"; "1♀, Robson, BC, 2-24.IX.1949: H.R. Foxlee leg"; "1♀, Robson, BC, 26.VI.1950: H.R. Foxlee leg"; "1♀, Lac Brule, QC, 3.VII.1950: O. Peck"; "1♂, Dowe's S., ON, 1.VI.1951: J.F. McAlpine leg"; "1♀, Ennotville, ON, 5.VII.1951: collector unknown"; "1♀,Lac Mondor, Ste. Flore, QC, 6.VII.1951: E.G. Munroe leg"; "1♂, Rampart House, YT, 6.VII.1951: J.E.H. Martin leg"; "1♂, Singhampton, ON, 14.VIII.1951: collector unknown"; "1♂, Maromora, ON, 19.V.1952: J.R. Vockeroth leg"; "1♂, Robson, BC, 24.V.1952: H.R. Foxlee leg"; "1♀, Robson, BC, 1.VI.1952: H.R. Foxlee leg"; "1♀, Sawler, NS, 9.VII.1952: K.H. Sanford leg"; "1♀, Belleville, ON, 18.VII.1952: J.C. Martin leg"; "1♂, Ottawa, ON, 7.VIII.1952: J.F. McAlpine leg"; "1♀, Marmora, ON, 8.VIII.1952: J.F. MacAlpine leg"; "1♂, Chatterton, ON, 25.VIII.1952: J.C. Martin leg"; "1♀, Marmora, ON, 26.VIII.1952: C. Boyle leg"; "1♂, Cap Rouge, QC, 3.VI.1953: O. Peck leg"; "1♂, Duchesnay, QC, 5.VII.1957: O. Peck leg"; "1♂, Cap Rouge, QC, 3.VIII.1953: O. Peck leg"; "1♂, Diamond Hd. Trail, Garibaldi Pk., BC, 3400-400ft, 17.VIII.1953: G.J. Spencer leg"; "1♀, Diamond Head Trail, Squamish, BC, 3200ft, 26.VIII.1953: W.R.M. Mason leg"; "1♀,

Saanich, BC, 20.X.1953: O. Peck leg"; "1♀, Harrington Lake, Gatineau Pk., QC, 20.VI.1954: J.E.H. Martin leg"; "1♀, Francford, ON, 23.VI.1954: John C. Martin leg"; "1♀, Cascapedia, QC, 5.VIII.1954: J.E.H. Martin leg"; "1♀, Hebron, NL, 9.VIII.1954: J.F. McAlpine leg"; "4♂, Rondeau Prk., ON, 10.IX.1954: W.R.M. Mason leg"; "1♀, Brighton, ON, 24.IX.1954: J.C. Martin leg"; "1♂, Brighton, ON, 18.V.1955: J.C. Martin leg"; "1♀, Brighton, ON, 28.V.1955: A.P. Arthur leg"; "1♀ and 1♂, Brighton, ON, 15.VI.1955: A.P. Arthur leg"; "1♂, Cap Rouge, QC, 3.VIII.1955: O. Peck leg"; "1♀, Scandia, AB, 26.VI.1956: O. Peck leg"; "1♀, Parke Reserve, Kam. Co., QC, 950ft, 7.VIII.1957: W.R.M. Mason leg"; "5♀, Parke Reserve, Kam. Co., QC, 12.VII.1957: G.E. Shewell leg"; "2♀, Parke Reserve, Kam. Co., QC, 950ft, 10.VIII.1957: W.R.M. Mason leg"; "1♂, Parke Reserve, Kam. Co., QC, 950ft, 14.VIII.1957: W.R.M. Mason leg"; "1♂, Parke Reserve, Kam. Co., QC, 950ft, 15.VIII.1957: W.R.M. Mason leg"; "1♂, Parke Reserve, Kam. Co., QC, 950ft, 23.VIII.1957: W.R.M. Mason leg"; "1♂, Ancaster, ON, 1.IX.1957: J.E.H. Martin leg"; "1♀ and 4♂, Mt. Pleasant, ON, 10.VII.1958: L.A. Kelton leg"; "1♂, Tillsonburg, ON, 11.VII.1958: L.A. Kelton leg"; "1♂, Shawville, QC, 6.VIII.1958: L.A. Kelton leg"; 1♂, Summit L., mi 392 Alaska Hwy, BC, 2-4.VII.1959: R.E. Leech leg"; "1♂, Summit L., mi 392 Alaska Hwy, BC, 6.VII.1959: E.E. MacDougall leg"; "1♂, Summit L., mi 392 Alaska Hwy, BC, 7.VII.1959: E.E. MacDougall leg"; "1♂, Summit L., mi 392 Alaska Hwy, BC, 28.VII.1959: E.E. MacDougall leg"; "1♀, Summit L., mi 392 Alaska Hwy, BC, 31.VII.1959: E.E. MacDougall leg"; "1♀, Rougemont, QC, 4.VIII.1959: E.J. LeRoux leg"; "1♀, Little Salmon L., YT, 62°10'N, 134°40'W, 9.VIII.1959: R.E. Leech leg"; "1♀, Chimo, QC, 17-18.VIII.1959: W.R.M. Mason leg"; "1♀, Ottawa, ON, 2.IX.1959: J.R. Vockeroth leg"; "1♀, Ottawa, ON, 21.IX.1959: S.M. Clark leg"; "1♂, Terrace, BC, 11.VI.1960: J.G. Chillcott leg"; "1♀, Terrace, BC, 5.VIII.1960: W.R. Richards leg"; "1♂, Old Chelsea, QC, 13.VI.1961: J.R. Vockeroth leg"; "1♂, Jumping Pd. Cr., 20 mi W Calgary, 28.VI.1962: W.R.M. Mason leg"; "1♂, 4mi NW of Old Chelsea, Gatineu Pk., QC, 6.VIII.1961: H.E. Mirillon leg"; "2♂, Old Chelsea, QC, 30.VIII.1962: J.R. Vockeroth leg"; "1♂, Rollet, QC, 15.VIII.1963: W. Gagne leg"; "1♀, Shelburne,

NS, 13.IX.1965: R.C. Clark leg"; "1♀, Mt. Ste Marie, Low, QC, 1800ft, 20.IX.1965: J.R. Vockeroth leg"; "1♂, Stirling surr., ON, II.1966: L. Masner leg"; "1♀ and 3♂, Kashwakamak Lake, ON, V.1966: L. Masner leg"; "1♀, Kovaluk River, NT, MT, 2-6.VII.1971: W.R.M. Mason leg"; "1♂, 20mi E Tuktoyakluk, NT, 3-6.VII.1971: W.R.M. Mason leg"; "1♂, Kovaluk River, NT, MT, 6-10.VII.1971: W.R.M. Mason leg"; "1♀, Lac Chicobi, QC, MT, 19.VIII.1971: A. Saube leg"; "1♀ and 1♂, Dundas, ON, 7-11.VIII.1972: D.M. Wood leg"; "2♂, Point Grey, Vancouver, BC, V.1973: J.R. Vockeroth leg"; "1♂, Aylmer West, ON, MT, 13.VI.1973: collector unknown"; "1♂, Constance Bay, ON, 17-21.IX.1973: L. Masner leg"; "1♂, Grenadier Is., St. Lawrence Is. Nat. Pk., ON, 4.VI.1975: E. Sigler leg"; "1♂, McDonald Is., St. Lawrence Is. Nat. Pk., ON, 21.VII.1976: A. Carter leg"; "2♀, Thwartay Is., St. Lawrence Is. Nat. Pk., ON, 22.VII.1976: W. Reid leg"; "1♀, Thwartay Is., St. Lawrence Is. Nat. Pk., ON, 30.VII.1976: W. Reid leg"; "1♂, McDonald Is., St. Lawrence Is. Nat. Pk., ON, 11.VIII.1976: A. Carter leg"; "1♂, Thwartay Is., St. Lawrence Is. Nat. Pk., ON, 15.VIII.1976: W. Reid leg"; "1♂, McDonald Is., St. Lawrence Is. Nat. Pk., ON, 16.VIII.1976: A. Carter leg"; "1♂, McDonald Is., St. Lawrence Is. Nat. Pk., ON, 17.VIII.1976: W. Reid leg"; "1♂, St. Anne de Belleuve, Montreal, QC, 20.VIII.1976: R.L. Manel leg"; "1♂, McDonald Is., St. Lawrence Is. Nat. Pk., ON, 21.VIII.1976: A. Carter leg"; "1♂, Mermaid Is., St. Lawrence Is. Nat. Pk., ON, 21.VIII.1976: W. Reid leg"; "1♂, McDonald Is., St. Lawrence Is. Nat. Pk., ON, 22.VIII.1976: A. Carter leg"; "4♂, McDonald Is., St. Lawrence Is. Nat. Pk., ON, 23.VIII.1976: A. Carter leg"; "1♂, Thwartay Is., St. Lawrence Is. Nat. Pk., ON, 24.VIII.1976: W. Reid leg"; "1♂, McDonald Is., St. Lawrence Is. Nat. Pk., ON, 25.VIII.1976: A. Carter leg"; "3♂, McDonald Is., St. Lawrence Is. Nat. Pk., ON, 27.VIII.1976: A. Carter and W. Reid leg"; "1♂, St. Anne de Belleuve, Montreal, QC, 27.VIII.1976: R.L. Manel leg"; "1♂, McDonald Is., St. Lawrence Is. Nat. Pk., ON, 28.VIII.1976: W. Reid leg"; "1♂, McDonald Is., St. Lawrence Is. Nat. Pk., ON, 29.VIII.1976: W. Reid leg"; "1♂, McDonald Is., St. Lawrence Is. Nat. Pk., ON, 30.VIII.1976: W. Reid leg"; "2♂, McDonald Is., St. Lawrence Is. Nat. Pk., ON, 4.IX.1976: W. Reid leg"; "2♀,

McDonald Is., St. Lawrence Is. Nat. Pk., ON, 6.IX.1976: W. Reid leg"; "1♂, McDonald Is., St. Lawrence Is. Nat. Pk., ON, 9.IX.1976: W. Reid leg"; "5♂, Thwartay Is., St. Lawrence Is. Nat. Pk., ON, 7.IX.1976: W. Reid leg"; "1♀ and 6♂, Thwartay Is., St. Lawrence Is. Nat. Pk., ON, 9.IX.1976: W. Reid leg"; "1♂, Thwartay Is., St. Lawrence Is. Nat. Pk., ON, 10.IX.1976: W. Reid leg"; "1♂, McDonald Is., St. Lawrence Is. Nat. Pk., ON, 11.IX.1976: W. Reid leg"; "1♀ and 1♂, McDonald Is., St. Lawrence Is. Nat. Pk., ON, 13.IX.1976: W. Reid leg"; "3♂, Thwartay Is., St. Lawrence Is. Nat. Pk., ON, 14.IX.1976: W. Reid leg"; "1♀, McDonald Is., St. Lawrence Is. Nat. Pk., ON, 28.IX.1976: W. Reid leg"; "1♂, St. Anne de Belleuve, Montreal, QC, 2.X.1976: R.L. Manel leg"; "1♀, Mulcaster Is., St. Lawrence Is. Nat. Pk., ON, 5.X.1976: W. Reid leg"; "1♀, Kouchibouguac Nat. Pk., NB, 23.VII.1977: S.J. Miller leg"; "1♀, St. Anne de Belleuve, Montreal, QC, VII.1977: R.L. Manuel leg"; "1♂, Kouchibouguac Nat. Pk., NB, 3.VIII.1977: S.J. Miller leg"; "1♀, Kouchibouguac Nat. Pk., NB, 16.VIII.1977: S.J. Miller leg"; "14♀ and 1♂, Kouchibouguac Nat. Pk., NB, 23.VIII.1977: S.J. Miller leg"; "2♀, Kouchibouguac Nat. Pk., NB, 24.VIII.1977: S.J. Miller leg"; "2♀, Kouchibouguac Nat. Pk., NB, 28.VIII.1977: S.J. Miller leg"; "1♀ and 1♂, Kouchibouguac Nat. Pk., NB, 30.VIII.1977: S.J. Miller leg"; "3♀, Kouchibouguac Nat. Pk., NB, 7.IX.1977: S.J. Miller leg"; "15♀ and 3♂, Kouchibouguac Nat. Pk., NB, 20.IX.1977: S.J. Miller leg"; "2♀, Kouchibouguac Nat. Pk., NB, 24.VIII.1978: S.J. Miller leg"; "1♂, Ranger Stn., Livingstone, AB, VI.1980: M. Sanborne leg"; "1♂, Hamilton, ON, 9-18.VII.1980: M. Sanborne leg"; "1♀, Ottawa, ON, 4.VIII.1982: A. Sauve leg"; "2♂, Middle Head, NS, 24.VI.1983: J.R. Vockeroth leg"; "1♂, James Bay Hwy km 66, QC, 4-12.VI.1987: L. LeBlanc leg"; "4♀, Boyar Lake to Strikine R., Cassiar Hwy., BC, 5.VIII.1988: Peck leg"; "1♀, Ottawa, ON, MT, 18-25.VIII.1989: H. Goulet leg"; "1♀, Pine Gleen, Nepean, Ottawa, ON, FIT, 27.VIII-1.X.1994: L. Masner leg"; "1♂, Port Hope, ON, 21.V.1995: collector unknown"; 1♂, Ottawa, ON, 1.VI.1995: collector unknown"; "1♀, Noubar Bostonian Orchard, Frelighsburg, QC, 22.VIII.1995: collector unkown", "1♀, Johnston Canyon, AB, 4700ft, collecion date unkown: K.C. Hermann leg". USA: "1♀ and 1♂,

Wayne Co., NY, 30.V.1947: collector unknown"; "1♂, Ithaca, NY, 10.VIII.1947: collector unknown"; "1♂, Richard Hwy mi 250, AK, 25.VI.1951: W.R.M. Mason leg"; "1♂, Shaw Crk., mi 289 Rich. Hwy, AK, 28.VI.1951: Mason and McGillis leg"; "2♀, Isabella Pass, Summit Lake, AK, 9.VII.1951: Mason and McGills leg"; "2♀, Isabella Pass, Summit Lake, AK, 1.VIII.1951: W.R.M. Mason leg"; "1♀ and 1♂, Paxton Lodge, Gulkana, AK, 4.VIII.1951: W.R.M. Mason leg"; "1♂, Naknek, AK, 2.VIII.1952: W.R.M. Mason leg"; "1♂, King Salmon, Naknek R., AK, 10.VIII.1952: W.R.M. Mason leg"; "1♂, Orlando, FL, 29.III.1953: W.R.M. Mason leg"; "1♀, Cedar Swamp, Champaign Co., OH, 18.V.1954: E.L. Sleeper leg"; "7♀ and 1♂, Lakes of the Clouds, Mt. Washington, NH, 5000ft, 1.VIII.1954: Becker, Munroe and Mason leg"; "2♀, cow pasture, Tell Rd., Mt. Washington, NH, 5700ft, 2.VIII.1954: Becker, Munroe and Mason leg"; "2♀, Lakes of the Clouds, Mt. Washington, NH, 5000ft, 7.VIII.1954: Becker, Munroe and Mason leg"; "11♀, Alpine Garden, Mt. Washington, NH, 5200-5600ft, 7.VIII.1954: Becker, Munroe and Mason leg"; "2♀, Summit Flats, Mt. Washington, NH, 5900-6200ft, 7.VIII.1954: Becker, Munroe and Mason leg"; "6♀, Oakes Gulf, Mt. Washington, NH, 4700-5000ft, 8.VIII.1954: collector unkown"; "48♀, Lakes of the Clouds, Mt. Washington, NH, 5000ft, 9.VIII.1954: Becker, Munroe and Mason leg"; "1♀, Staunton, VA, 2.V.1957: J.R. Vockeroth leg"; "1♂, Clingman's Dome, Gr. Smoky Mts. Nat. Pk., NC, 6300-6642 ft, 28.V.1957: J.R. Vockeroth leg"; "1♂, Highlands, NC, 3800ft, 16.VI.1957: W.R.M. Mason leg"; "1♀, Alpine Gardens, Mt. Washington, NH, 1650m, VII.1958: J.R. Vockeroth leg"; "4♀, Mt. Washington, NH, 14.VIII.1958: J.R. Vockeroth leg"; "1♀, Lake Junaluska, Haywood Co., NC, 21.VIII.1969: H.V. Weems leg"; "1♂, Unalakleet, AK, 14.VI.1961: R. Madge leg"; "5♂, Unalakleet, AK, 20.VI.1961: R. Madge leg"; "3♂, Unalakleet, AK, 5.VII.1961: B.S. Hemming leg"; "2♂, Unalakleet, AK, 15.VII.1961: B.S. Hemming leg"; "2♂, Benzie Co., MI, VII.1967: B. Carlson leg"; "1♂, Deering, AK, MT, 8-19.VIII.1968: J. Matthews leg"; "3♀ and 2♂, Ann Arbor, MI, IX-X.1975: M.G. Fitton leg"; "1♀ and 1♂, Ann Arbor, MI, VIII.1976: Gould leg"; "5♀, Cantwell, Denali, AK, 2300-300ft, 24.VII.1984: S. and J. Peck"; "1♀, Van Trump Pk., Rainier Nat.

Pk., WA, 1500-1800m, 29.VII.1985: L. Masner leg"; "1♀, McDowell Co., NC, 9.VII-17.IX.1987: Brc. Hym, Team leg"; "1♂, Shenandoah Nat. Pk., Page Co., VA, 1300m, 8.VII.1987: L. Dumouhel leg"; "2♂, Compton Gap, Warren Co., Shenandoah Nat. Pk., VA, 11.VII-23.VIII.1987: BRC Hym. Team leg"; "2♂, Bid Meadow, Shenandoah Nat. Pk., VA, 1300m, MT, 20.VIII.1987: BRC Hym. Team leg"; "1♀, 4mi S Cuckoo, Lonisato, VA, MT, 15-25.IV.1988: J. Klone and D.J. Smith leg"; "1♀, nr Armandale, Fairfax Co., VA, MT, collection date unknown: D.R. Smith". MEXICO: "1♀, Chihuahua, Chihuahua, 24.IV.1985: A. González leg"

Redescription.

Length. Body: 2.6-3.0 mm. Antennae: 2.0 mm (♀), 2.2 mm (♂). Wings: 2.5-2.8 mm.

Coloration. Head, mesosoma and metasoma black. Mandibles yellowish brown with darker teeth. Antennae yellowish brown, first segment dorsally dark. Legs yellowish brown, darker metacoxa. Veins of wings yellow.

Head. Triangular-shaped in anterior view. Face smooth, covered with white setae. Width of the head 2 times its length in dorsal view and 1.3 its height in anterior view. Malar area coriaceous, 0.6-0.7 times of compound eye height. Transfacial line length equal to compound eye height. Diameter of the toruli equal or slightly larger than inter-toruli and torulus to compound eye distances. Occipital and postocular carinae absents. Compound eyes glabrous. In males, POL:OOL:LOL ratio = 7:5:3 in males, ocelli diameter being 3; in females, POL:OOL:LOL ratio = 8:5:3.5 in males, ocelli diameter being 2.5. Frons, gena and occiput smooth, shiny and glabrous except for a few sparse setae.

Antennae. Cylindrical flagellomeres covered with pubescence. Female antennal formula: 8(3), 3.5(2.5), 7.5(2), 7.5(2), 7.5(2), 7(2), 6.5(2), 6.5(2). 6(2), 6(2.5), 5.5(2.5), 5.5(2.5), 11(2.5). Male antennal formula: 8(4), 4(3), 10(3.5), 10(3), 10(3), 9(2.5), 9(2.5), 9(2.5), 9(5), 8.5(2), 8(2), 8(2), 7.5(2), 9(2). Placodeal sensilla start at F1 in males; in females starting at F3 but not abundant

until F4.

Mesosoma. Pronotal plate smooth. Pronotum heavily punctate and pubescent, transversely carinate in its lower region. Mesoscutal width 1.1-1.2 times its length in dorsal view. Mesoscutum shiny and almost glabrous except for a few setae; smooth (Fig. 3a) to softly carinate between notauli (Fig. 3b). Notauli complete, usually tenuous in anterior mesoscutum (Fig. 3a); presence of internal carinae with a wide range of variability regarding its extension and percurrence (Fig. 3a, 3b); median mesoscutal furrow short. Mesoscutum overall rugosity variable. Lateral mesoscutum smooth and punctate; parapsidal signum lightly defined; parascutal sulcus absent, presence of coarse band instead. Scutellar length 0.6 times of mesoscutum length in dorsal view. Scutellum strongly areolate (Fig. 3a, 3b). Scutellar foveae triangular-shaped and alutaceous, narrower next to interfoveal line and basally defined by a carina; lateral pits of scutellar foveae present but not deeply excavated. Interfoveal line present. Circumscutellar carina complete and clearly defined, dorsally projected at scutellar apex. Mesopleuron smooth, glabrous and shiny, with internally carinate transverse groove; presence of internally carinate groove along anterior margin of mesopleuron and coriaceous sculpture in upper anterior mesopleuron. Mesopleural triangle alutaceous and scarcely pubescent. Metanotal troughs coarsely sculptured and pubescent. Propodeum coriaceous and pubescent, divided in large cells; central median cell glabrous, longitudinally divided in smaller cells, while lower propodeum divided by a longitudinal carina.

Forewings. Pubescent. Radial cell of fore wing closed, 2.6-2.7 times longer than wide. Marginal pubescence of fore wing denser at apical third.

Metasoma. As long as head + mesosoma, sometimes slightly longer. Petiole from 1 to 1.3 times longer than metacoxa, smooth and shiny. Third metasomal tergum 2 to 2.3 times longer than fourth tergum in dorsal view. Fifth, sixth and seventh metasomal terga visible in dorsal view. Metasomal terga smooth and glabrous, not punctate.

Biology. One female and one male were collected from a *Hemerobius humulinus* Linnaeus,

1758 cocoon, while another female was collected from a cocoon belonging to an undetermined species of *Micromus* Rambur, 1842. One female and two more males were collected from cocoons of an unknown hemerobiid.

Distribution. Nearctic. Known from Canada: Quebec (Provancher, 1887); United States: Pennsylvania (Kieffer, 1907) and Wisconsin (Kieffer, 1909). First record Mexico (Chihuahua); also for Alberta, British Columbia, New Brunswick, Newfoundland and Labrador, Northwest Territories, Nova Scotia and Ontario (Canada), and Alaska, Florida, Michigan, New Hampshire, New York, North Carolina, Ohio and Virginia (USA).

Comments. Regarding the type material of *A. mellipes,* Provancher mentioned the specimen being a female. However, when examining it, we realized Provancher's sex determination was incorrect and the specimen is a male.

Anacharis nevadensis was originally included in the genus *Aegilips* by Kieffer. However, the holotype revealed to present the transverse and internally carinate mesopleural groove exclusive from the genus *Anacharis*. This, among other morphological features such as the relative size of the second and third metasomal tergites (in the range of *Anacharis* proportions), has convinced us to transfer this species from the genus *Aegilips* to *Anacharis.*

The designation *A. marginata* covers a wide range of mesoscutal sculpture variability. On one side of the spectrum, we find those specimens close to the *A. levifrons* type: the notauli are weak and superficial, not strongly excavated and almost disappear in the anterior third of the mesoscutum; the entire mesoscutum surface is smooth and shiny, with only a weak carinate sculpture inside the notauli that spills over the edges of the notauli. On the other side, we can see those specimens closer to the *A. nevadensis* type, which present a strongly alutaceous mesoscutum with some transverse carinae and a deeply excavated notauli with strong internal notauli. There is a wide range between both extremes of the series among the rest of the specimens placed under the denomination *A. marginata*, which leads us to the assumption that it is a species with a large

intraspecific diversity regarding the mesoscutum sculpture.

Anacharis melanoneura Ashmead, 1887

(Figures 2c, 2d)

Anacharis melanoneura Ashmead, 1887: 158 (male)

Diagnosis. Species with elongated petiole, complete internally carinate notauli and coriaceous malar area, characters shared with *A. tripartita*. However, *A, melanoneura* presents a strongly areolate scutellum, and coriaceous microsculpture in the mesoscutum and anterior mesopleuron (scutellum alutaceous to slightly carinate in *A. tripartita,* never areolate; coriaceous sculpture in mesoscutum and anterior mesopleuron, when present, very reduced).

Type material of *Anacharis melanoneura.* Holotype ♂ deposited in USNM with the following labels: "Jacksonville, FLA" (white label); "Type no. 23604, USNM" (red label), "*Anacharis melanoneura*, Ashmead" (white label).

Additional material (191♀ and 211♂). CANADA: "1♀, Victoria, BC, 21.VI.1928: W. Downes leg"; "1♂, Berthierville, QC, 15.VIII.1939: L. Daviault leg"; "1♀, Robson, BC, 15-31.VIII.1944: H.R. Foxlee leg"; "1♀, Edmonton, AL, 24.VI.1946: W.R.M. Mason leg"; "1♀, Robson, BC, 2.IX.1947: H.R. Foxlee leg"; "1♂, Wayne Co., NY, 30.V.1947: collector unknown"; "1♂, Robson, BC, 13.VII.1947: H.R. Foxlee leg"; "1♀, Cultus Lake, BC, 1.VII.1948: H.R. Foxlee leg"; "2♂, Norman Wells, NT, 9.VII.1949: W.R.M. Mason leg"; "1♀, Robson, BC, 1-5.VIII.1949: H.R. Foxlee leg"; "1♀, Robson, BC, 23.VIII.1949: H.R. Foxlee leg"; "1♀, Gt. Whale R., QC, 29.VIII.1949: J.R. Vockeroth leg"; "1♀, Alfred, ON, 4.VII.1950: O. Peck leg"; "1♂, Ottawa, ON, 14.VIII.1950: D.W.

Peters leg"; "1♀, McMurray, AB, 10.VIII.1953: G.E. Ball leg"; "2♀ and 3♂, McMurray, AB, 10.VIII.1953: G.E. Ball leg"; "1♀, Diamond Head Trail, Squamish, BC, 3200ft, 26.VIII.1953: W.R.M. Mason leg"; "1♂, Gartrell's orchard, Summerland, BC, 17.IX.1953: J.H. McLeod leg"; "1♀, Constance Bay, ON, 14.VI.1954: T.N. Freeman leg"; "1♀, Hebron, Labrador, NF, 16.III.1954: J.F. McAlpine leg"; "1♂,Constance Bay, ON, 24.VI.1954: T.N. Freeman leg"; "1♂, Atlin, BC, 20.VI.1955: H. Huckel leg"; "1♂, Midland, ON, 24.VIII.1955: J.G. Chillcott leg"; "1♂, Waterton, AB, 18.VI.1956: O. Peck leg"; "1♂, Ottawa, ON, 15.VII.1957: J.E.H. Martin leg"; "1♀, Parke Reserve, Kam Co., QC 950ft, 13.VIII.1957: W.R.Mason leg"; "3♂, Ottawa, ON, 25.V.1958: J.R. Vockeroth leg"; "1♂, Ottawa, ON, 26.V.1958: J.G. Chillcott leg"; "1♂, Mt. Pleasant, ON, 20.VII.1958: L.A. Kelton leg"; "1♂, White Lake, Oliver, BC, 23.V.1959: E.E. MacDougall leg"; "1♀, Summit Lake, Mi 392 alaska Hwy., BC, 4200ft, 19-21.VII.1959: R.E. Leech leg"; "1♀, Whitehorse, YT, 20.VIII.1959: R. Madge leg"; "1♀, Marmora area, ON, 21.VIII.1959: L.A. Kelton leg"; "1♂, Shames, 16mi SW Terrace, BC, 4.VI.1960: J.G. Chillcott leg"; "1♂, 32mi SW Terrace, BC, 8.VI.1960: C.H. Mann leg"; "1♂, Spring Creek, Terrace, BC, 11.VI.1960: C.H. Mann leg"; "1♀, 6mi E of Terrace, BC, 17.VI.1960: W.W. Moss leg"; "1♂, Cagnon Road, 6mi W of Terrace, BC, 220ft, 20.VI.1960: W.W. Moss leg"; "2♀, 32mi SW Terrace, BC, 5.VII.1960: B. Heming leg"; "3♀, Kleanza Creek, 14km E of Terrace, BC, 13.VII.1960: W.R. Richards leg"; "4♀, Terrace, BC, 2.VIII.1960: W.R. Richards leg"; "1♀, Terrace, BC, 19.VII.1960: J.G. Chillcott leg"; 1♀, Terrace, BC, 2.VIII.1960: W.R. Richards leg"; 1♀, Terrace, BC, 5.VIII.1960: W.R. Richards leg"; "1♂, Rounded Pk., ON, 27.VI.1961: Kelton and Brumpton leg"; "1♀, Vineland, ON, 4.V.1962: Kelton and Thorpe leg"; "2♂, Jumping Pd. Cr., 20mi W Calgary, AB, 3.VII.1962: W.R.Mason leg"; "1♀, Jumping Pd. Cr., 20mi W Calgary, AB, 19.VII.1962: W.R.Mason leg"; "1♀, Takhini Hot Springs, YT, 2400ft, 19.VIII.1962: P.J. Stisko leg"; "1♀, Rollet, QC, 15.VIII.1963: W. Gagne leg"; "1♂, Milkranch Cr., BC, 21.VIII.1963: collector unknown"; "1♀, Golden L., ON, 12.VIII.1965: McAlpine and Martin leg"; "1♀, Hixon, BC, 29.VII.1965: E.D.A. Dyer leg"; "1♀, Vineland, ON,

4.V.1967: Ketton and Thorpe leg"; "3♂, Old Chelsea, QC, 30.VIII.1967: J.R. Vockeroth leg"; "1♂, Kovolu KR, NT, MT, 2-6.VII.1971: N. R. M. Masner leg"; "1♂, Kovaluk River, NWT, 69°11'N 131°W, 6-10.VII.1971: W. R. M. Mason leg"; "1♂, Aylmer West, ON, MT, 8.VI.1973: collector unknown"; "1♂, Lac Chicobi, QC, MT, 17.VIII.1971: A. Sauvé leg"; "1♂, Stittsville, ON, 17-21.VIII.1976: M. Sanborne leg"; "1♀, St. Anne de Bellevue, Montreal, QC, 27.VIII.1976: R.L. Manuel leg"; "1♂, Thwartway Is., St. Lawrence Is. Nat. Park, ONT, 21.VIII.1976: A. Carter leg"; "1♂, McDonald Is., St. Lawrence Is. Nat. Park, ON, 27.VIII.1976: W. Reid leg"; "1♂, Thwartway Is., St. Lawrence Is. Nat. Park, ONT, 29.VIII.1976: A. Carter leg"; "1♂, Thwartway Is., St. Lawrence Is. Nat. Park, ONT, 30.VIII.1976: W. Reid leg"; "1♂, McDonals Is., St. Lawrence Is. Nat. Park, ONT, 4.IX.1976: W. Reid leg"; "1♂, Thwartway Is., St. Lawrence Is. Nat. Park, ONT, 5.IX.1976: W. Reid leg"; "1♂, Thwartway Is., St. Lawrence Is. Nat. Park, ONT, 7.IX.1976: W. Reid leg";"1♂, Thwartway Is., St. Lawrence Is. Nat. Park, ONT, 10.IX.1976: W. Reid leg"; "2♂, Thwartway Is., St. Lawrence Is. Nat. Park, ONT, 12.IX.1976: W. Reid leg";"1♂, Thwartway Is., St. Lawrence Is. Nat. Park, ONT, 14.IX.1976: W. Reid leg"; "2♂, Thwartway Is., St. Lawrence Is. Nat. Park, ONT, 21.IX.1976: G. Calderwood leg"; "3♂, McDonald Is., St. Lawrence Is. Nat. Park, ONT, 28.IX.1976: G. Calderwood leg"; "1♂, McDonald Is., St. Lawrence Is. Nat. Park, ONT, 1.X.1976: W. Reid leg"; "1♂, McDonald Is., St. Lawrence Is. Nat. Park, ONT, 6.X.1976: W. Reid leg"; "2♂, Constance Bay, Carleton Co., ON, 10.VIII.1977: M. Sanborne leg"; "1♀, Kouchibougac Nat. Park, NB, 3.VII.1977: S.J. Miller leg"; "1♂, Kouchibougac Nat. Park, NB, 20.IX.1977: S.J. Miller leg"; "1♂, Kouchibougac Nat. Park, NB, 16.VIII.1978: S.J. Miller leg"; "1♂, Kouchibougac Nat. Park, NB, 23.VIII.1977: S.J. Miller leg"; "1♀, Kouchibougac Nat. Park, NB, 25.VIII.1977: S.J. Miller leg"; "1♀ and 2♂, Kouchibougac Nat. Park, NB, 20.IX.1977: S.J. Miller leg"; "1♀, Ancastar bog, ON, 1-8.VIII.1984: B. de Jange leg"; "1♂, Ottawa, ON, MT, 25.V-1.VI.1986: H. Goulet leg"; "1♂, Ottawa, ON, MT, 6-17.VII.1986: H. Goulet leg"; 1♀, Dezandeash Lake, Haines Jet, YT, 700-900m, 2.VIII.1988: S. and J. Peck leg"; "3♂, Boyar Lake to Strikine R., Cassiar Hwy, BC, 5.VIII.1988:

Peck leg"; "1♂, Methley Beach, MB, 21.V.1989: R.G. Lowen leg"; "1♂, Ottawa, ON, MT, 12-19.VIII.1989: H. Goulet leg". USA: "1♀, Ithaca, NY, 9.VI.1947: W. Mason leg"; "1♂, Stenbenville, OH, 5.IX.1950: J.C. Martin leg"; "1♀, Shaw Crk., M 289 Rich. Hwy, AK, 28.VI.1951: Mason and Mcgillis leg" "1♀, Birch Lake, nr. Fairbanks, AK, 7.VII.1951: W.R.M. Mason leg"; "1♂, Gainesville, FA, 25.IV.1952: O. Peck leg"; "1♂, Shaw Crk., M 289 Rich. Hwy, AK, 11.VII.1952: Mason and Mcgillis leg"; "1♀ and 1♂, Paxton Lodge, Gulkana, AK, 4.VIII.1951: W.R.M. Mason leg"; "1♀, Naknek, AK, 2.VIII.1952: W.R. Mason leg"; "1♂, Naknek River, King Salmon, AK, 4.VIII.1952: J.B. Hartley leg"; "1♂, Naknek River, King Salmon, AK, 5.VIII.1952: J.B. Hartley leg"; "1♂, Cold Bay, AK, 13.VIII.1952: W.R. Mason leg"; "2♀, Naknek River, King Salmon, AK, 4.VIII.1952: J.B. Hartley leg"; "5♂, Orlando, FL, 29.III.1953: W.R.M. Mason leg"; "3♀, Hortense, GA, 5.IV.1953: J.C. Martin leg"; "1♀, Lakes of the Clouds, Mt. Washington, NH, 5000ft, 1.VIII.1954: Becker, Munroe and Mason leg"; "1♀, Lakes of the Clouds, Mt. Washington, NH, 5000ft, 6.VIII.1954: Becker, Munroe and Mason leg"; "1♀, Lakes of the Clouds, Mt. Washington, NH, 5000ft, 7.VIII.1954: Becker, Munroe and Mason leg"; "3♀, Summit Flats, Mt. Washington, NH, 5900-6200ft, 7.VIII.1954: Becker, Munroe and Mason leg"; "9♀ and 1♂, Lakes of the Clouds, Mt. Washington, NH, 5000ft, 9.VIII.1954: Becker, Munroe and Mason leg"; "2♀, Alpine Garden, Mt. Washington, NH, 5200-5600ft, 7.VIII.1954: Becker, Munroe and Mason leg"; "1♂, Apple Valley, CA, 15.V.1955: J.E.H. Martin leg"; "1♂, Sloansville, NY, 1.VII.1955: J.C. Martin leg"; "1♀, Pine Mountain, Rabun Co., GA, 1400ft, 15.V.1957: W.R.M. Mason leg"; "1♂, Panther Junction, Big Bend Nat. Park, TX, 3500-4000ft, 14.V.1959: W.R.M. Mason leg"; "1♀, Highlands, NC, 23.V.1957: W.R.M. Mason leg"; "1♀, Highlands, NC, 31.V.1957: W.R.M. Mason leg"; "1♀, Rabun Co., GA, 9.VIII.1957: J.G. Chillcott leg"; "1♀ and 6♂, Kerrville, TX, 13.IV.1959: W.R.M. Mason leg"; "1♀, Fredericksburg, TX, 18.IV.1959: W.R.M. Mason leg"; "1♀, Kerrville, TX, 4.V.1960: L.J. Bottimer leg"; "1♂, Chicago Cr., Clear Cr. Co., CO, 2.VIII.1961: W.R.M. Mason leg"; "1♂, Neotoma, Hockling Co., OH, 3.VI.1962: F.W. Mead leg"; "1♂, Gainesville, FL, 2.III.1966: F.W.

Mead leg"; "1♂, Ramsey Cyn., 15mi S Sierra Vista, Huachuca Mts., 6000ft, AZ, 30.VI.1967: Sternitzky leg"; "2♂, Benzie County, MI, VII.1967: B. Carlson"; "1♀, Gainesville, FL, MT, 22.IV.1968: H.V. Weems leg"; "1♀, Gainesville, FL, MT, 24.IV.1968: F.W. Mead leg"; "2♀ and 1♂, Ann Arbor, MI, IX-X.1975: M. G. Fitton leg"; "1♂, Gainesville, FL, 12.III.1977: L. Masner leg"; "3♂, South Meadows Camp, 7 mi. N. Woodland Park, Teller, CO, 21-28.VII.1977: S. Peck leg"; "2♀ and 5♂, Carrizo Arroyo, 20 min W Las Lances, Valencia Co, AZ, 1-23.VIII.1977: S. and J. Peck leg"; "1♀, Rd. to Rustler Park, Portal, AZ, 7.VIII.1977: L. Masner leg"; "1♀, Stockton, CA, 22.V.1981: Bouček"; "1♀, Mt. Washington, NH, 5500', 20.VIII.1981: H. Goulet leg"; "1♀ and 1♂, Coaloil Pt. Reserve, Santa Bárbara, CA, 22-29.VI.1982: K. Chaseman leg"; "2♀, 12mi NW Taft, Kern Co., CA, MT, 9-16.IV.1983: D.B. Wahl leg"; "1♀, Van Trump Park, Rainier Nat. Park, WA, 1500-1800m, 29.VII.1985: L. Masner leg"; "1♂, Alachua Co, FL, 14-16.IV.1986: Lev. Leg"; "2♀, Sapelo Island, GA, MT, 28.IV-9.V.1987: Shrus and Duner leg"; "2♀ and 6♂, 10 km NE Harleyville, Francis Beidler For., Dorchester Co., 1-9.V.1987"; "2♂, Tang Lewood Sprg., Pendleton, Anderson Co, SC, MT, 6.V.1987: J. Morse leg"; "1♂, Petleton, Anderson Co., SC, 250m, 1-7.VI.1987: J. Morse leg"; "2♀, Pendleton, Anderson Co, SC, 250m, MT, 6-10.VI.1987"; "4♀ and 4♂, ESE Simmier, San Luis Obispo Co, CA, 22-30.VI.1987: D.A. Wahl leg"; "1♀, Shenandoah Nat. Park, Page Co., VA, 1300m, 8.VII.1987: L. Du leg"; "1♂, Compton Gap, Shenandoah Nat. Park, Warren Co., VA, 800m, MT, 11.VII-23.VIII.1987: BRC Hym Team leg"; "1♂, Dowell Co., 37°N-81°30´W, MT, VII-IX.1987: CNC Hym. Team leg"; "8♂, McDowell Co., SC, 9.VII-17.IX.1987: BRC. Hym. Team leg"; "1♀, White face, Macon Co., NC, MT, 10.VII.1987: S. T. Huber leg"; "2♀, Big Meadow, Shenandoah Nat. Park, VA, 1300m, MT, 20.VIII.1987: BRC Hym Team leg"; "1♀, 8km NW Blacksburg, Montgomery Co., VA, MT, 12-24.X.1987"; "1♀, Williamsville, Wayne Co., MO, 20.IX-20.X.1988: J. T. Becker leg"; "1♂, Gainesville AE, Alachua Co., FL, 20.XI.1987-23.II.1988: D. Wahl leg"; "1♀, Big Bend Ranch, Presidio Co., TX, 29°29'N 103°48'W, MT, 28.X-1.XI.1989: D. Judd leg"; "1♀, Big Bend Ranch, Presidio Co., TX, 29°29'N 104°1'W, MT, 28.X-1.XI.1989: D.

Judd leg"; "1♀, 6mi SE Pozo, San Luis Obispo Co., CA, 1500ft, MT, 24.IV-4.V.1990: W.E. Wahl leg"; "1♂, J. D. Pinto, Agnew site, Clallam Co, WA, 25.VII.1990: S. S. Sal leg"; "1♀, Creek Canyon, South fork trailin Cave, Cochise Co., AZ, MT 31.V-2.VI.1991: J. E. O'Hara leg"; "4♀ and 23♂, Blackwater Draw nr. Portales, Roosevelt Co, NM, MT, 1-7.VI.1991: O'Hara and Jorgensen leg"; "5♀, Blackwater Draw nr. Portales, Roosevelt Co, NM, MT, 24-30.VI.1991: O'Hara and Jorgensen leg"; "1♀, Jacob Lake, Coconino Co., AZ, 16.VI.1993: J. D. Pinto leg"; "1♀, Patagonia, Sta. Cruz Co., AZ, MT, 16.I.1994: B. Brown and E. Wilk leg"; "3♀, Patagonia, Sta. Cruz Co., AZ, MT, 1.IV.1994: B. Brown and E. Wilk leg"; "18♀ and 3♂, Patagonia, Sta. Cruz Co., AZ, MT, 1-5.V.1994: B. Brown and E. Wilk leg"; "4♀ and 37♂, Patagonia, Sta. Cruz Co., 31°53'N 10°77'W, AZ, MT, 16.V.1994: B. Brown and E. Wilk leg"; "3♀, Patagonia, Sta. Cruz Co., AZ, MT, 14.VI.1994: B. Brown and E. Wilk leg"; "♀, Patagonia, Sta. Cruz Co., AZ, MT, 1-9.IV.1995: B. Brown and E. Wilk leg"; "4♀ and 3♂, Patagonia, Sta. Cruz Co., AZ, MT, 28.V.1995: B. Brown and E. Wilk leg"; "2♂, Patagonia, Sta. Cruz Co., AZ, MT, 9.VII.1995: B. Brown and E. Wilk leg"; "2♀, Patagonia, Sta. Cruz Co., AZ, MT, 5.VIII.1995: B. Brown and E. Wilk leg"; "1♀ and 4♂, Patagonia, Sta. Cruz Co., AZ, MT, 9.VIII.1995: B. Brown and E. Wilk leg"; "1♀, 8 km NW Black Sbeng, Montgomery Co., VA, MT, 24.X-8.XI.1997"; "1♀ and 1♂, Lexington, SC, 8-15.IV.2001: L. Masner leg". MEXICO: "2♀, Chihuahua, Chihuahua, 24.IV.1985: A. González leg"; "1♀ and 3♂, La Pastora, Guadalupe, Nuevo León, 26.IV.1987: A. González leg" DOMINICAN REPUBLIC: "1♂, Las Abejas, 60 km NW Cabo Rojo, Pedernales, 1200m, 30.XI.1991: L. Masner and S. B. Peck". JAMAICA: "1♀, Blue Mt. Trail, 5000-6000ft, 28.VII.1966: Howden and Becker leg". PANAMA: "1♀, Serranía del Pirre, Darien Cana, 1200m, 7-9.VI.1996: Ashe and R. Brooks leg". COLOMBIA: "1♂, Sector la Romelia, PNN Munchique, Cauca, 2°38'M 76°54'W, 2640m, MT, 25.IV-9.V.2004: H. Pino leg".

Redescription.

Length. Body: 2.3-2.8 mm. Antennae: 1.8-2.1 mm (♀), 1.8-2.3 mm (♂). Forewings: 1.9-2.4 mm.

Coloration. Head, mesosoma and metasoma black. Mandibles yellowish brown with darker teeth. Antennae yellowish brown, darker first segment. Legs yellowish brown with black coxae. Veins of wings dark yellow.

Head. Triangular-shaped in anterior view. Face smooth, covered with white setae. Width of head 2.4 times its length in dorsal view and 1.3 its height in anterior view. Malar area coriaceous, 0.7 times of compound eye height. Transfacial line length 1.2 times of compound eye height. Diameter of toruli slightly larger than inter-toruli distance and far larger than torulus to compound eye distance. Occipital and postocular carinae absents. Compound eyes glabrous. POL:OOL:LOL ratio = 8:5:3.5 in females and 7:5:3 in males, ocelli diameter being 2.5 in both sexes. Frons, gena and occiput smooth, shiny and glabrous except for a few sparse setae; light rugose sculpture in frons and genal area in some specimens.

Antennae. Cylindrical flagellomeres covered with pubescence. Female antennal formula: 8(3), 3.5(2.5), 11(2), 9(2), 8.5(2), 8(2), 7(2), 6.5(2), 6(2), 6(2), 5.5(2), 5(2), 9(2). Male antennal formula: 6.5(3), 3(2.5), 9(2), 7(2), 7(2), 6.5(2), 6(2), 6(2), 6(2), 5(2), 5(2), 9.5(2). Placodeal sensilla start at F1 in both sexes.

Mesosoma. Pronotal plate coriaceous. Pronotum strongly alutaceous and pubescent; ventral pronotum heavily carinate, dorsal pronotum carinae sometimes effaced. Mesoscutal width 1.2 times its length in dorsal view. Mesoscutum shiny and almost glabrous except for few setae; area between notauli from lightly alutaceous at basal notauli (Fig. 2d) to tenuously coriaceous in all its extension (Fig. 2c). Notauli complete, deeply excavated and internally carinate (Fig. 2c, 2d); median mesoscutal furrow short and not clearly defined from mesoscutum. Lateral mesoscutum smooth and punctate; parapsidal signum absent; parascutal sulcus slightly excavated and internally carinate. Scutellar length 0.5 to 0.6 times of mesoscutum length in dorsal view. Scutellum smooth to

alutaceous, shiny and areolate (Fig. 2c, 2d); only few big areolae. Scutellar foveae rounded, big and alutaceous, basally defined by carina, lateral pits of scutellar foveae present but not deeply excavated. Interfoveal line present. Circumscutellar carina complete and clearly defined, dorsally projected at scutellar apex. Mesopleuron smooth, glabrous and shiny, with internally carinate transverse groove; coriaceous sculpture in anterior mesopleuron. Mesopleural triangle alutaceous and densely pubescent. Metanotal troughs coarsely sculptured and pubescent. Propodeum coriaceous and heavily pubescent, divided in large cells; central median cell reduced to upper propodeum and partially divided in two symmetrical areas by a longitudinal median carina, while the lower propodeum divided into smaller cells.

Forewings. Pubescent. Radial cell of fore wing closed, 2.5 times longer than wide. Marginal pubescence of fore wing denser at apical third.

Metasoma. Longer than head + mesosoma. Petiole between 1.5 to 2.0 times longer than metacoxa, smooth and shiny. Third metasomal tergum 2.0 times longer than fourth tergum in dorsal view. Fifth, sixth and seventh metasomal terga visible in dorsal view. Metasomal terga smooth and glabrous, punctate in anterior region of each tergum, more distinct from T4 to T7.

Biology. Known to attack *Hemerobius stigma* (Miller and Lambdin, 1985) and *Micromus posticus* (Cave and Miller, 1987) (Neuroptera: Hemerobiidae).

Distribution. Nearctic and Neotropical. Known from Florida (Ashmead, 1887) and Alabama (Cave and Miller, 1987) (USA). First record for Canada (Alberta, British Columbia, Manitoba, New Brunswick, Newfoundland and Labrador, Northwest Territories, Ontario, Quebec and Yukon Territory), Colombia, Dominican Republic, Jamaica, Mexico (Chihuahua and Nuevo León) and Panama; also for Alaska, Arizona, California, Colorado, Georgia, Michigan, Missouri, Nebraska, New Hampshire, New Mexico, New York, North Carolina, Ohio, South Carolina, Texas, Virginia, Washington (USA).

***Anacharis mexicana* (Cameron, 1884)**

(Figures 1d 3c, 3d)

Megapelmus mexicanus Cameron, 1884: 487 (male)

Anacharis mexicana (Cameron) Dalla-Torre, 1893: 13 (male)

Anacharis lamyi Cockerell, 1899 **n. syn.**

Anacharis mexicana Ashmead, 1896 Homo.

Anacharis ashmeadi Dalla Torre and Kieffer, 1902

Diagnosis. *Anacharis mexicana has* a short petiole, slightly longer than metacoxa but never being as long as in *A. luciae, A. mantocephala*, *A. melanoneura, A. punctatifrons* and *A. tripartita*. It can be distinguished from *A. marginata* (also presenting petiole longer than metacoxa but not strongly elongated) by its smooth mesoscutum and big but not basally defined scutellar foveae (scutellum strongly areolate with smaller scutellar foveae, basally defined by a strong carina in *A. marginata*).

Type material of *Anacharis mexicana.* Holotype ♂ deposited in NHM with the following labels: "Bilimeh, Mexico" (white label); "P. Cameron Coll. 1914-110" (white label); "*Megapelmus mexicanus* Cameron" (white label); "B. M. Type Hym 1.238" (white label); "*Anacharis mexicana* (Cameron, 1884), J. P-V det. 2008" (white label).

Type material of *Anacharis lamyi*. Holotype ♀ deposited in USNM with the following labels: "*Anacharis mexicanus* Ashmead" (white label); "Type number 23605 USNM" (Red label); "Ckll. 1887, Stat. Oup." (white label).

Additional material (57♀ and 16♂). CANADA: "5♀, Victoria, BC, 21.VI.1928: W. Downes leg"; "1♀, Robson, BC, 3.VII.1947: H. R. Foxlee leg"; "1♀, Diamond Head Trail, Squamish, BC, 4600ft, 25.VIII.1953: W.R.M. Mason leg"; "1♀, Diamond Head Trail, Squamish, BC, 4000ft, 30.VIII.1953:

W.R.M. Mason leg"; "1♀, Indian House L., QC, 14.VIII.1954: W.R. Richards leg"; "1♂, Parke Reserve, Kam. Co., QC, 950ft, 7.VIII.1957: W.R.M. Mason leg"; "1♂, Parke Reserve, Kam. Co., QC, 950ft, 18.VIII.1957: W.R.M. Mason leg"; "1♂, Vaseaux L., Oliver, BC, 20.V.1959: R.E. Leech leg"; "1♀, Victoria, BC, 2.VI.1959: R. Madge leg"; "1♀, mi 392 Alaska Hwy., Summit Lake, BC, 5000ft, 6.VII.1959: R.E. Leech leg"; "1♀, mi 392 Alaska Hwy., Summit Lake, BC, 4700ft, 7.VII.1959: E.E. McDougall leg"; "2♀, mi 392 Alaska Hwy., Summit Lake, BC, 4500ft, 11-14.VII.1959: E.E. McDougall leg"; "1♀, mi 392 Alaska Hwy., Summit Lake, BC, 4700ft, 15.VII.1959: E.E. McDougall leg"; "2♀, mi 392 Alaska Hwy., Summit Lake, BC, 4500ft, 17-19.VII.1959: E.E. McDougall leg"; "1♀, mi 392 Alaska Hwy., Summit Lake, BC, 4500ft, 28.VII.1959: E.E. McDougall leg"; "1♂, mi 392 Alaska Hwy., Summit Lake, BC, 4500ft, 30.VII.1959: E.E. McDougall leg"; "1♀, Little Salmon L., YT, 62°10'N, 134°40'W, 9.VIII.1959: R.E. Leech leg"; "1♀, Chimo, QC, 17-18.VIII.1959: W.R.M. Mason leg"; "2♀, mi 392 Alaska Hwy., Summit Lake, BC, 4500ft, 19-21.VIII.1959: E.E. McDougall leg"; "1♀, Echo L., Mt. Evans, CO, 10600ft, 26.VIII.1961: C.H. Mann leg"; "1♀, mi 43 Peel Plt. Rd., North Fork Crossing, YT, 3500ft, 6.VII.1962: R.E. Leech leg"; "1♂, Jumping Pound Crk., 20 mi W Calgary, AB, 14.VIII.1962: K.C. Hermann leg"; "5♀ and 2♂, Boyar Lake to Strikine R., Cassiar Hwy, BC, 5.VIII.1988: Peck leg"; "1♀, 0.5km E Writing-on-Stone Prov. Pk., AB, PT, 1-4.IX.1991: D. McCouruodale leg". USA: "4♀ and 1♂, Isabella Pass, Summit L., AK, 1.VIII.1951: W.R.M. Mason leg"; "1♀, Smugglers' Notch, VT, 6.IX.1951: collector unknown"; "1♂, Naknek, AK, 19.VII.1952: W.R.M. Mason leg"; "1♀, Mansanite L., Lassen Nat. Pk., CA, 16.VI.1959: Kelton and Medge leg"; "1♂, Unalakleet, AK, 20.VI.1961: R. Madge leg"; "1♂, Unalakleet, AK, 5.VII.1961: R. Madge leg"; "1♀, Cottonwood Pass, Gunnison Co., CO, 12100ft, 29.VII.1961: B.H. Poole leg"; "2♀ and 1♂, Mt. Evans, Doolittle Ranch, CO, 10000ft, 31.VII.1969: C.H. Mann leg"; "1♀, Mt. Evans, Doolittle Ranch, CO, 9800ft, 10.VIII.1961: B.H. Poole leg"; "1♀, Karr Cyn., Lincoln Nat. Prk., NM, 8000ft, 30.VII.1977: L. Masner leg"; "1♀, Rustler Pk., Portal, AZ, 6.VIII.1977: L. Masner";

"3♀, Sr. Blanca, Lincoln Co., NM, 9700ft, 10-26.VI.1979: S. and J. Peck leg"; "1♀, 1mi E Blue Lake, Humboldt Co., CA, 7.IV.1983: J.D. Pinto leg"; "4♀, Denali Hwy, Cantwell, AK, 2300-3000m, 24.VII.1984: S. and J. Peck leg"; "2♀, Denali Hwy, Cantwell, AK, 2300-3000m, 24.VIII.1984: S. and J. Peck leg". MEXICO: "1♂, Actopán, Hidalgo, 29.VII.1954: J.G. Chillcott leg"; "1♀ W. Side Cortes Pass, Mexico DF, 9500ft, 13.VIII.1954: J.G. Chillcott leg"; Rt 175, 25 mi NE Oaxaca, Oaxaca, 6000-7000ft, 13.VIII.1962: H.E. Milliron leg"; "1♀, Presa, Tejocotal, Tamaulipas, 30.III.1985: A. González leg". GUATEMALA: "1♀ and 1♂, Huehuetenango, Todos los Santos, 2100m, 30.VIII.1987: M. Sharkey leg"; "2♂, 61km N San Marcos, 9200ft, collection date unknown: M. Sharkey leg". BOLIVIA: "1♀, Espinaza/Pojo, Cochab, 19.II.1976: L. Peña leg".

Redescription.

Length. Body: 3-3.3 mm. Antennae: 2.0-2.2 mm (♀), 2.7-3.2 mm (♂). Wings: 2.8-3.2 mm.

Coloration. Head, mesosoma and metasoma black. Mandibles yellowish brown with darker teeth. Antennae dark brown with black first segment. Legs yellowish brown with darker coxae. Veins of wings brownish.

Head. Triangular-shaped in anterior view. Face smooth, covered with abundant white setae. Width of head 2.3 times its length in dorsal view and 1.1 its height in anterior view. Malar area coriaceous, 0.8 times of compound eye height. Transfacial line length 1.2 times of compound eye height. Diameter of toruli equal to the inter-toruli distance and larger than torulus to compund eye distance. Clypeus smooth, glabrous and shortly convex. Occipital and postocular carinae absents. Compound eyes glabrous. POL:OOL:LOL ratio = 7:5:3 in females and 6:5:3 in males, ocelli diameter being 2.5 in both sexes. Frons, gena and occiput smooth, shiny and glabrous except for few sparse setae..

Antennae. Cylindrical flagellomeres covered with pubescence. Female antennal formula: 8(3), 4(3), 11(2), 8.5(2.5), 8(2.5), 7.5(2.5), 7(2), 7.5(2), 7.5(2), 6(2), 6(2), 5(2), 9(2.5). Male

antennal formula: 9(4), 2(3), 11(3), 10(3), 10(3), 10(3), 9(3), 9(3), 9(3), 9(3), 9(3), 8.5(3), 8(2.5), 10.5(2.5). Placodeal sensilla start at F1 in both sexes.

Mesosoma. Pronotal plate alutaceous. Pronotum slightly pubescent; lower and anterior pronotum carinate, dorsal pronotum smooth. Mesoscutal width 1.2 times its length in dorsal view. Mesoscutum smooth, shiny and glabrous except for some short anterior setae; slightly alutaceous sculpture basal notauli in some specimens. Notauli complete but becoming more superficial when reaching anterior mesoscutum (Fig. 3c, 3d), sometimes having weak internal carinae in anterior mesoscutum (Fig. 3d); median mesoscutal furrow almost unnoticeable. Lateral mesoscutum smooth and non-punctate; parapsidal signum and parascutal sulcus absents. Scutellar length 0.7 times of mesoscutum length in dorsal view. Scutellum smooth and shiny, not areolate (Fig. 3c, 3d). Scutellar foveae rounded, large and smooth, not basally defined by a carina; lateral pits of scutellar foveae not clearly defined. Interfoveal line short. Circumscutellar carina complete and clearly defined, dorsally projected at scutellar apex. Mesopleuron smooth, glabrous and shiny, with internally carinate transverse groove; presence of alutaceous sculpture and some oblique carinae in its anterior half. Mesopleural triangle alutaceous with sparse setae. Metanotal troughs shortly coarse, densely covered by long hyaline hairs abundant in its central area. Propodeum coriaceous and pubescent, divided in large cells; central area divided by a median longitudinal carina and some transverse carinae forming six square cells.

Forewings. Pubescent. Radial cell of fore wing closed, 2.7 times longer than wide. Marginal pubescence of fore wing denser at apical third.

Metasoma. About same length as head + mesosoma. Petiole about 1.2 times longer than metacoxa, smooth and shiny (Fig. 1d). Third metasomal tergum 2 times longer than fourth tergum in dorsal view. Fifth, sixth and seventh metasomal terga visible in dorsal view. Metasomal terga smooth and glabrous, punctate in anterior region of each tergum, more distinct from T4 to T7.

Biology. Unknown.

Distribution. Nearctic and Neotropical. Known from Mexico (Cameron, 1884); first record for Bolivia, Canada (Alberta, British Columbia, Northwest Territories, Quebec and Yukon Territory), Costa Rica, Dominican Republic, Guatemala, Honduras, Nicaragua and USA (Alaska, Arizona, California, Colorado and New Mexico).

Comments. This species was originally described by Ashmead (1896) as *A. mexicana*; this designation was however a homonymy of *A. mexicana* (Cameron, 1884). Cockerell (1899) proposed a new name: *Anacharis lamyi*. This was not acknowledged by Dalla Torre and Kieffer (1910), who proposed another name: *A. ashemadi.* According to ICZN Article 23.6, the designation *Anacharis ashmeadi* is invalid, due to *A. lamyi* having precedence over it.

When examining the type material of *Anacharis lamyi*, it presents smooth mesoscutum and scutellum, effaced notauli, and petiole is as long and metacoxa and coarsely sculptured. All these characters are also present in *Anacharis mexicana* (Cameron, 1884); thus, we consider *Anacharis lamyi* a junior synonym of *A. mexicana.*

Anacharis osceolus Ashmead, 1887 *incertae sedis*

Acothyreus osceolus Ashmead 1887: 157-158 (male).

Anacharis osceolus; Restrepo-Ortiz and Pujade-Villar, 2010b: 435-436 (male).

Type material of *Anacharis osceolus*. Lost according to Weld (1952).

Comments. The original description of *A. osceolus* mentions an almost quadrangular-shaped head, a characteristic not yet seen in *Anacharis*, but in other Anacharitinae genera such as *Acanthaegilopsis, Aegilips, Proanacharis*, and *Xyalaspis;* it also mentions the presence of an elongated petiole and second and third abdominal tergum about the same length; both

characteristics mentioned above have been found and we are therefore not able to assert the species validity, thus designating it as *nomen dubium*.

Anacharis pediculata* Provancher, 1889 *incertae sedis

Anacharis pediculate Provancher, 1889: 169 (male).

Type material of *Anacharis pediculata.* Lectotype ♂ deposited in UL with the following labels: "*Anacharis pediculata* Provancher" (white label); "Lectotype 39 *Anacharis pediculata* Provancher; Comeau, 1941" (red label); "Lectotype 1317 *Anacharis pediculata* Provancher; Grahan and Rohwer 1915; Barron, 1971" (red label).

Comments. According to the original description (Provancher, 1889), the specimen was collected near Ottawa by J.A. Guignard, and deposited in his collection until sent to Provancher, who described the species. The description clearly mentions the head characteristics visible in the type (Fig. 2c): head oval in shape, and presence of a ridge between the toruli (neither feature being a synapomorphy for *Anacharis*). Thus, the wrong head was already glued onto the specimen when Provancher described it as *A. pediculata*. Despite the type being a concoction of two different species, Article 1.3.3 of the ICZN does not apply, unfortunately, because the specimen is not a true biological hybrid, so the species is still valid and the species name is available, according to Article 17.1. However, we are unable to match the Provancher type with intact material from collections we examined, mainly because the pin through the mesosoma has destroyed important features required for species identification in *Anacharis,* and the loss of the head means we are not able to check for important taxonomical facial features like the malar sulcus. Therefore, *A. pediculata* is treated as an *incertae sedis.*

895 ***Anacharis punctatifrons* Kieffer, 1907**

(Figure 2e)

Anacharis punctatifrons Kieffer, 1907: 143 (female)

900 **Diagnosis.** Species very similar to *A. tripartita,* to which shares the non areolate scutellum and elongated petiole. However, it can be distinguished by always having a smooth and shiny mesoscutum and wider and not internally carinate notauli (mesoscutum usually lightly carinate around notauli in *A. tripartita*, and notauli internally carinate and narrower). It is also similar to *A. mexicana,* to whom it shares the smooth mesoscutum and scutellum and the tenuous notauli;
905 however, it presents an elongated petiole, basally defined scutellar foveae and non-projected circumscutellar carine (In *A. mexicana,* petiole about as long as metacoxa, never elongated; scutellar foveae not distinguishable from the rest of scutellar surface, circumscutellar carina forming a clearly projected ridge).

910 **Type material of *Anacharis punctatifrons*.** Holotype ♀ deposited in CAS with the following labels: "San Mateo Co. CAL. Baker" (white label); "*Anacharis*" (white label); "*Anacharis punctatifrons* Kieffer" (red label); "California Academy of Sciences, Type no. 10591" (white label).

Additional material (40♀ and 39♂). CANADA: "1♀, Turkey Pt., ON, 8.VI.1931: G.S. Walley
915 leg"; "1♂, Robson, BC, 3.VII.1947: H.R. Foxlee leg"; "1♂, Gt. Whale R., QC, 20.VIII.1949: J.R. Vockeroth leg"; "1♂, Robson, BC, 9.VI.1950: H.R. Foxlee leg"; "1♂, Jarvis L., ON, 20.VIII.1952: J.F. Malpine leg"; "1♂, Brighton, ON, 18.V.1955: J.C. Martin leg"; "1♂, Parke Reserve, Kam. Co., QC, 950ft, 7.VIII.1957: W.R.M. Mason leg"; "3♂, Kovaluk River, NWT, 69°11'N 131°W, 6-

10.VII.1971: W. R. Mason leg"; "1♀, Constance Bay, ON, YPT, 12-19.X.1973: G. Gibson leg";
920 "1♀, Kouchibouguac Nat. Prk., NB, 20.IX.1977: S.J. Miller leg"; "1♀, Ross River, YT, MT, 16.VII-31.VIII.1985: S. and J. Peck leg"; "1♂, km 66 James Bay Hwy, QC, FIT, 4-12.VI.1987: L. LeBlanc leg"; "1♂, Anahim, BC, 1000 to 1500 m, 17.VII.1988, S. and J. Peck leg". USA: "2♂, Paxson Lodge, Gulkana, AK, 4.VIII.1951: W.R.M. Mason leg"; "1♂, Cold Bay, AK, 13.VIII.1952: W.R.M. Mason leg"; "1♀, West Chicago Cr., Clear Cr. Co., CO, 9800ft, 11.VIII.1961: S.M. Clark leg"; "1♂,
925 Deering, Sewars Peninsula, AK, MT, 8-19.VIII.1968: J. Matthews leg"; "2♀ and 2♂, South Meadows Camp, 7 mi. N Woodland Park, Teller, CO, 21-28.VII.1977: S. Peck leg"; "2♀, Cantwell, Denali, AK, 2300-3000ft, 24.VII.1984: S. and J. Peck leg"; "1♂, Patagonia, Sta. Cruz Co., MT, 14.VI.1994: B. Brown and E. Wilk"; "2♂, Patagonia, Sta. Cruz Co., AZ, 31°53'N 110°77'W, MT, 16.VI.1994: E. Wilk and B. Brown"; "1♂, Patagonia, Sta. Cruz Co., AZ, MT, 9.VII.1995: E. Wilk
930 and B. Brown"; "1♀, Patagonia, Sta. Cruz Co., AZ, MT, 10.XI.1995: E. Wilk and B. Brown". MEXICO: "2♀, Presa, Tejocotal, Tamaulipas, 30.III.1985: A. González leg". DOMICAN REPUBLIC: "9♀ and 3♂, Las Abejas, Sierra de Barohuco, 1300m, 17-19.I.1989: L. Masner leg"; "1♀ and 6♂, Las Abejas For., 60km NW Cabo Rojo, Pedernales: date and collector unknown". GUATEMALA: "1♂, 20km SE Huehuetenango, Todos los Santos, 2500m, 10.VIII.1987: M.
935 Sharkey leg"; "2♀ and 1♂, Huehuetenango, Todos los Santos, 2700m, 30.VIII.1987: M. Sharkey leg". HONDURAS: "1♂, Cerro de Uyuca, 12km W Zamorano, S. Francisco Morazán, 14°2'N, 87°5'W, 1870m, FIT, 10-27.VI.1994: Ashe and R. Brooks leg". COSTA RICA: "1♂, 3200m: 3-13.IV.1985: H. Gowle and L. Masner leg"; PANAMA: "4♀ and 3♂, Chiriquí, Las Lagunas, 22.V.1977: S. and J. Peck leg"; "3♀, Chiriqui Province, 2km W Cerro Punta, 1700m, 19.V-
940 8.VI.1977: Peck and Howden leg". COLOMBIA: "1♀ and 2♂, Caldas, 5°15'N, 76°25'W, 3300-3500m, 2.IV.1973: J. Helava leg"; "1♀ and 1♂, 10-20km S Chinacota, Norte de Santander, 6000-9000ft, 10.V.1974: J. Peck leg"; "2♀, Pamplona, Norte de Santander, 7000-9000ft, 13.V.1974: J. Peck leg"; "1♂, El Ramo, Sierra Nevada de Santa Marta Nat. Pk., Magdalena, 10°48'N, 73°39'W,

2500m, MT, 30.III-5.V.2001: J. Cantillo leg"; "1♀, Cabaña Chaina, Iguaque SFF, Boyacá, 5°25'N, 73°27'W, 2600m, MT, 13.IV-5.V.2001: P. Reina leg". VENEZUELA: "1♀, Mucuy, nr Tabay, Mérida, 2000-3000ft, 25.IV-2.V.1981: L. Masner leg"; "1♀, Laguna Negra, Mérida, 4000m, 29.IV.1981: L. Masner leg".

Redescription.

Length. Body: 2.8-3.3 mm. Antennae: 2-2.3 mm (♀), 2.5-2.6 mm (♂). Forewings: 2.6-2.9 mm.

Coloration. Head, mesosoma and metasoma black. Mandibles yellowish brown with darker teeth. Antennae yellowish brown with dark first segment. Legs yellowish brown with darker coxae, metacoxa black. Veins of wings brownish.

Head. Triangular-shaped in anterior view. Face pubescent, covered with white setae. Width of the head 2.5 times its length in dorsal view and 1.2 its height in anterior view. Malar area coriaceous, 0.6 times of compound eye height. Transfacial line length equal to compound eye height. Diameter of toruli bigger than inter-toruli and torulus to compound eye distances. Clypeus smooth, glabrous and shortly convex. Occipital and postocular carinae absents. Compound eyes glabrous. In males; POL:OOL:LOL ratio = 7.5:4:3, ocelli diameter being 3; in females; POL:OOL:LOL ratio = 8:4.5:3, ocelli diameter being 2.5. Frons, gena and occiput smooth, shiny and glabrous except for few sparse setae..

Antennae. Cylindrical flagellomeres covered with pubescence. Female antennal formula: 6.5(3), 3(2.5), 11(2), 8.5(2), 8(2), 7.5(2), 7(2), 6.5(2), 6.5(2), 6(2), 6(2), 6(2.5), 9(2.5). Male antennal formula: 7(3), 3.5(2.5), 10(2), 8.5(2), 8(2), 8(2), 7.5(2), 7(2), 7(2), 7(2), 7(2), 7(2), 7(2), 6.5(2), 8.5(2). Placodeal sensilla starting at F1 in both sexes.

Mesosoma. Pronotal plate coriaceous. Pronotum pubescent; ventral pronotum slightly alutaceous and carinate, dorsal pronotum smooth and non-carinate. Mesoscutal width 1.1 times its

length in dorsal view. Mesoscutum smooth, shiny and almost glabrous except for few short setae in anterior and lateral regions, some specimens present shortly defined transverse carinae at base of notauli. Notauli complete without internal carinate sculpture (Fig. 2e); median mesoscutal furrow superficial and not clearly defined from mesoscutum. Parapsidal signum absent; parascutal sulcus reduced to some weakly excavated cells in anterior mesoscutum. Scutellar length 0.7 times mesoscutum length in dorsal view. Scutellum smooth to alutaceous and shiny, not areolate (Fig. 2e). Scutellar foveae rounded, big and smooth, basally defined by carina; lateral pits of scutellar foveae present but weakly excavated. Interfoveal line present. Circumscutellar carina complete and clearly defined, dorsally projected at scutellar apex. Mesopleuron glabrous and shiny, divided by internally carinate transverse groove; presence of some oblique carinae in anterior mesopleuron above groove and alutaceous sculpture beneath groove. Mesopleural triangle covered with dense pubescence. Metanotal troughs lightly coarse and pubescent. Propodeum slightly alutaceous and heavily pubescent, divided in large cells; central area composed by large superior cell partially divided by median carina and four smaller lower cells.

Forewings. Pubescent. Radial cell of fore wing closed, 2.7 times longer than wide. Marginal pubescence of fore wing denser at apical third.

Metasoma. Longer than head + mesosoma. Petiole about two times length of metacoxa, smooth and shiny. Third metasomal tergum 2.0 times longer than fourth tergum in dorsal view. Fifth, sixth and seventh metasomal terga visible in dorsal view. Metasomal terga smooth and glabrous, punctate in anterior region of each tergum, more distinct from T4 to T7.

Biology. Unknown.

Distribution. Nearctic and Neotropical. Known from California (Kieffer, 1907) (USA); first record for Canada (British Columbia, Manitoba, Northwest Territories, Quebec and Yukon Territory), Colombia, Costa Rica, Dominican Republic, Guatemala, Honduras, Mexico (Tamaulipas), Nicaragua, Panama, and Venezuela; also for Alaska, Arizona, Colorado, North

Carolina and Washington (USA); .

995

***Anacharis tripartita* Kieffer, 1907**

(Figure 2f)

Anacharis tripartita Kieffer, 1907: 143 (female)

1000

Diagnosis. Species similar to *A. melanoneura*, both species sharing deeply excavated and internally carinate notauli; it can be distinguished by having smooth to weakly areolate scutellum and smooth mesoscutum, rarely lightly carinate (stronger areolate sculpture in scutellum and carinate to coriaceous sculpture at the base of notauli, sometimes extended across al mesoscutum, in *A.* 1005 *melanoneura*). It can be distinguished from the also similar species *A. punctatifrons* by having internally carinate notauli and sometimes presenting tenuous coarse sculpture in the scutellum (notauli not internally carinate and scutellum always smooth and shiny in *A. punctatifrons*). The petiole of *A. tripartita* is usually shorter than those of *A. melanoneura* and *A. punctatifrons*, ranging from 1.3 times to twice the length of metacoxa (petiole in *A. melanoneura* and *A. punctatifrons* at 1010 least twice time longer than metacoxa, sometimes longer).

Type material of *Anacharis tripartita.* Holotype ♀ deposited in CAS with the following labels: "Santa Clara Co. CAL. Baker" (white label); "*Anacharis tripartita* Kieffer" (red label); "California Academy of Sciences, Type no. 10617" (white label).

1015

Additional material (153♀ and 141♂). GREENLAND: "1♂, Sondrestom Air Base, Greenland, 6.VIII.1962: W.J. Brown leg"; "1♀, Sondrestom Air Base, Greenland, 6.VIII.1962: W.J. Brown leg". CANADA: "1♂, Brookville, ON, 12.VIII.1903: W. Metcalfe leg"; "1♂, Victoria, BC,

21.VI.1928: W. Downes leg"; "1♀, Robson, BC, 1.VII.1947: H.R. Foxlee leg"; "1♀ and 1♂, Robson, BC, 26.VII.1947: H.R. Foxlee leg"; "1♀, Ottawa, ON, 30.VII.1947: O. Peck leg"; "1♂, Robson, BC, 1.VIII.1947: H.R. Foxlee leg"; "1♀ and 1♂, Robson, BC, 15-31.VIII.1947: H.R. Foxlee leg"; "1♂, Robson, BC, 19-24.VIII.1947: H.R. Foxlee leg"; "2♀ and 2♂, Robson, BC, 12-24.IX.1947: H.R. Foxlee leg"; "2♀ and 1♂, , Robson, BC, 4.X.1947: H.R. Foxlee leg"; "1♀, Robson, BC, 25.VIII-15.IX.1948: H.R. Foxlee leg"; "1♂, Robson, BC, 4.VIII.1949: H.R. Foxlee leg"; "3♀, Robson, BC, 12-30.IX.1949: H.R. Foxlee leg"; "1♂, Cultus Lake, BC, 1.VII.1948: H.R. Foxlee leg"; "1♀, Robson, BC, 1-5.VIII.1949: H.R. Foxlee leg"; "1♂, Robson, BC, 1-10.VIII.1949: H.R. Foxlee leg"; "1♂, Robson, BC, 8-24.VIII.1949: H.R. Foxlee leg"; "2♀, Robson, BC, 23.VIII.1949: H.R. Foxlee leg"; "1♀, Robson, BC, 25.VIII-5.IX.1948: H.R. Foxlee leg"; "1♂, Gt. Whale H., QC, 20.VIII.1949: J.R. Vockeroth leg"; "1♂, Robson, BC, 1-10.VIII.1949: H.R. Foxlee leg"; "1♂, Robson, BC, 10.VIII.1949: H.R. Foxlee leg"; "1♀, Robson, BC, 12.IX.1949: H.R. Foxlee leg"; "1♀, Robson, BC, 8-24.VIII.1950: H.R. Foxlee leg"; "1♂, Rivière du Lup, QC, 29.VII.1951: G.E. Shewell leg"; "1♀, Robson, BC, 27.VI.1952: H.R. Foxlee leg"; "1♂, Jarvis Lake, ON, 28.VIII.1952: J.F. McAlpine leg"; "1♂, Diamond Hd. Trail, Garibaldi Park, BC, 3400-4000ft; 17.VIII.1953: G.J. Spencer leg"; "1♂, Squamish L., Diamond Hd. Trail, BC, 4600ft; 29.VIII.1953: W.R.M. Mason leg"; "1♀, Gartrelis orchard, Summerland, BC, 17.X.1953: J.H. McLeod et al"; "1♂, Miracle Beahc, BC, 11.VI.1955: R. Coyles leg"; "1♂, Atlin, BC, 13.VI.1955: H. Huckel leg"; "1♀, Belleville, ON, 10.IX.1955: J.C. Martin leg"; "2♀, Ottawa, ON, 30.X.1956: J.R. Vockeroth leg"; "1♀, Harrow, Lake Erie, ON, 22.VII.1957: FIS leg"; "1♂, Ottawa, ON, 25.VII.1957: J.E.H. Martin leg"; "1♀, Ottawa, ON, 10.VII.1957: O.Peck leg"; "3♂, Parke Reserve, Kam Co., 7.VIII.1957: W.R.M. Mason leg"; "1♀, Parke Reserve, Kam Co., 8.VIII.1957: W.R.M. Mason leg"; "2♀, Lac Crescence, Kam Co., QC, 10.VIII.1957: W.R.M. Mason leg"; "1♂, Kam Co., Parke Reserve, QC, 11.VIII.1957: G.E. Shewell"; "1♀ and 1♂, Kam Co., Parke Reserve, QC, 950ft, 13.VIII.1957: W.R.M. Mason leg"; "2♀ and 3♂, Kam Co., Parke Reserve, QC, 950ft, 18.VIII.1957:

W.R.M. Mason leg"; "2♀, Parke Reserve, Kam Co., QC, 26.VIII.1957: W.R.M. Mason leg"; "1♀, Ottawa, ON, 22.VI.1958: J.R. Vockeroth leg"; "1♀,Shawville, QC, 22.VII.1958: L.A. Kelton leg"; "1♂, Summit Lake, Mi 392 Alaska Hwy, 5000ft, VI.1959: R.E. Leech leg"; "1♂, Summit Lake, Mi 392 Alaska Hwy, 4700ft, 15.VII.1959: E.E. MacDougall leg"; "1♂, Summit Lake, Mi 392 Alaska Hwy, 4500ft, 17-19.VII.1959: R.E. Leech leg"; "1♀, Summit Lake, Mi 392 Alaska Hwy, 4200ft, 27.VII.1959: R.E. Leech leg"; "1♂, Summit Lake, Mi 392 Alaska Hwy, 4500ft, 28.VII.1959: R.E. Leech leg"; "1♂, Summit Lake, Mi 392 Alaska Hwy, 4500ft, 30.VII.1959: R.E. Leech leg"; "3♂, Summit Lake, Mi 392 Alaska Hwy, 4200ft, 19-21.VIII.1959: R.E. Leech leg"; "1♀,Marmora Area, ON, 21.VIII.1959: L.K. Smith leg"; "1♀, 33mi W of Terrace, BC, 11.VI.1960: J.G. Chillcott leg"; "1♂, Horseshoe Canyon, Drumheller, AB, 2750ft, 17.VII.1960: D.F. Hardwick leg"; "1♂, Dearlock, ON, 18.VII.1960: S.M. Clark leg"; "1♂, Terrace, BC, 2.VIII.1960: W.R. Richards leg"; "1♀, Bergland, ON, 3.VIII.1960: S.M. Clark leg"; "1♂, mi 3 Lakelse Rd., Terrace, BC, 6.VIII.1960: C.H. Mann leg"; "1♀, Cameron L., Waterton Nat. Pk., AB, 950ft, 19.VIII.1961: B.H. Poole leg"; "2♀, Vineland, ON, 4.V.1962: G. Thorpe leg"; "3♀ and 1♂, Jumping Pd. Cr., 20mi W Calgary, AB, 14.VIII.1962: W.R.M. Mason leg"; "2♂, Rollet, QC, 15.VIII.1963: W. Gagne leg"; "1♂, Hixon, BC, 22.VII.1965: E.D.A. Dyer leg"; "1♀ and 2♂, Hixon, BC, 29.VII.1965: E.D.A. Dyer leg"; "1♀, Hixon, BC, VIII.1965: E.D.A. Dyer leg"; "1♂, Golden L., ON, 12.VIII.1965: McAlpine and Martin leg"; "1♀, Hixon, BC, 28.VIII.1965: E.D.A. Dyer leg"; "1♀, Cowichan, BC, VII.1966: J.A. Chapman leg"; "3♂, Kovaluk River, NWT, 69°11'N 131°W, 6-10.VII.1971: W. R. Mason leg"; "1♂, McDonald Is., St. Lawrence Nat. Park, ON, MT, 19.VII.1976: A. Carter leg"; "1♂, McDonald Is., St. Lawrence Nat. Park, ON, MT, 28.VII.1976: A. Carter leg"; "1♀, Thartway Is., St. Lawrence Nat. Prk., ON, 5.VIII.1976: W. Reid leg"; "1♀, Thartway Is., St. Lawrence Nat. Prk., ON, 11.VIII.1976: W. Reid leg"; "1♀, Mermaid Is., St. Lawrence Nat. Prk., ON, 21.VIII.1976: W. Reid leg"; "2♂, Constance Bay, Carleton Co., ON, 10.VIII.1977: M. Sanborne leg"; "1♂, Kouchibouguac Nat. Park, NB, 18.V.1977: S.J. Miller leg"; "1♂, Kouchibouguac Nat. Park, NB, 16.VIII.1977: S.J.

Miller leg"; "1♂, Kouchibouguac Nat. Park, NB, 23.VIII.1977: S.J. Miller leg"; "2♂, Kouchibouguac Nat. Park, NB, 28.VIII.1977: S.J. Miller leg"; "1♀, Burnaby Mt., BC, 17.VII.1978: D. Gillespie leg"; "1♂, Lac Brule, QC, 7.VIII.1978: O. Peck leg"; "1♀, Kouchibouguac Nat. Prk., 13.IX.1978: S.J. Miller leg"; "1♂, Jourdan Station, ON, 1.VI.1979: R. Boyle leg"; "1♂, East Scarp, Ridge Mt. Nat. Park, MB, 700m, 30.VI.1979: Mason leg";"1♀, MA, 7-14.VI.1985: R. E. Ronghley leg"; "1♂, James Bay Hwy, km 66, QC, FIT, 4-12.VI.1987: L. Leblanc leg"; "1♀, Haines Jat 10km, YT, 800m, MT, VII.1988: S. and J. Peck leg"; "1♀, bet. Vancouver and Whiterock, Dear Is., BC, 9.VII.1988: A.T. Finnamore leg"; "1♂, Boyar Lake to Strikine, Cassiar Hwy, BC, 5.VIII.1988: Peck leg"; "1♂, Central Exp. Farm, Ottawa, ON, 45°23'18"N, 75°43'8"W, 75m, 13-14.V.2001: Black and Goulet leg"; "1♂, Lac Roddick, QC, 46°15'21"N, 75°54'44"W, YPT, 15-17.VIII.2009: L. Masner leg". USA: "1♂, Shaw Creek, M 289 Rich, Hwy, AK, 27.VI.1951: W.R.M. Mason and McGills leg"; "1♀, Birch Lake, nr. Fairbanks, AK, 7.VII.1951: W.R.M. Mason leg"; "1♂, Shaw Creek, M. 289 Rich. Hwy., 11.VII.1951: W.R.M. Mason and McGills leg"; "1♀, Mi 271 Richard Hwy, AK, 26.VII.1951: W.R.M. Mason leg"; 1♂, Paxson Lodge, Gulkana, AK: 31.VII.1951: W.R.M. Mason leg"; "1♂, Summit Lake, Isabella Pass, AK, 3.VIII.1951: W.R.M. Mason leg"; "1♂, Paxson Lodge, Gulkana, AK, 4.VIII.1951: W.R.M. Mason leg"; "1♀, Summit Lake, Isabella Pass, AK, 8.VIII.1951: W.R.M. Mason leg"; "1♀, Naknek, AK, 21.VII.1952: W.R.M. Mason leg"; "1♀, King Salmon, Naknek R., AK, 2.VIII.1952: J.B. Hartley leg"; "1♀, King Salmon, Naknek R., AK, 5.VIII.1952: J.B. Hartley leg"; "1♂, King Salmon, Naknek R., AK, 8.VIII.1952: J.B. Hartley leg"; "3♀, Cold Bay, AK, 13.VIII.1952: W.R.M. Mason"; "1♀, Cedar Swamp, Champaign Co., OH, 11-18.V.1954: E.L. Glee leg"; "1♀, Alpine Garden, Mt. Washington, NH, 5200-5600ft, 7.VIII.1954: Munroe and Mason leg"; "3♀ and 2♂, Lakes of the Clouds, Mt. Washington, NH, 5000ft, 9.VIII.1954: Munroe and Mason leg"; "2♂, Umiat, AK, 12.VII.1959: R. Madge leg"; "1♂, Umiat, AK, 23.VII.1959: R. Madge leg"; "1♀, Saddleback Mt., Lincoln Co., OR, 13.VIII.1960: J.C. Dirks-Emunds leg"; "1♀, Saddleback Mt., Lincoln Co., OR, 30.IX.1960: J.C. Dirks-Emunds leg"; "1♂,

Estes Pk., CO, 7500ft, 2.VII.1961: W.R.M. Mason leg"; "2♂, Doolittle Ranch, Mt. Evans, CO, 9800ft, 3.VIII.1961: W.R.M. Mason leg"; "2♂, Doolittle Ranch, Mt. Evans, CO, 9800ft, 9.VIII.1961: W.R.M. Mason leg"; "1♂, West Chicago Cr., Clear Cr. Co., CO, 9800ft, 11.VIII.1961: B.H. Poole leg"; "1♀, Neotoma, Hocking Co., OH, 3.VI.1962: F.W. Read leg"; "1♀ and 4♂, Benzie Co., MI, VII.1967:B. Carlson leg"; "1♀, Deering, Seward Peninsula, AK, MT, 1-6.VIII.1968: J. Matthews leg"; "1♀, Deering, Seward Peninsula, AK, MT, 8-19.VIII.1968: J. Matthews leg"; "1♀, Deering, Seward Peninsula, AK, MT, 22-31.VIII.1968: J. Matthews leg"; "1♀, Deering, Seward Peninsula, AK, MT, 28-31.VIII.1968: J. Matthews leg"; "2♂, Forsyth, GA, MT, 22.IV.1970: F.T. Naumann leg"; "1♀, Ann Arbor, MI, IX-X.1975: M.G. Fitton leg"; "1♀, Ann Arbor, MI, VIII.1976: Gould leg"; "2♀ and 3♂, South Meadows Camp, 7 mi. N Woodland Park, Teller, CO, 21-28.VII.1977: S. Peck leg"; "2♀, Flyes Prk., Portal, AZ, 6.VIII.1977: L. Masner leg"; "1♀, Rd. to Rustler Prk., Portal, AZ, 7.VIII.1977: L. Masner leg"; "1♀, Sumerith, Henry Ford Pk., UT, 9000ft, MT, 1-10.VIII.1978: S. and J. Peck leg"; "1♀, Saddleback Mt., Lincoln Co., OR, 4.VII.1979: J.C. Dirks-Emunds leg"; "1♀, Strawberry Canyon Berkley, Alameda Co., CA, 27.IV.1981: C. M. Yoshimoto leg"; "2♂, Coaloil Pt. Reserve, Santa Bárbara, CA, 22-29.VI.1982: K. Chaseman leg"; "1♂, 12mi NW Taft, Kern Co., CA, MT, 9-16.IV.1983: D.B. Wahl leg"; "1♂, 12mi NW Taft, Kern Co., CA, MT, 16-22.IV.1983: D.B. Wahl leg"; "4♀ and 1♂, Cantwell Denali, AK, 24.VII.1984: S. and J. Peck"; "1♀, N. F. Waconde, Bonaparte Campground, Okanagan Nat. Forest, Okanagan Co., WA, 24.VII.1985: A. Finnamore and T. Thormin leg"; "8♀, Van Trump Park, Rainier Nat. Park, WA, 1500-1800m, MT, 29.VII.1985: L. Masner leg"; "1♀, Yosemite N. P., CA, 2500m, 6.VIII.1985: Masner leg"; "1♀, Paradise, Mt. Rainier Nat. Park, Pierce Co., WA, 12.VIII.1985: Finnamore and Thormin leg"; "1♀, Mt. Baker, WA, 2.VIII.1986: H. Goulet leg"; "5♀ and 2♂, San Luis Obispo Co., CA, 22-30.VI.1987: D. A. Wahl leg"; "1♀, McDowell Co., NC, 9.VII-17.IX.1987: BRC. Hym Team leg"; "1♂, Dungonen Rec. Area, Clallan Co., WA, 26.VII.1990: J. D. Pinto leg."; "1♀, Cristal Springs Canyon, Catalina Mts., AZ, 11.VIII.1990: L. Masner leg"; "1♂, Patagonia, Sta.

Cruz Co., AZ, 31°53'N 110°77'W, MT, 16.I.1994: E. Wilk and B. Brown"; "4♀ and 1♂, Patagonia, Sta. Cruz Co., AZ, MT, 1-5.V.1994: E. Wilk and B. Brown"; "4♂, Patagonia, Sta. Cruz Co., MT, 14.VI.1994: B. Brown and E. Wilk"; "10♂, Patagonia, Sta. Cruz Co., AZ, 31°53'N 110°77'W, MT, 16.VI.1994: E. Wilk and B. Brown"; "1♂, Patagonia, Sta. Cruz Co., MT, 28.V.1995: B. Brown and E. Wilk"; "2♂, Patagonia, Sta. Cruz Co., AZ, MT, 1.VII.1995: E. Wilk and B. Brown"; "2♂, Patagonia, Sta. Cruz Co., AZ, MT, 9.VII.1995: E. Wilk and B. Brown"; "1♀ and 5♂, Patagonia, Sta. Cruz Co., AZ, MT, 9.VIII.1995: E. Wilk and B. Brown"; "1♀, Patagonia, Sta. Cruz Co., AZ, MT, 13.VIII.1995: E. Wilk and B. Brown"; "1♀, Patagonia, Sta. Cruz Co., AZ, MT, 24.IX.1995: B. Brown and E. Wilk ". MEXICO: "1♀, Ixtapan de la Sal, DF, 9.VIII.1954: J.G. Chillcott"; "2♀ and 8♂, La Pastora, Guadalupe, Nuevo León, 26.IV.1987: A. González leg". COLOMBIA: "2♀ and 3♂, Caldas, 5°15'N, 76°25'W, 3300-3500m, 2.IV.1973: J. Helava leg". VENEZUELA: "1♀, Táchira, 55km NE San Cristóbal, 10000ft, 17-18.V.1974: J. Peck leg"

Length. Body: 2.9-3 mm. Antennae: 2.1-2.2 mm (♀), 2.5-3.0 mm (♂). Wings: 2.4-2.8 mm.

Coloration. Head, mesosoma and metasoma black. Mandibles yellowish brown with darker teeth. Antennae brownish with black first segment. Legs yellowish brown with darker coxae. Veins of wings brownish.

Head. Triangular-shaped in anterior view. Face pubescent, covered with white setae, larger and more abundant in malar area. Width of head 1.1 times its height in anterior view. Malar area coriaceous, 0.8 times of compound eye height. Transfacial line same length as compound eye height. Clypeus smooth, glabrous and shortly convex. Occipital and postocular carinae absents. Compound eyes glabrous. In males, POL:OOL:LOL ratio = 6:3.5:3, ocelli diameter being 2.5; in females, POL:OOL:LOL ratio = 7:3.5:3, ocelli diameter being 2.5. Frons, gena and occiput smooth, shiny and glabrous except for few sparse setae..

Antennae. Cylindrical flagellomeres covered with pubescence. Female antennal formula:

7(3), 3(2.5), 10(2), 9(2), 8.5(2), 8.5(2), 7(2), 6.5(2), 6(2), 5(2), 5(2), 5(2), 7(2). Male antennal formula: 9(3), 3.5(3), 10(2), 9(2), 8(2), 8(2), 7.5(2), 7.5(2), 7(2), 7(2), 7(2), 7(2), 6.5(2), 8.5(2). Placodeal sensilla start at F1 in males.

Mesosoma. Pronotal plate coriaceous. Pronotum smooth and shiny with some punctuations,; lower pronotum carinate. Mesoscutal width 1.1 times its length in dorsal view. Mesoscutum smooth, shiny and almost glabrous except for few short setae. Notauli complete with strong transverse carinate sculpture (Fig. 2f); median mesoscutal furrow superficial and not clearly defined from mesoscutum. Parapsidal signum and parascutal sulcus absents. Scutellar length 0.6 times of mesoscutum length in dorsal view. Scutellum alutaceous to lightly carinate and shiny, divided in irregular cells by some short ridges (Fig. 2f). Scutellar foveae rounded, big and smooth, without any internal carinae and basally defined by a carina; lateral pits of scutellar foveae present but weakly excavated. Interfoveal line present. Circumscutellar carina complete and clearly defined, slightly projected at scutellar apex. Mesopleuron glabrous and shiny, divided by internally carinate transverse groove; alutaceous sculpture in anterior mesopleuron. Mesopleural triangle alutaceous and covered with dense pubescence. Metanotal troughs shortly coarse and densely pubescent. Propodeum slightly alutaceous and heavily pubescent, divided in large cells.

Forewings. Pubescent. Radial cell of fore wing closed, 2.6-2.8 times longer than wide. Marginal pubescence of fore wing denser at apical third.

Metasoma. Longer than head + mesosoma. Petiole from 1.3 to 2.0 times longer than metacoxa, smooth and shiny. Third metasomal tergum 2.0 times longer than fourth tergum in dorsal view. Fifth, sixth and seventh metasomal terga visible in dorsal view. Metasomal terga smooth and glabrous, punctate in anterior region of each tergum, more distinct from T4 to T7.

Biology. One male collected from *Hemerobius*; one female collected from a cocoon of an unknown hemerobiid larvae predating on *Adelges piceae* (Ratzeburg, 1844) (Hemiptera: Adelgidae).

Distribution. Nearctic and Neotropical. Known from California (Kieffer, 1907) (USA). First records for Canada (Alberta, British Columbia, New Brunswick, Ontario and Quebec), Colombia, Greenland, Mexico (Nuevo León and Mexico DF) and Venezuela; also for the states of Alaska, Arizona, Colorado, Georgia, New Hampshire, Ohio, Oregon and Utah (USA).

***Anacharis tucumana* Díaz, 1979**

(Figure 2b)

Anacharis tucumana Díaz, 1979: 26-27 (female)

Diagnosis. Species with smooth malar area and heavily elongated petiole, a set of characters not seen in other American *Anacharis,* except for the new species *A. luciae* and *A. mantocephala.* However, it presents a smooth mesoscutum with weak and incomplete notauli and lacks scutellar sculpture very similar to *A. eucharioides* (Dalman, 1818) (notauli complete and internally carinate and scutellum strongly areolate in *A. luciae* and *A. mantocephala*).

Type material of *Anacharis tucumana*. Holotype deposited at IFML.

Comments. We were not able to examine the type material of the species. However, after examining the pictures send to us by Dr. Emilia Pérez, we conclude *A. tucumana* is a valid species. The description of *A. tucumana* done by Díaz (1979) is complete enough for proper identification of the species to make a redescription unnecessary.

***Figites subcompressa* (Provancher, 1889) n. comb.**

Eucoila subcompressa Provancher, 1881: 237 (female)

Anacharis subcompressa; Provancher, 1889: 168 (female)

Type material of *Anacharis subcompressa.* Lectotype ♀ desposited in UL with the following labels: "*Anacharis subcompressa* Provancher" (white label); "Lectotype *Anacharis subcompressa* Provancher, Comeau '41" (red label); "Lectotype *Anacharis subcompressa* Provancher, Gahan and Rohrwer '15, Barron '71" (red label).

Comments. This specimen was originally described by Provancher as *Eucoila subcompressa*. Later, Provancher himself moved this species to the genus *Anacharis,* thus renaming it *Anacharis subcompressa*. When examining the type, it does not fit within the genus *Anacharis*, not even within the subfamily Anacharitinae; it lacks the synapomorphic characteristics mentioned before, while presenting characteristics of the genus *Figites* instead: oval-shaped head, non-overlapping mandibles, second abdominal tergite in the form of a collar and wrinkled, and heavily carinated lateral mesosoma. Hence, we move this species to the genus *Figites*, thus being renamed *F. subcompressa.*

Discussion

As mentioned before, prior to this study, the genus *Anacharis* comprised 13 species in America, all of them, with the exception of *A. mexicana* and *A. tucumana*, belonging to the Nearctic region. The study of the type material and a large sample of undetermined specimens has resulted in interesting taxonomic findings. *Anacharis subcompressa* was transferred to *Figites,* while *Aegilips nevadensis* was moved to *Anacharis* and synonymized with *A. marginata*, like *A. flavicornis, A. levifrons*, and *A. mellipes*. Also, two new species of *Anacharis,* closely related to *A. tucumana,* were described: *A. luciae* and *A. mantocephala.*

These changes decrease the number of New World *Anacharis* species to eight, with two of them being endemic to the Neotropical region — *A. tucumana* and *A. luciae* — for just one exclusively Nearctic species — *A. marginata.* This pattern, with no obvious differences between the Nearctic and the Neotropical regions, was also observed when revising *Xyalaspis*, another pan-American genus.

The most frequently collected species in the New World are *A. marginata* and *A. melanoneura*; the combined number of specimens represent two thirds of the overall examined specimens. *Anacharis tripartita* is the third most abundant species, representing about one quarter of the total of specimens included in the study. The other species are significantly scarcer: *A. mexicana* and *A. punctatifrons* represent a small portion of all the specimens examined, while for the newly described *A. mantocephala* and *A. luciae*, only a few specimens were collected. No specimens have been found for *Anacharis tucumana*; this can be attributable to the absence of material from Argentina, where we found the only known location of this species. It should be noted, however, that among our samples, there is an underrepresentation of Neotropical material compared to the Nearctic one.

The extension of the known distribution area of each species has no relation with its abundance of specimens. Despite being the most abundant species among the studied samples, *Anacharis marginata* presents a smaller known distribution area when compared with other American *Anacharis*: it has been abundantly collected in the Eastern Coast and Northwest of North America; with its southernmost representatives being collected in Northeastern Mexico. *Anacharis melanoneura* has also been collected in Southwestern North America, the Caribbean islands, and as far south as Colombia. *Anacharis tripartita* and *A. punctatifrons* present similar distribution

patterns: both have been collected along all the Nearctic region – from the Arctic to Northern Mexico– and reach the northernmost countries of the Neotropical region. *Anacharis mexicana* is also known throughout the entire Nearctic region, but it has a more meridional limit regarding its distribution area, being collected as far as Bolivia.

Anacharis mantocephala is a case worth mentioning; despite being very scarcely collected, it is known to occur along the Neotropical region, being collected in Bolivia, Colombia, and Costa Rica, and also being found in South Carolina, which makes us consider it has a relatively abundant distribution area, comprising most of North and South America. The other newly described species, *A. luciae*, as previously mentioned, seems to be endemic to the Neotropical region, being cited from the Dominican Republic in the Caribbean and in Colombia, Venezuela, and Southern Brazil on the mainland.

The American *Anacharis* species present interesting particularities in regards to their morphological diversity. As mentioned in the introduction, the elongated petiole has previously been considered as a synapomorphic characteristic of this genus. However, the American species *A. marginata* and *A. mexicana* present a shorter petiole, never exceeding 1.3 times the length of the metacoxa, while in the remaining know *Anacharis* species, the petiole is about twice as long as the metacoxa. *Anacharis tucumana, A. luciae*, and *A. mantocephala* represent the other side of the spectrum: the petiole in these species is even more elongated than usually found in the genus, reaching 2.5 times the length of the metacoxa in some cases. These three species also share a completely smooth malar area, a feature not seen in any other *Anacharis* – other species present a coriaceous sculpture. These characteristics may suggest a close relationship between these species.

The dorsal sculpture of the mesosoma and the extension and percurrence of notauli are also

characteristics with taxonomical significance among Cynipoidea. The American *Anacharis* present a wide range of mesosomal sculpture. Regarding the mesoscutum surface, they never reach the strong sculpture we can see in *Xyalaspis*; most species present a smooth and shiny mesoscutum. However, there are some exceptions: *A. melanoneura* presents a rugose sculpture more or less extended between the notauli, in some specimens being coriaceous at the base of the notauli. In contrast, *A. marginata* shows a wide range of mesoscutal variability, from being rugose at the base of the notauli and the anterior portion of the notauli to being completely smooth.

More useful characteristics for distinguishing between the American species of *Anacharis* are those related with the notauli and the scutellum. Regarding the notauli, we can find complete, deeply excavated, and strongly carinate notauli in *A. luciae*, *A. mantocephala*, *A. melanoneura*, and *A. tripartita.* In addition, *A. puncatifrons* presents complete and deeply excavated notauli, albeit they are never internally carinate. The notauli in *A. marginata* are weaker, highly superficial in the anterior third of mesoscutum in some specimens, and although presenting internal carinae, they are not as strong and apparent as those of the previously mentioned species. *Anacharis mexicana* and *A. tucumana* represent the least developed state of this characteristic, with both species having incomplete and superficial notauli. In regards to the range of variation in the sculpture of the scutellum, there is a strongly areolate scutellar surface in *A. mantocephala*, *A. marginata*, and *A. melanoneura*. The next stage in scutellar sculpture can be found in *A. tripartita*, in which the scutellum carinae are weaker, in some cases resembling a rugose surface. *Anacharis luciae* presents a smooth scutellum with some weak carina, whereas *A. mexicana, A. punctatifrons,* and *A. tucumana* present a completely smooth and shiny scutellum. *Anacharis mexicana* is characterized by lacking basal carinae in the scutellar foveae; they are therefore not separated from the rest of the scutellum, but form a continuous smooth surface.

Our knowledge about Anacharitinae biology is still relatively incomplete, as previously mentioned. This study, although not exhaustive in this aspect, has shown some interesting results. Some of the examined *Anacharis marginata* specimens were collected from cocoons of Hemerobiidae; in three cases, more information about the host was reared: one female was collected from *Micromus* cocoons, while another two specimens (one female and one male) were collected from *Hemerobius humulinus* cocoons. In addition, *A. tripartita* has been confirmed as parasitoid of Hemerobiidae; sadly, we could not obtain any further information about the host species or genus. However, our study contributes to the knowledge on *Anacharis* biology. Currently, it is the member of the subfamily with the wider range of known hosts and the only genus about which we have reliable information in terms of its life cycle as a parasite. Further work is necessary to improve our understanding of the biology of Anacharitinae.

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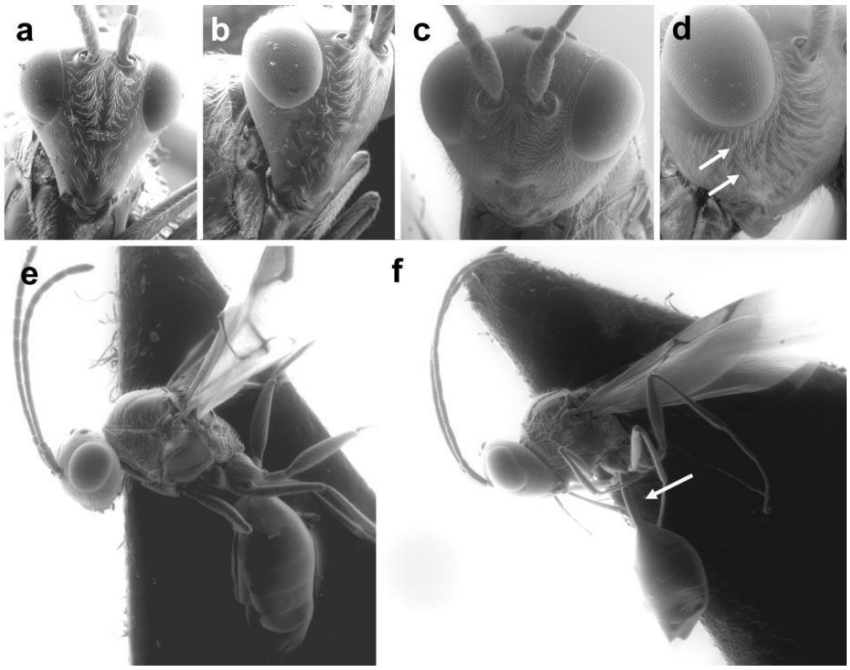
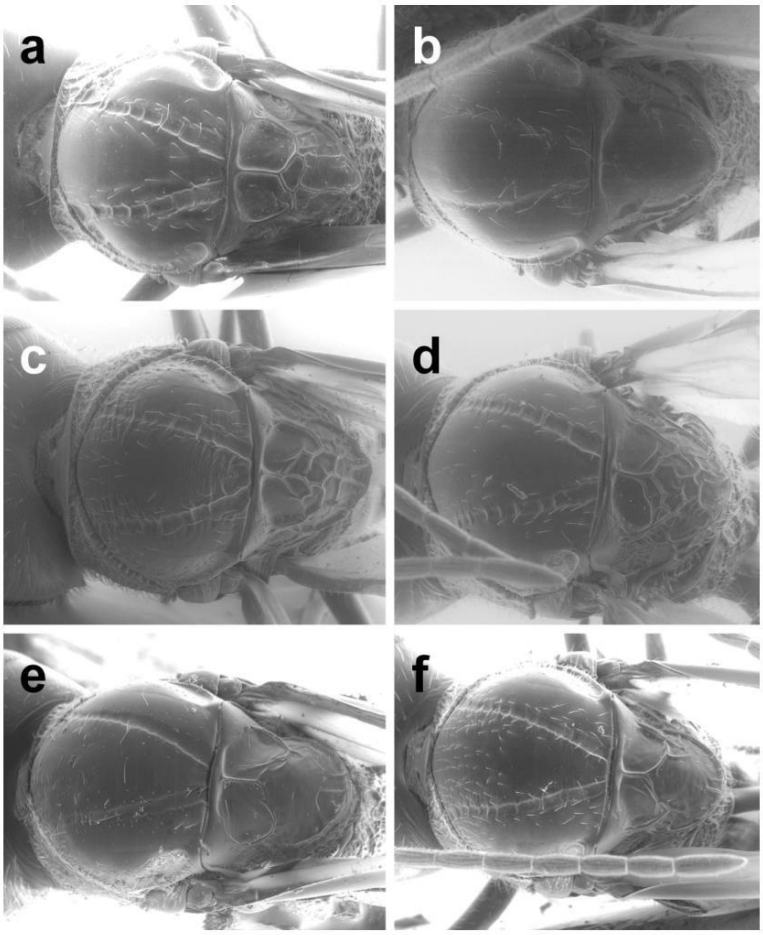


Figure 1. *Anacharis mantocephala* **sp. n**: head in (a) anterior view and (b) lateral view. *Anacharis marginata*: head in (c) anterior view and (d) lateral view. Lateral view of: (d) *Anacharis mexicana*; (e) *Anacharis luciae* **sp. n**.



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Figure 2. Mesosoma in dorsal view of: (a) *Anacharis luciae*; (b) *Anacharis tucumana*; (c, d) *Anacharis melanoneura*; (e) *Anacharis punctatifrons*; (f) *Anacharis tripartita.*

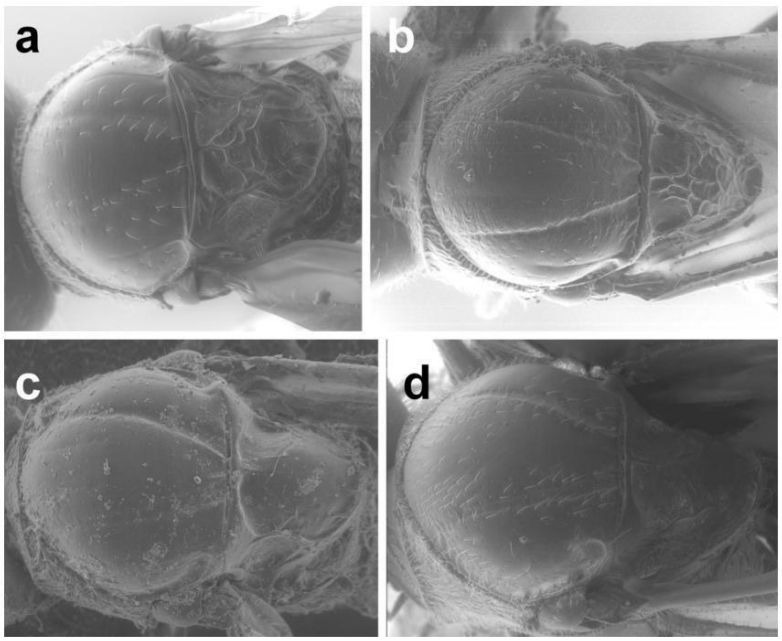


Figure 3. Mesosoma in dorsal view of: (a, b) *Anacharis marginata*; (c, d) *Anacharis mexicana.*

4.2.18. *Cornaegilips* gen. n.

Section: Systematics, Morphology and Physiology

Cornaegilips gen. n. (Hymenoptera: Cynipoidea: Figitidae: Anacharitinae) from Andean region, with an identification key to the genera of Anacharitinae worldwide

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Running title: *Cornaegilips* gen. n. from Andean region

ABSTRACT

Cornaegilips **gen. n.** is described to accommodate *Aegilips chilensis* Bréthes, 1918. The previously known species *Aegilips chilensis* is not considered belonging to *Aegilips* anymore but a new endemic genus of Andean region, *Cornaegilips* **gen. n.** characterized for presenting cephalic anteroposteriors processes resembling spines formed from the postgenal carina. This and other diagnostic characters are exposed and illustrated, and morphological affinities with other Anacharitinae genera are discussed. Redescription and photographs of *Cornaegilips chilensis* comb. n. are given. An updated key to the genera of Anacharitinae worldwide and illustrations are included.

Key words: Andean, Hemerobiidae parasitoids, Anacharitinae, *Aegilips chilensis*, *Cornaegilips*.

INTRODUCTION

Anacharitinae is one of the 12 subfamilies comprising the cynipoid wasp family Figitidae (Paretas-Martínez *et al.* 2011). The members of this subfamily can be easily distinguished from other figitids by three main synapomorphies (Ros-Farré *et al.* 2000): (1) triangular-shaped head in frontal view (although in some specimens a secondary expansion of the malar area makes it more square-shaped), (2) rounded and continuous pronotal plate, and (3) small broadly overlapping mandibles. Anacharitinae presents also a distinct biology; while most figitid subfamilies are parasitoids of cyclorrhaphan flies (Ronquist 1999), the

anacharitines have been reported attacking the aphid-feeding larvae of Hemerobiidae (Neuroptera) (Díaz 1979, New 1979, Kierych 1984, Miller & Lamdin 1985, Fergusson 1986, Cave & Miller 1987, Ronquist 1999, Mata-Casanova *et al* 2014a).

The subfamily currently includes nine genera: *Acanthaegilips* Ashmead, 1896; *Acanthaegilopsis* Pujade-Villar, 2013; *Aegilips* Haliday, 1835; *Anacharis* Dalman, 1823; *Calofigites* Kieffer, 1909; *Hexacharis* Kieffer, 1907; *Proanacharis* Kovalev, 1996; *Solenofigites* Díaz, 1979 and *Xyalaspis* Hartig, 1843. Anacharitinae can be divided between those genera presenting a groove on the mesopleuron (whether it is oblique as in *Acanthaegilips* or *Solenofigites,* or longitudinal as in *Anacharis, Calofigites* and *Hexacharis*) and those without a groove on the mesopleuron (genera *Acanthaegilopsis, Aegilips* and *Xyalaspis*). *Acanthaegilopsis, Aegilips, Proanacharis* and *Xyalaspis* also present a secondary expansion of the malar area giving them a sub-quadrangular head in front view.

While Anacharitinae presents a cosmopolitan distribution being present on all continents except for Antarctica, the bulk of diversity is located in the Neotropical region, where six genera are present, three of them are endemic (*Acanthaegilips, Calofigites* and *Solenofigites*). Three other genera are: *Aegilips, Anacharis* and *Xyalaspis*. Genus *Aegilips* in the Andean region was only represented by only one species, *Aegilips chilensis* Bréthes, 1918 known from Chile and Argentina. More recent studies on American *Aegilips* (unpublished data) have shown a greater diversity of this genus in the Neotropical region.

Examination of *Aegilips chilensis* type material has shown the presence of some characters that separate it from other *Aegilips* species, and the cephalic projections are unique among Anacharitinae. So taken into account this rare character, we propose the creation of a

new monotypic genus *Cornaegilips* **sp. n.** and a new combination *Cornaegilips chilensis* (Bréthes, 1918) **comb. n.** We also present an updated key for Anacharitinae genera.

MATERIAL AND METHODS

For this study, specimens of *Aegilips chilensis* deposited in Museo Argentino de Ciencias Naturales "Bernardino Rivadavia" (MACN, Buenos Aires, Argentina), Museo de La Plata (MLP, La Plata, Argentina) have been studied, along with undetermined specimens deposited in the Canadian National Collection of Insects, Arachnids and Nematodes (CNC, Ottawa, Canada) and the Natural History Museum (NHM, London, United Kingdom) collections.

Morphological terms used are those of Richards (1977), Ronquist (1995) and Ros-Farré *et a.* (2003). All measurements are relative except for the body length. Measurements and abbreviations include: F1–F12, first and subsequent flagellomeres; POL (post-ocellar distance) is the distance between the inner margins of the posterior ocelli; OOL (ocular-ocellar distance) is the shortest distance between the inner margin of the compound eye and the outer edge of the posterior ocellus; LOL (lateral–frontal ocellar distance) is the distance between the edges of the lateral and frontal ocelli. Antennal formula includes scape, pedicel and flagellomeres length and relative width in brackets. Biogeographical regions are according to Morrone (2001, 2015).

Images were taken at the 'Serveis Científico-Tècnics' of the University of Barcelona. The field-emission gun environmental scanning electron microscope (Quanta 200 ESEM) was used for high-resolution imaging, under a low voltage (12.0 kV) and without gold-

coating of the specimens in order to preserve the material.

RESULTS

New taxa

Cornaegilips Mata-Casanova & Pujade-Villar gen. n.

Type species: *Aegilips chilensis* Bréthes, 1918

Diagnosis. *Cornaegilips* **gen. n.** lacks mesopleural groove, a character that makes it member of the complex of closely related genera formed by *Acanthaegilopsis, Aegilips* and *Xyalaspis. Cornaegilips* **gen. n.** also lacks scutellar spine, thus separating it from *Acanthaegilopsis* and *Xyalaspis* and making it morphologically similar to *Aegilips.* However, *Cornaegilips* **gen. n.** presents a smooth malar area without the coriaceous sculpture always present in *Aegilips.* This trait is not enough to consider it as a distinct genus because it presents some intrageneric variability within other Anacharitinae genera such as *Anacharis* (Mata-Casanova *et al.* 2015) and *Xyalaspis* (Mata-Casanova *et al,* 2014b). *Cornaegilips* **gen. n.** presents postoccipital carina like *Solenofigites;* however, in *Cornaegilips* **gen. n.** the postoccipital carina is projected backwards forming two spiky anteroposterior processes, a character absent in other Anacharitinae.

Etymology. The name of genus *Cornaegilips* indicates the horn-like postgenal processes.

Biology. Parasitoids of genus *Sympherobius* Banks, 1904 (Neuroptera) (Loiácono & Díaz, 1977).

Distribution. Andean region.

***Cornaegilips chilensis* (Bréthes, 1918) n. comb.**

Aegilips chilensis Bréthes, 1918: 164 (female)

Type material. CHILE. Lectotype ♀ deposited at MACN with the following labels: "Santiago de Chile, 1918, Porter leg" (white label). Paralectotype ♀ deposited at MACN with the following labels: "Santiago de Chile, 1918, Porter leg" (white label).

Additional material (12♀ & 18♂). CHILE:

"4♂, Puerto Fui, Valdivia, Chile, 4.III.1955: L. E. Pena leg" (CNC); "1♂, Carambide, Arauco, 10.II.1955: L. E. Peña leg" (CNC); "1♀, Las Trancas, Nuble, 30.II.1956: L. E. Peña leg" (CNC); "1♂, Puerto Eden, Isla Wellington, 49°S, 350ft, 3.XII.1958: collector unknown" (NHM); "1♂ & 1♀, Pichinahuel, Cord. Nahuelbuta, Arauco, 11-1400m, 1-10.I.1959: L. Peña leg" (CNC); "1♂, Río Blanco, Curarantín, Malleco, 21-31.I.1959: L. E. Peña leg" (CNC); "1♂, El Coigo, Curico, 1-25.X.1960: J. Foerster leg" (CNC); "1♂, El Coigo, Curico, 10-20.X.1960: J. Foerster leg" (CNC); "1♀, Perto Crital, Lag. Buenos Aires, Aysen, 9-10.I.1961: L. Peña leg" (CNC); "1♂ & 1♀, El Coigo, Curico, 1-7.II.1961: J. Foerster leg" (CNC); "1♂ & 1♀, La Vinilla, Cord. Curico, 14-16.II.1961: L. E. Peña leg" (CNC); "1♀, Las Trancas, Nuble, 6.XII.1964: L. E. Peña leg" (CNC); "1♀, Los Alpes, Nahuelbuta N. P., 17.I.1985: I.D. Gauld leg" (NHM); "1♀ & 1♂, Conguillio N. P., 23.I.1985: I.D. Gauld leg" (NHM); "2♂, Rincón de la Pícara, Valdivia, 31.I.1985: I.D. Gauld leg" (NHM); "1♀, Los Alpes, Nahuelbuta N. P., II.1985: I.D. Gauld leg" (NHM); "3♀, Chiloe, 24km N of Castro, 9.II.1985: I.D. Gauld leg" (NHM); "1♂, J. Fernández Island, Plazoleta-El Yunque, 23-29.I.1992: S. Marshall leg" (CNC). ARGENTINA: "3♂, Pucará, Lacar, Neuquén, Argentina,

II-1953: V. O y A. Ogloblin coll."; "2♀; La Cruz, Chile, I-1967: Rojas Poblete leg" parasito de Synpherobius(Neuróptero); "2♂, Isla Victoria, Rio Negro, Argentina, 27-XII-70, Nauman coll", "1♀ & 1♂, Isla Victoria, Rio Negro, Argentina, 15-26.XII.1971, Nauman leg". (MLP); "2♂, El Bolsón, Río Negro, Argentina, 29.X.1962: A. Kovacs leg" (NHM). ISLAS MALVINAS/FALKLANDS: "1♀, Puerto Argentino/Port Stanley, 16.XII.1981: M. Vogel leg" (NHM).

Redescription.

Female. Length. Body: 1.9-2.4 mm. Wings: 2-2.8 mm. Antenna: 1.8-2.1 mm (♀),

Coloration. Head, mesosoma and metasoma black. Mandibles yellowish brown with darker teeth. Antennae brown. Legs and coxae yellowish, coxae and femur darker. Wings hyaline, dark yellow veins.

Head. Head triangular-shaped in front view; as high as wide in front view and 2.2 to 2.5 times its length in dorsal view. Face smooth and shiny with piliferous punctures, covered by short hairs uniformly distributed. Malar area smooth, absence of malar sulcus. Transfacial line 1.2 times the height of the compound eye. Diameter of the toruli shorter than intertorular distance but equal to eye-torulus distance. Clypeus shortly defined, convex, smooth and glabrous. Occipital carina absent; postgenal carina present, forming two spiky occipital anteroposterior processes (Fig. 1 a-d): one behind compound eye and another in rear malar area. Compound eyes completely glabrous. Ocelli almost arranged in line; POL: OOL: LOL ratio = 5.5: 6.0: 2.0, being the ocelli diameter 2; Frons smooth and shiny, almost glabrous except for some pubescence near the margin of the compound eye.

Antennae. Cylindrical flagellomeres, covered with pubescence. Female antennal formula: 8(3), 3(2.5), 6.5(2), 6.5(2), 6(2), 6(2), 5(2.5), 5(2.5), 4.5(2.5), 4(2.5), 4(2.5), 4(2.5), 6(2.5). Placodeal sensilla start on F2.

Mesosoma. Pronotal plate alutaceous and covered by short pubescence. Pronotum (Fig. 1a) without microsculpture but carinated: lower region obliquely carinated, while upper pronotum presents vertical carinae; pubescence density variable. Mesoscutum (Fig. 1b) width 1.2 to 1.3 its length in dorsal view. Mesoscutum smooth and almost glabrous in its central region, pubescence reduced to the margins of the mesoscutum. Notauli complete but weakening in as they reach the anterior edge, not internally carinated; median mesoscutal furrow absent. Parapsidal signum present but weak; parascutal sulcus absent. Scutellum (Fig. 1b) smooth and glabrous, surrounded by a circumscutellar carina. Scutellum 0.7 to 0.9 times the length of the mesoscutum in dorsal view. Scutellar foveae big and smooth, not basally defined; in some specimens basal carinae of scutellar foveae completely disappeared, making the foveae undistinguishable from scutellar surface. Lateral pits of scutellar foveae absent. Interfoveal line incomplete, short and weak, disappeared in some specimens. Mesopleuron (Fig. 1a) smooth, glabrous and shiny, crossed in the anterior half by some weak oblique ridges. Mesopleural triangle smooth and shiny, covered with sparse hyaline pubescence. Propodeum (Fig. 1a) alutaceous and pubescent; central area glabrous divided by a longitudinal median carina.

Wings. Pubescent. Radial cell of forewing closed, 2.8 times longer than wide. Marginal pubescence of the wing denser at the apical third.

Metasoma. Petiole two times longer than wide, heavily carinated in all sides. Third abdominal tergum 3 times longer than the fourth abdominal tergum in dorsal view. Fifth, sixth and seventh abdominal terga are visible in dorsal view. Metasoma glabrous and smooth; anterior region of the abdominal tergum punctuated from fifth to seventh terga.

Male. Similar to female. Length of antenna 1.9-2.2 mm (♂).Antennal formula: 7(2.5), 3(2), 6(2), 6(2), 6(2), 6(2), 6(2), 6(2), 5(2), 5(2), 5(2), 5(2), 4.5(2), 6(2). Placodeal sensilla start at F1. POL: OOL: LOL ratio = 5.5: 5.0: 3.0 being the ocelli diameter 2.

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Host. *Sympherobius* sp. (Neuroptera).

Distribution. Andean region: Chilean Central subregion, Patagonian subregion and Subantarctic subregion.

Biogeographic considerations. Taxa from the Andean, Cape, Australian and Antarctic (fossils) regions are phylogenetically more closely related to each other than they are to those of either regions (Morrone 2015). The Malvinian fauna exhibits a great linkage to that from southernmost South America, these islands belong to the Subantartica sub-region, which is closely related to the Chilena Central subregion. All this, explains the distribution of *C. chilensis* as an endemic species of the Andean region.

Comments. In the original description of *Aegilips chilensis*, Bréthes did not designate holotype. In Loiácono and Díaz (1977), holotype was designed, which according to article 73.1.3 of the ICZN is incorrect. Due to this evidence, we designated the lectotype and paralectotype.

DISCUSSION

Weld (1952) separated Anacharitinae in two groups: one characterized by the presence of scutellar spine which included genera *Acanthaegilips* and *Xyalaspis*, and another group lacking this feature and including the remaining genera. As mentioned by Restrepo-Ortiz & Pujade-Villar (2010), this character is quite confusing and does not reflect monophyly (Ros-Farré *et al.* 2000; Buffington *et al.* 2007, 2012). Instead, a new division based on the presence

or absence of an oblique groove in the mesopleuron was proposed, thus separating *Acanthaegilips* and *Solenofigites* from the rest of Anacharitinae. *Anacharis*, *Calofigites, Hexacharis* and *Proanacharis* also present mesopleural groove, although it is not oblique but transverse. It should be taken into account that this character is not synapomorphic: *Proanacharis* is considered a basal Anacharitinae genus (Ros-Farré *et al.* 2000), while *Calofigites* is closer to *Acanthaegilips* and *Solenofigites; Anacharis* and *Hexacharis* are sister taxa (Buffington *et al.* 2007, 2012). The aspect of the groove also varies between genera: *Anacharis* and *Proanacharis* present a deeply excavated groove with internal carination, while the groove in *Calofigites* and *Hexacharis* is weaker and never internally carinated (even effaced in some *Hexacharis*).

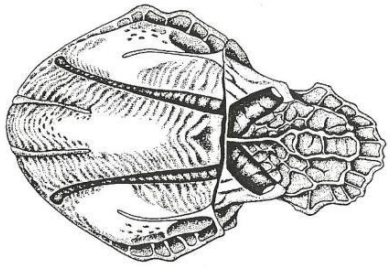
The remaining Anacharitinae genera – *Acanthaegilopsis, Aegilips, Cornaegilips* **gen. n.** and *Xyalaspis* – do not present any groove but a smooth mesopleuron with some wrinkled anterior sculpture which is covered by coriaceous sculpture in *Acanthaegilopsis*. These four genera are morphologically very similar and their monophyly is supported by phylogenetic studies (Ros-Farré *et al.* 2000; Buffington *et al.* 2007, 2012). As mentioned before, cephalic features are rare among the anacharitines; only *Solenofigites* presents postoccipital carina. *Cornaegilips* **gen. n.** is a rarity among anacharitines due to the occipital spiky processes.

The description of two new genera (*Acanthaegilopsis* and *Cornaegilips* **gen. n.**) and news papers on Anacharitinae taxonomy has rendered Restrepo-Ortiz & Pujade-Villar (2010) key obsolete. An updated key for Anacharitinae genera identification is given below.

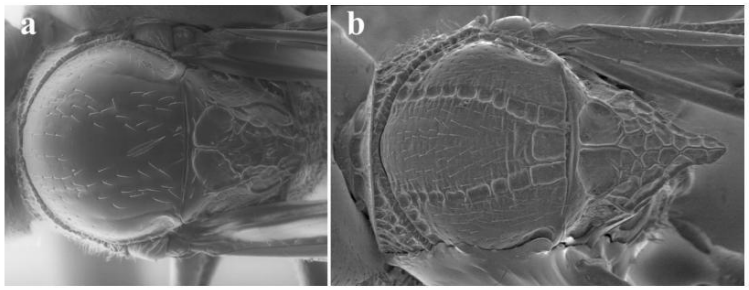
Key to genera of Anacharitinae

1. Circumscutellar carina forming a belt sculptured with scalloped skirting around the lateral and posterior margins of the scutellum resulting a margin irregularly undulating; forewing with dark spots and dark stripes along the veins.

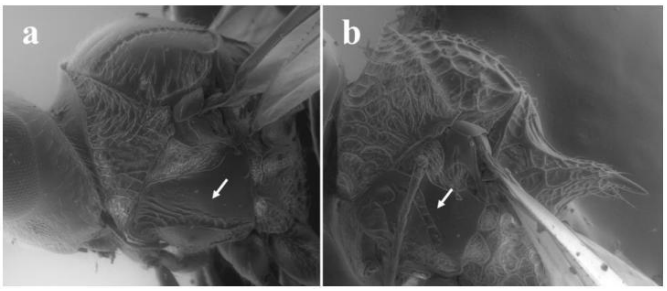
..…….....
..... ***Proanacharis*** **Kovalev** [One species: *Proanacharis miriabilis* Kovalev, 1996]



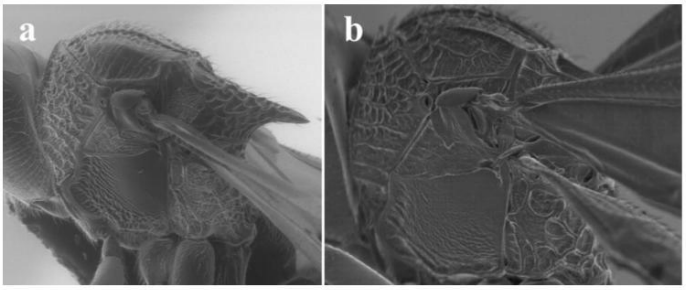
Circumscutellar carina narrow, not forming a belt (a), or absent, with a scutellar spine instead (b) ……..…….....2



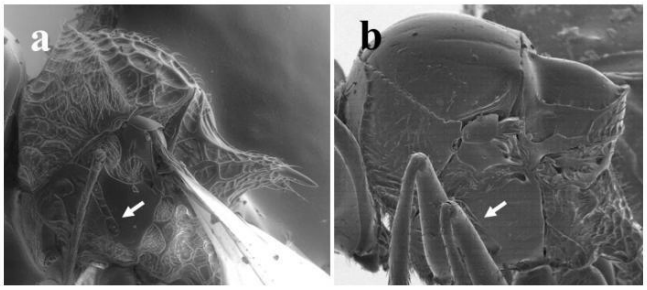
2. Mesopleural groove present, which can be much reduced in some specimens …..... 3



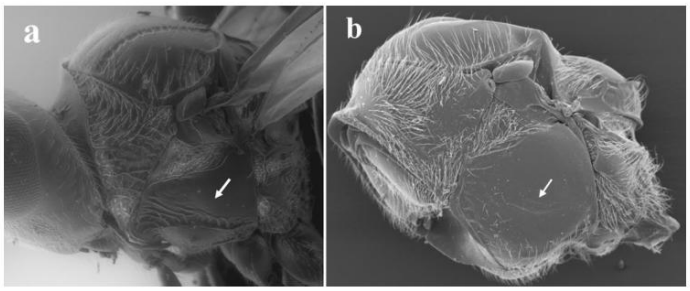
Mesopleural groove absent; mesopleuron with carinated sculpture variable in extension (a) or coriaceous sculpture (b) ……..... 7



3. Mesopleural groove originating on the juncture between the pronotum and the mesopleural triangle and obliquely crossing the whole mesopleuron. 4

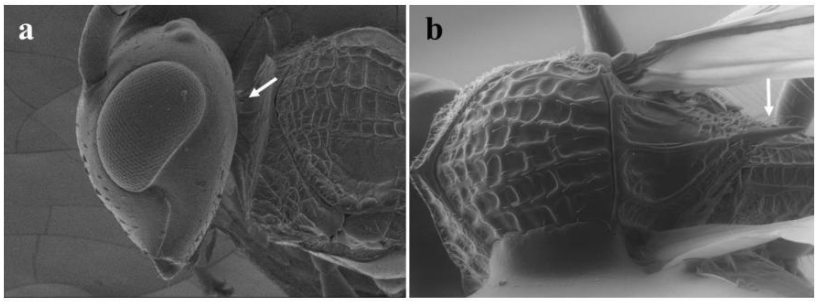


Mesopleural groove originating in the anterior edge of mesopleuron and longitudinally crossing the whole mesopleuron (a); in some specimens it can be reduced to almost having disappeared (b). 5

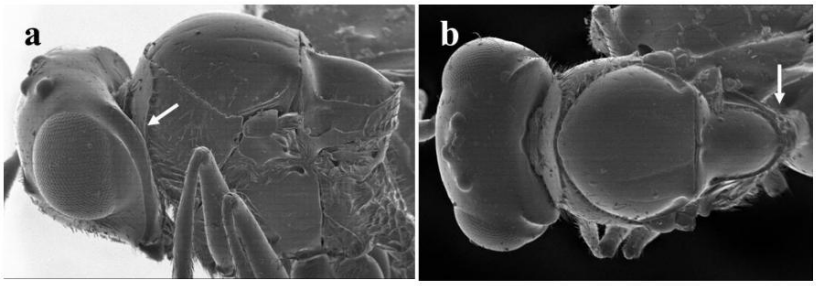


12

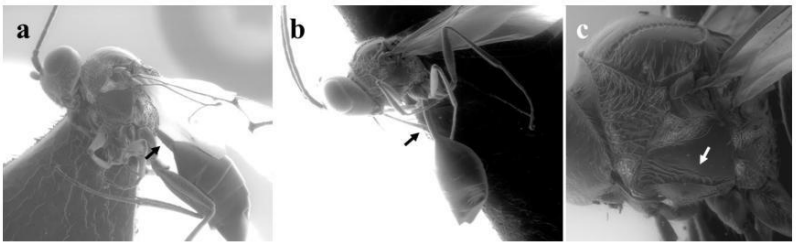
4. Occipital carina absent; malar groove present and well defined (a); circumscutellar carina developed in a strong scutellar spine (b). …….. ***Acanthaegilips*** **Ashmead**



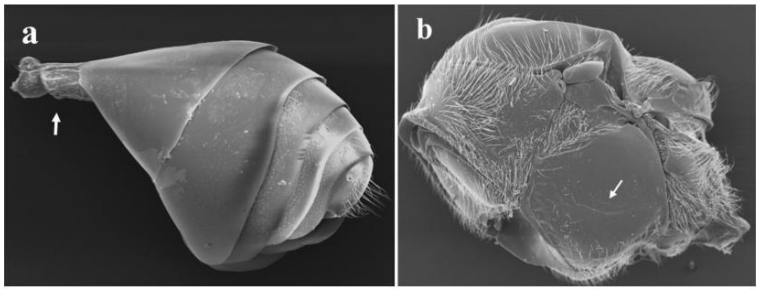
Occipital carina present; malar area smooth (a), without any groove or sulcus; circumscutellar carina narrow, no presence of scutellar spine (b). ……..... ***Solenofigites*** **Díaz** [One species: *Solenofigites lautus* Díaz, 1979]



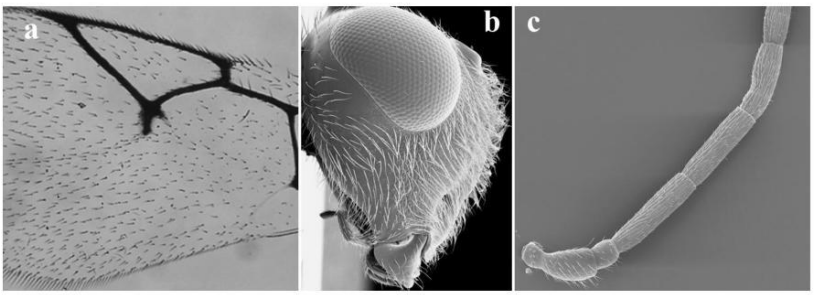
5. Elongated petiole, at least as long as third coxa (a), usually longer (b); transverse mesopleural groove strong, reaching end of mesopleuron and internally carinated (c); presence of some coriaceous sculpture in the anterior mesopleuron which can be extended to half of mesopleuron in some specimens. ……..... ***Anacharis*** **Dalman**



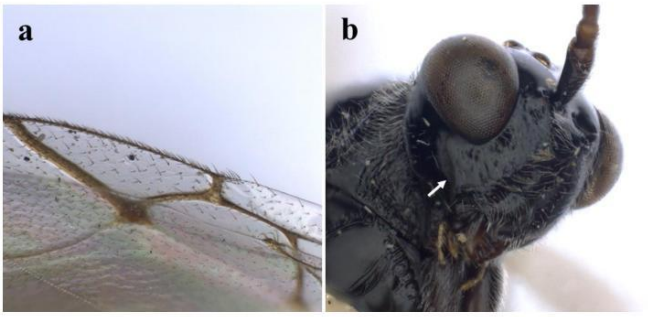
Petiole shorter than third coxa, usually as long as wide (a); transverse mesopleural groove rarely reaching the end of mesopleuron, disappeared in some specimens (b); mesopleuron without traces of coriaceous sculpture. …….....…..... 6



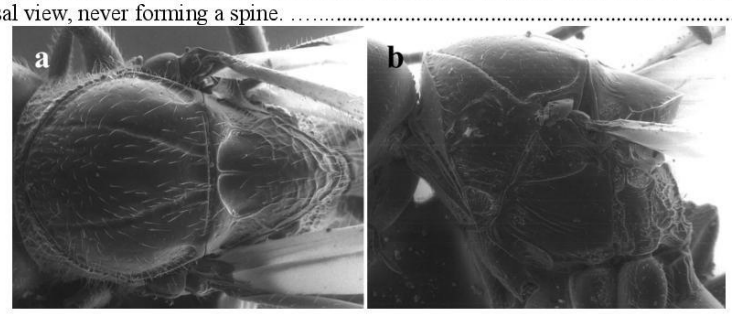
6. Vein 2rm elongated (a); malar sulcus coriaceous (b); male with the third flagellomeres amended, ventrally excavated on proximal one-thirds and expanded distally (c). … ***Hexacharis*** **Kieffer** [One species: *Hexacharis flavipes* Kieffer, 1907]



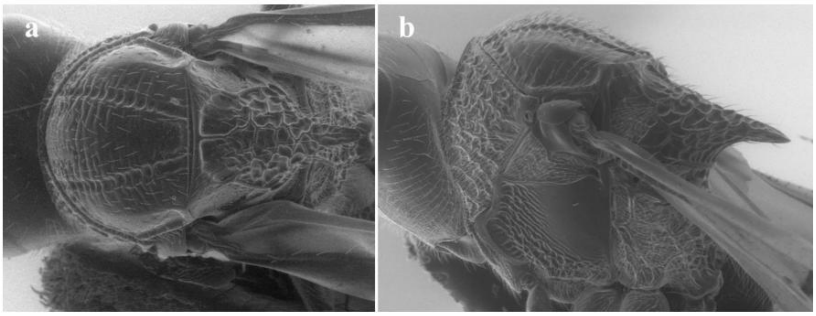
Vein 2rm absent (a); malar area smooth, without any groove or sulcus (b); male unknown. ……..... ***Calofigites*** **Kieffer**



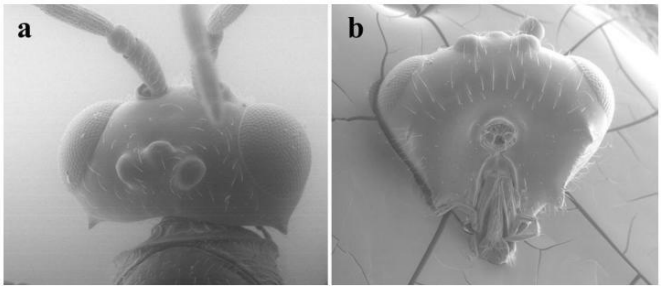
7. Circumscutellar carina present; scutellum rounded or slightly projected at the apex in dorsal view, never forming a spine. …….. 8



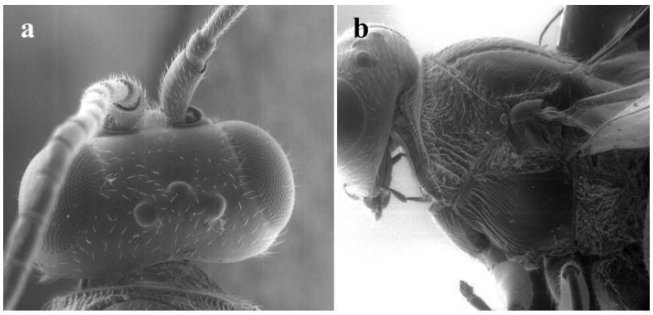
Circumscutellar carina absent; scutellum projected into a scutellar spine. ……..... 9



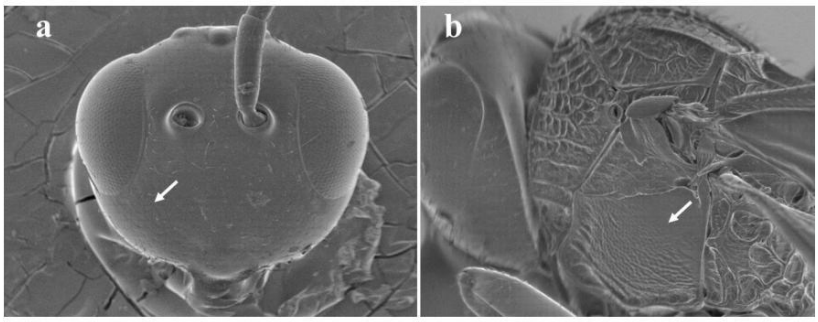
8. Occipital carina present; presence of spiky processes directed backwards in occipital region. …….. ***Cornaegilips* Mata-Casanova & Pujade-Villar** [One species: *Cornaegilips chilensis* (Bréthes, 1918)]



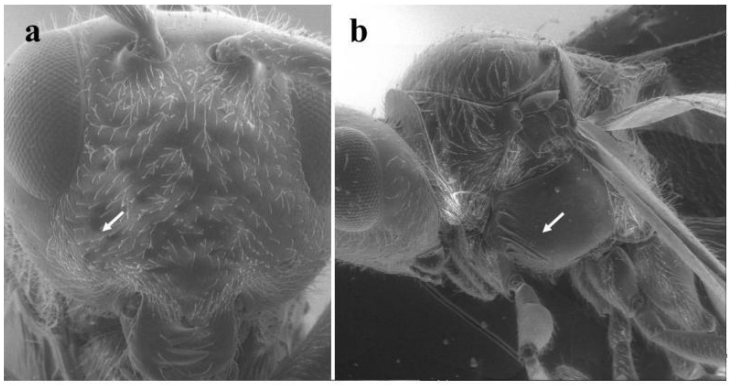
Occipital carina absent. Occipital region smooth. ……..…..... ***Aegilips*** **Haliday**



9. Malar area smooth (a); mesopleuron with coriaceous sculpture in the anterior region which can be extended to cover its whole surface (b). …… ***Acanthaegilopsis*** **Pujade-Villar**



Malar area with coriaceous band (a), reduced to the base of compound eye in some specimens; mesopleuron with some anterior carinae which can be extended to cover half of its surface, but never presenting coriaceous sculpture (b). .... ***Xyalaspis*** **Hartig**



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ACKNOWLEDGMENTS

Thanks are due to Arturo Roig Alsina (MACN), John Huber and Jennifer Read (CNC) and David Notton (NHM) for the loan of the material studied. To Comisión de Investigaciones Científicas de la Provincia de Buenos Aires (CIC), Universidad Nacional de La Plata (UNLP), Argentina, for their constant support. This study has been funded by project CGL2014-56151-P of the Science and Innovation Ministry of Spain and the grant BES-2012-060797 of the Ministry of Economy of Spain.

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systematic literature of the world up to date, including keys to families and subfamilies and list of new generic, specific and variety names. Ann Arbor, Michigan. Privately printed.

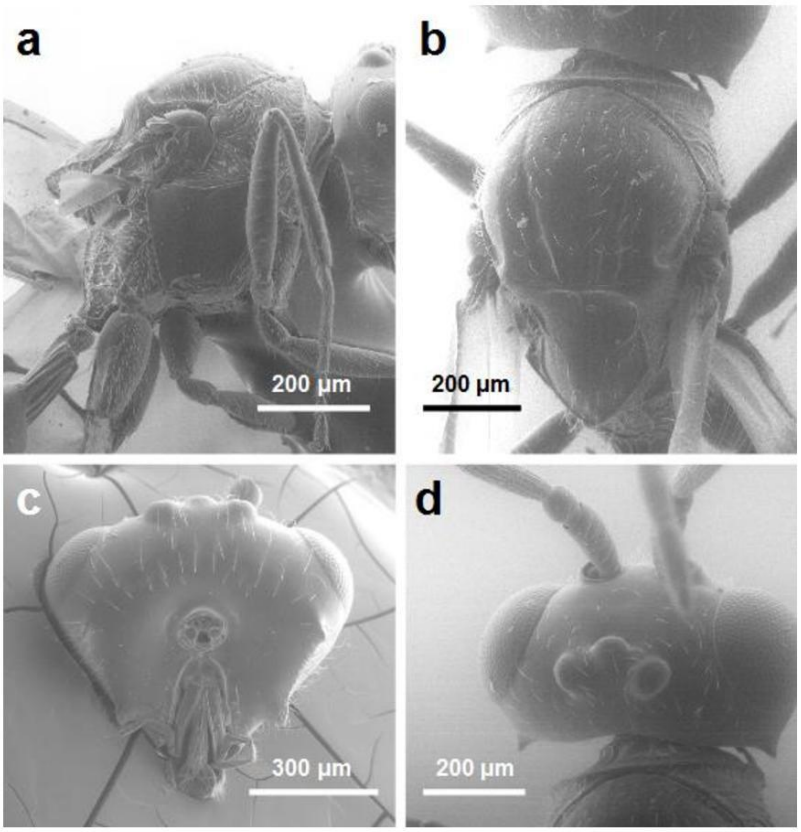


Figure 1. *Cornaegilips chilensis* **n. comb.**: (a) mesosoma in lateral view; (b) mesosoma in dorsal view; (c) head from rear view; (d) head in dorsal view).

4.3. Key to Anacharitinae genera and species

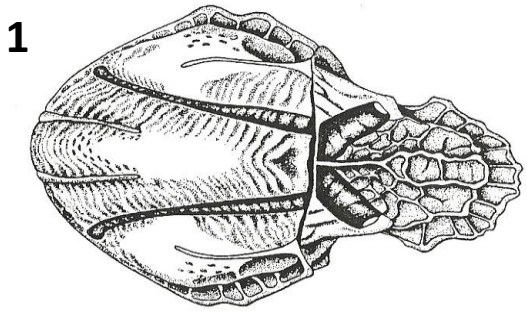
As listed before, one of the main objectives of the present thesis was the realization of keys for Anacharitinae species that could be used by entomologists, agronomists and other field specialists. Previous keys were outdated, and some genera keys were just based in unreliable characters.

An updated key for Anacharitinae genera was needed. Since Restrepo-Ortiz & Pujade-Villar (2010), two new genera have been described – *Acanthaegilopsis* and *Cornaegilips* – and some characters used are not useful anymore or quite confusing. Regarding genus *Acanthaegilips*, new species have been added to Ros-Farré *et al.* (2003) key. About *Aegilips, Anacharis* and *Xyalaspis*, new keys have been needed to made due to the last worldwide key for species of these genera was that of Dalla-Torre & Kieffer (1910), totally out of date and heavily relying on coloration, a useless character for Anacharitinae.

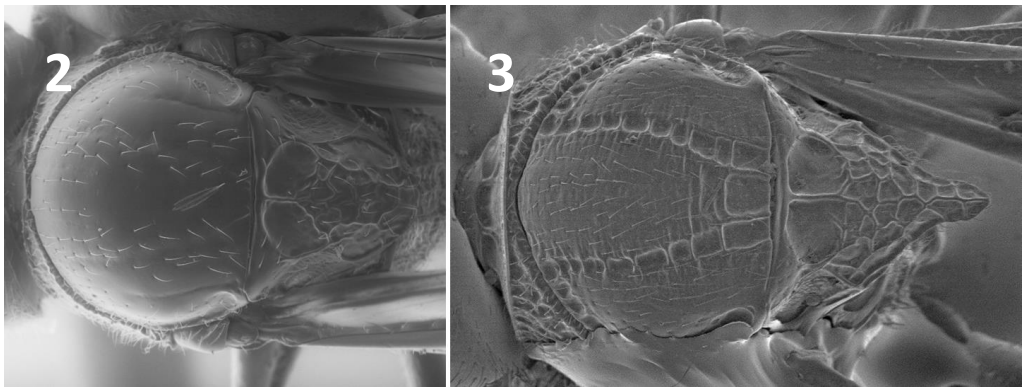
This represents the first modern attempt to summarize all the taxonomical information related to Anacharitinae. We are confident that it will mean a very useful tool for both people working on aphid pest control and entomology researchers.

Key to genera of Anacharitinae

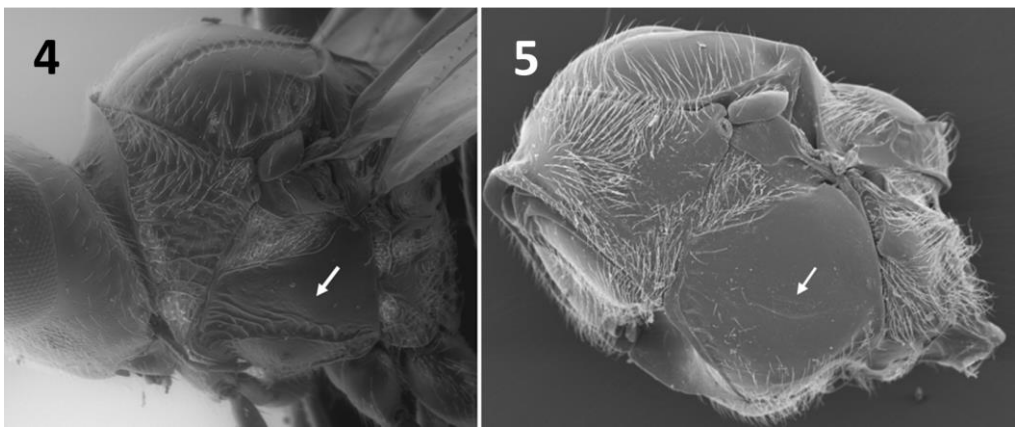
1. Circumscutellar carina forming a belt sculptured with scalloped skirting around the lateral and posterior margins of the scutellum resulting a margin irregularly undulating; forewing with dark spots and dark stripes along the veins [1]. ..... ……...***Proanacharis*** **Kovalev** [One species: *Proanacharis miriabilis* Kovalev, 1996]



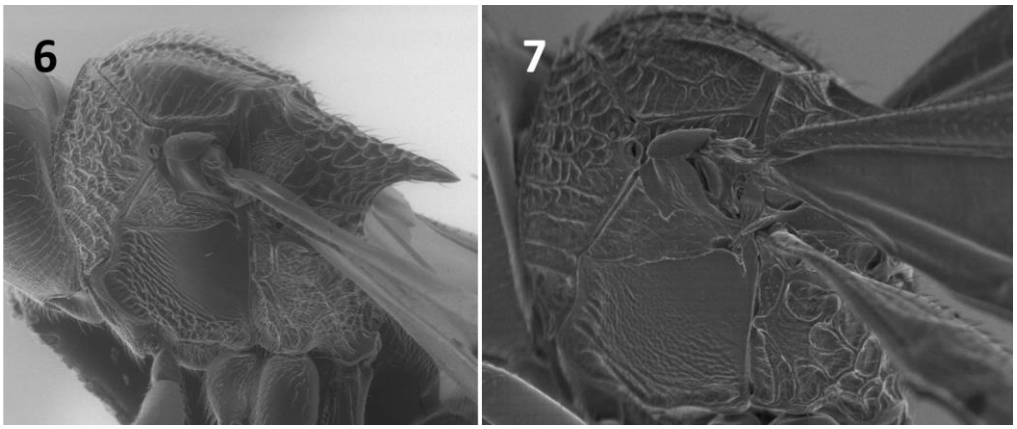
Circumscutellar carina narrow, not forming a belt [2], or absent, with a scutellar spine instead [3] ….....2



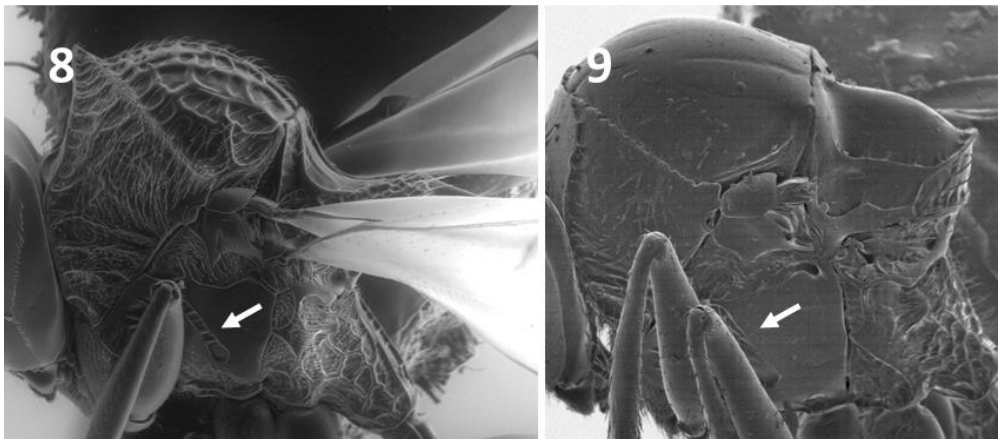
2. Mesopleural groove present [4], which can be much reduced in some specimens [5]. …….....3



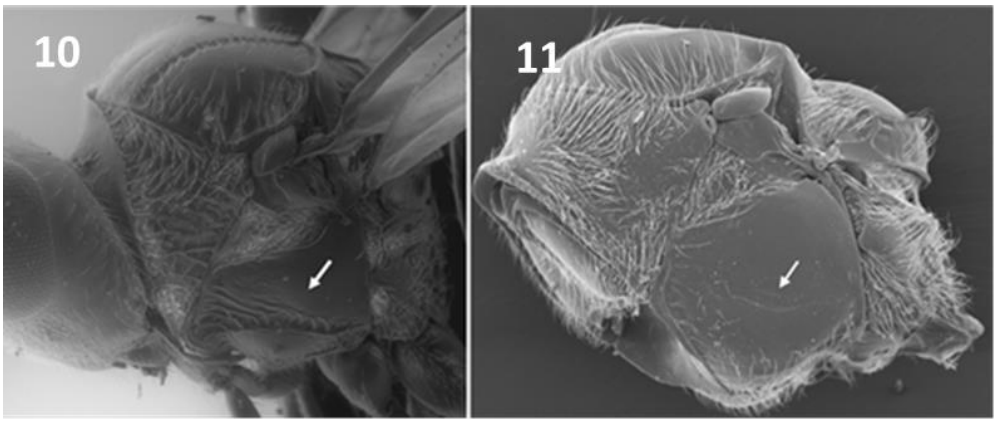
Mesopleural groove absent; mesopleuron with carinated sculpture variable in extension [6] or coriaceous sculpture [7] ……..... 7



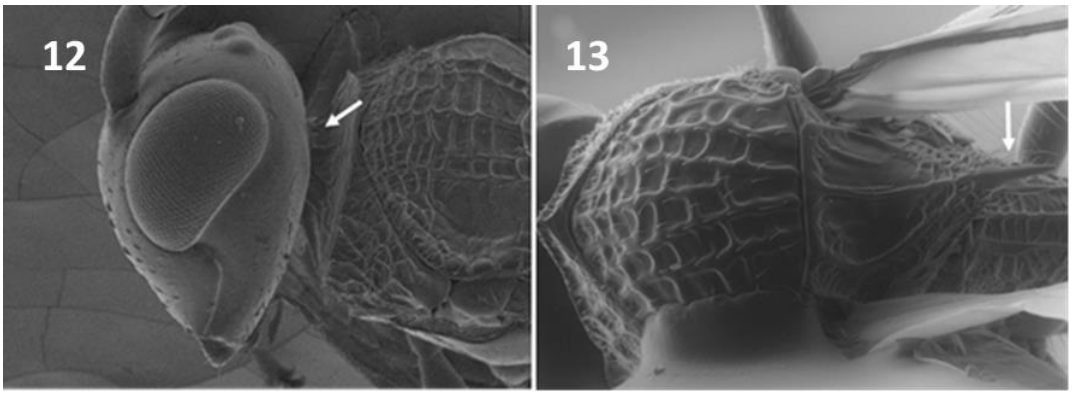
3. Mesopleural groove originating on the juncture between the pronotum and the mesopleural triangle and obliquely crossing the whole mesopleuron [8, 9]. 4



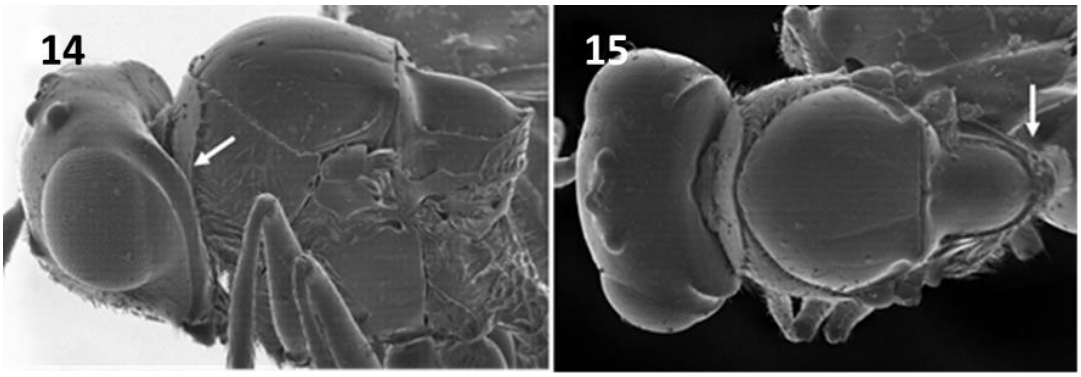
Mesopleural groove originating in the anterior edge of mesopleuron and longitudinally crossing the whole mesopleuron [10]; in some specimens it can be reduced to almost having disappeared [11]. …..... 5



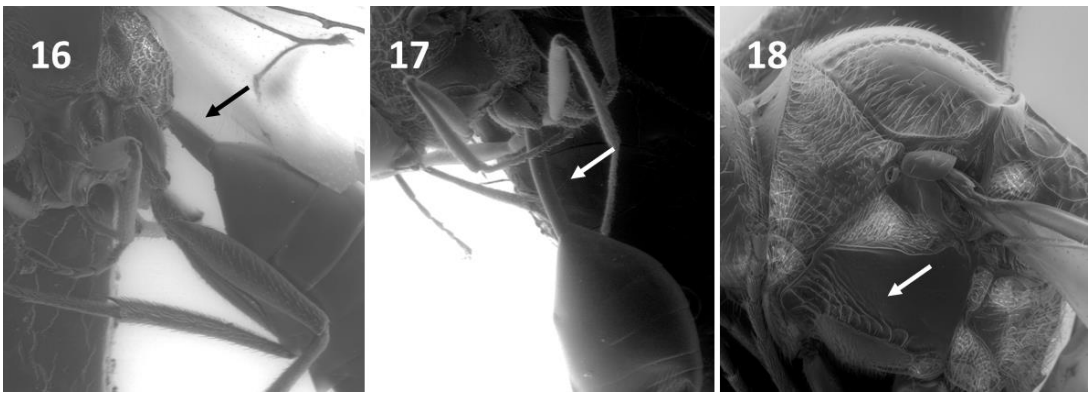
4. Occipital carina absent; malar groove present and well defined [12]; circumscutellar carina developed in a strong scutellar spine [13]. ……..... ***Acanthaegilips*** **Ashmead**



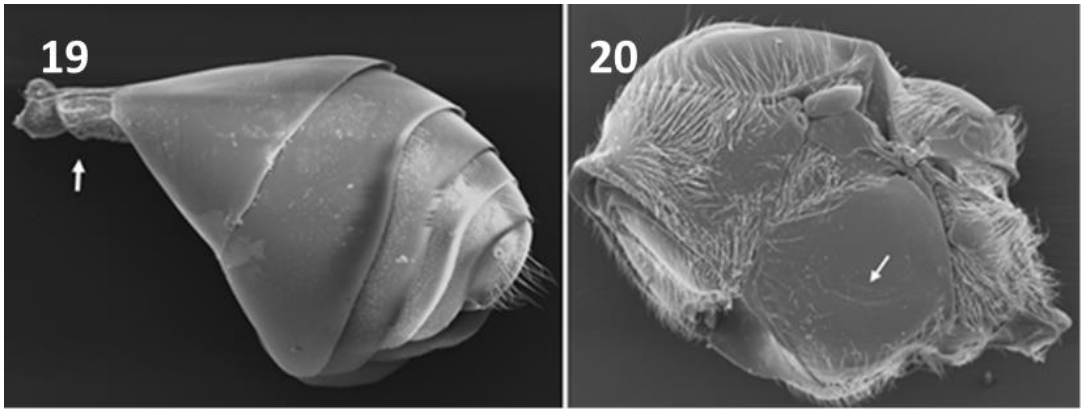
Occipital carina present; malar area smooth [14], without any groove or sulcus; circumscutellar carina narrow, no presence of scutellar spine [15]. ……..... ***Solenofigites*** **Díaz** [One species: *Solenofigites lautus* Díaz, 1979]



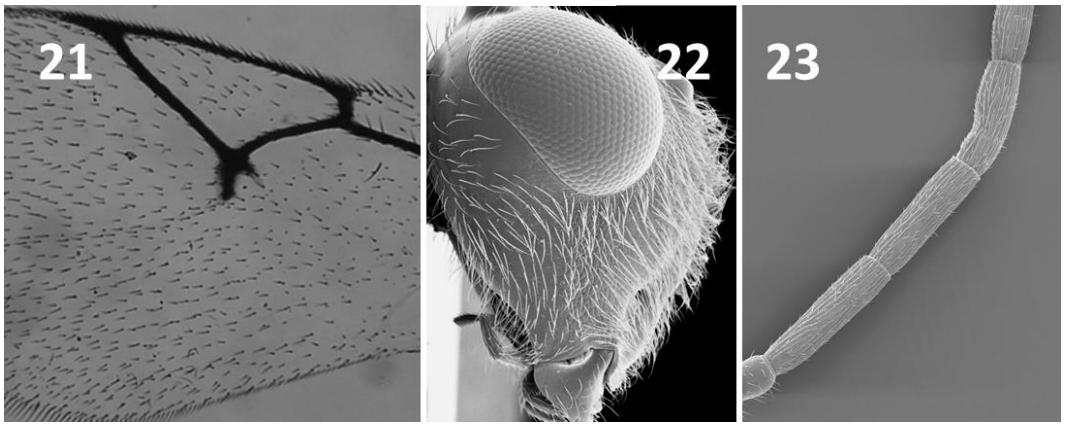
5. Elongated petiole, at least as long as third coxa [16], usually longer [17]; transverse mesopleural groove strong, reaching end of mesopleuron and internally carinated [18]; presence of some coriaceous sculpture in the anterior mesopleuron which can be extended to half of mesopleuron in some specimens. ……..... ***Anacharis*** **Dalman**



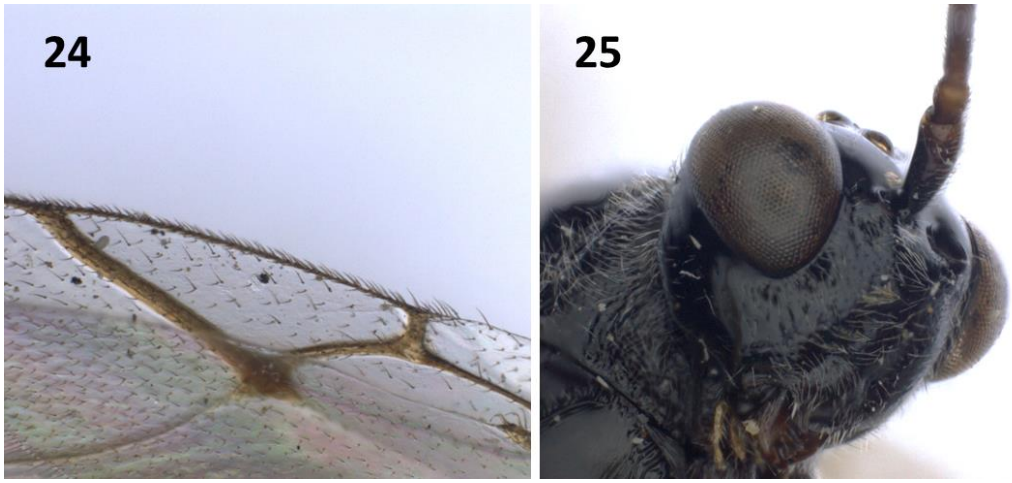
Petiole shorter than third coxa, usually as long as wide [19]; transverse mesopleural groove rarely reaching the end of mesopleuron, disappeared in some specimens [20]; mesopleuron without traces of coriaceous sculpture. …..... 6



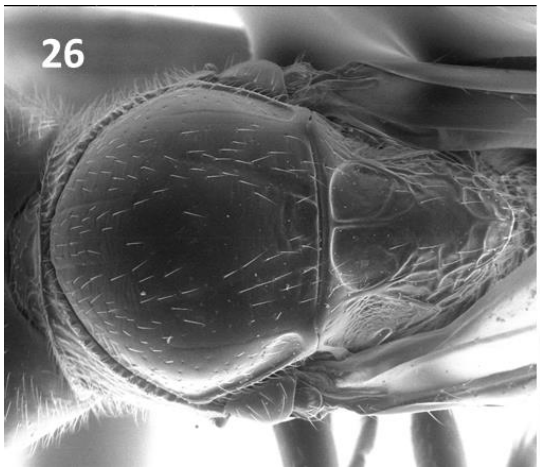
6. Radial cell always closed, vein 2rm elongated [21]; malar sulcus coriaceous [22]; male with the third flagellomeres amended, ventrally excavated on proximal one-thirds and expanded distally [23]. ……
……...…….. ***Hexacharis*** **Kieffer** [One species: *Hexacharis flavipes* Kieffer, 1907]

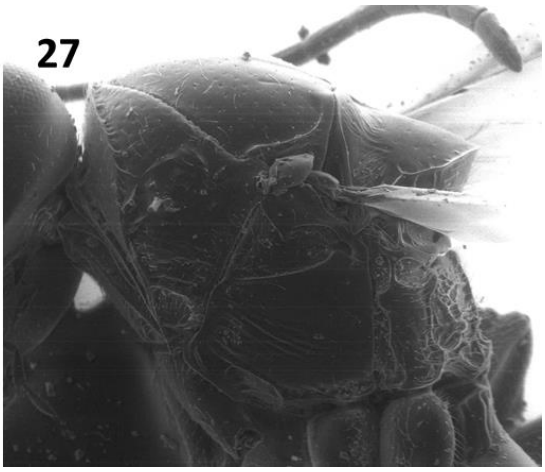


Radial cell sometimes open, vein 2rm absent [24]; malar area smooth, without any groove or sulcus [25]; male unknown. …..... ***Calofigites*** **Kieffer**

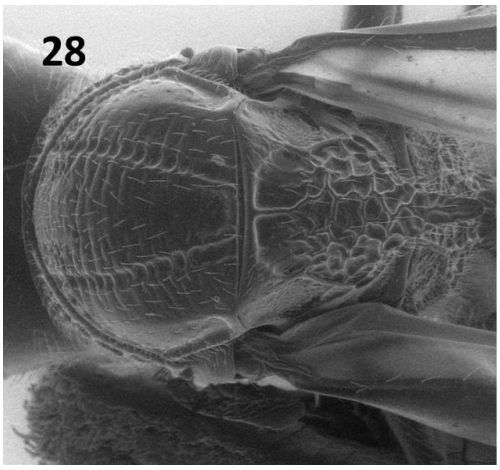


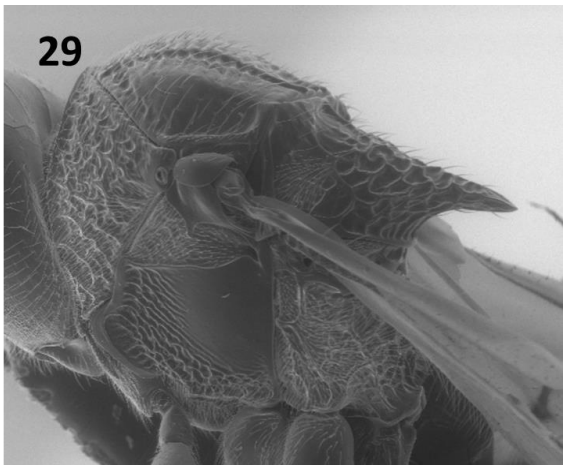
7. Circumscutellar carina present; scutellum rounded or slightly projected at the apex in dorsal view, never forming a spine [26, 27]. …..... 8





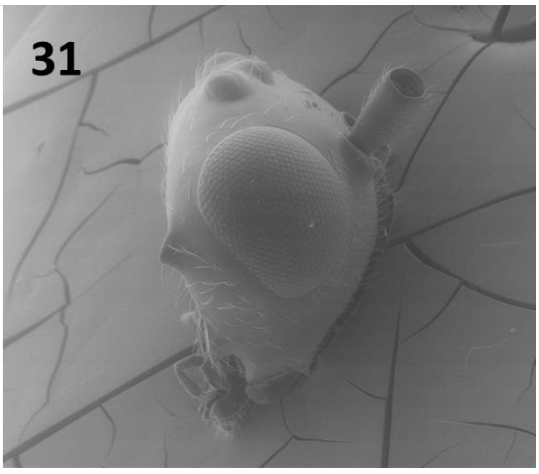
Circumscutellar carina absent; scutellum projected into a scutellar spine [28, 29]. …..... 9



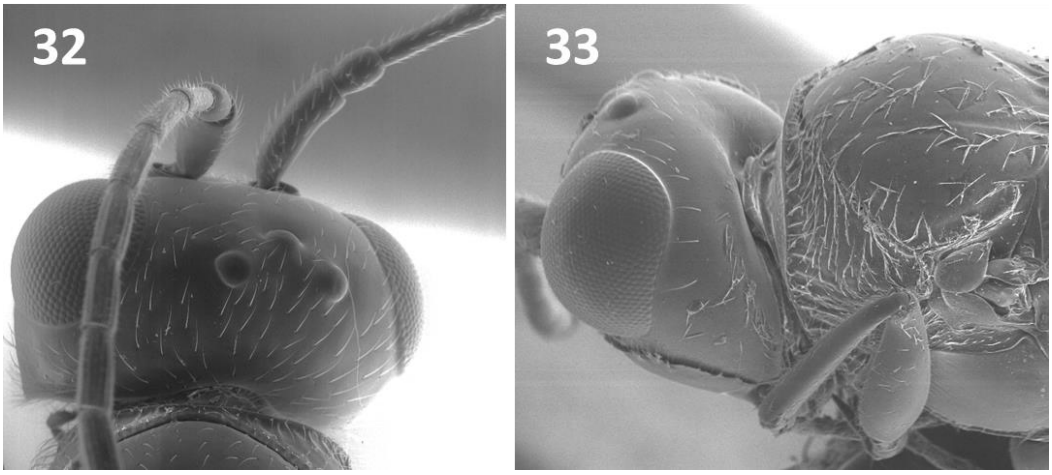


8. Occipital carina present; presence of spiky processes directed backwards in occipital region [30, 31]. ……..…….. ***Cornaegilips* Mata-Casanova & Pujade-Villar** [One species: *Cornaegilips chilensis* (Bréthes, 1918)]

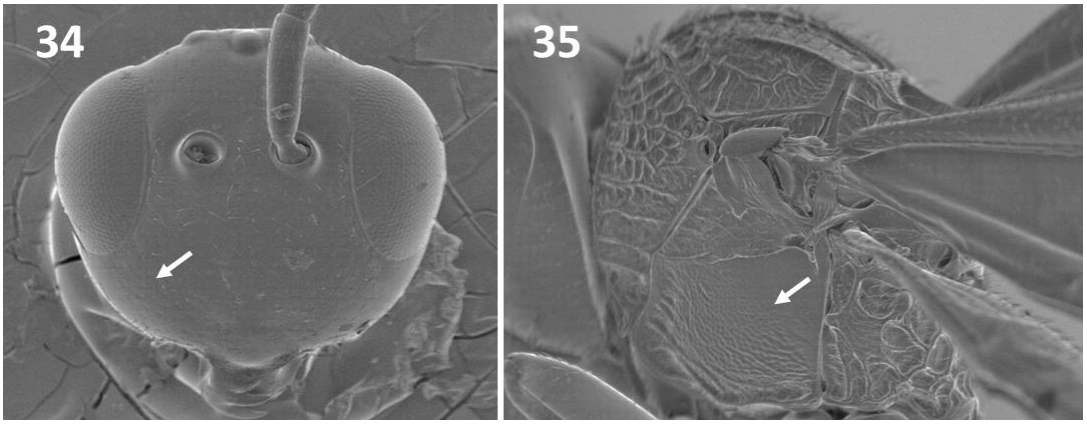




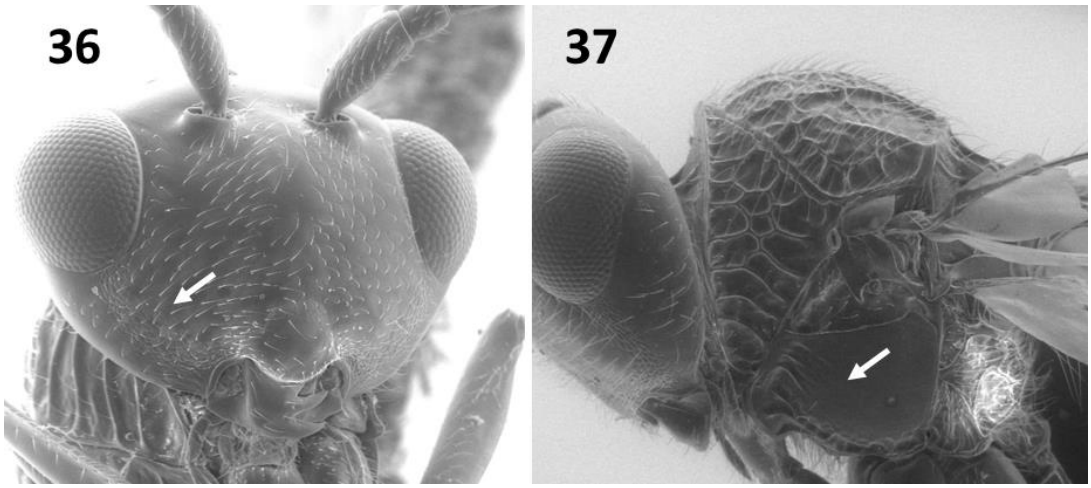
Occipital carina absent. Occipital region smooth [32, 33]. ……... ***Aegilips*** **Haliday**



9. Malar area smooth [34]; mesopleuron with coriaceous sculpture in the anterior region which can be extended to cover its whole surface [35]. ……...…… ***Acanthaegilopsis*** **Pujade-Villar**

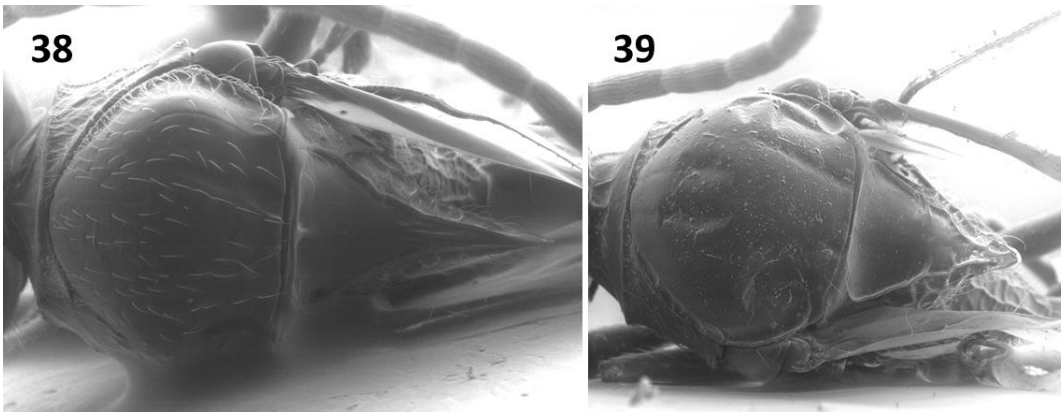


Malar area with coriaceous band [36], reduced to the base of compound eye in some specimens; mesopleuron with some anterior carinae which can be extended to cover half of its surface, but never presenting coriaceous sculpture [37]. ……..... ***Xyalaspis*** **Hartig**

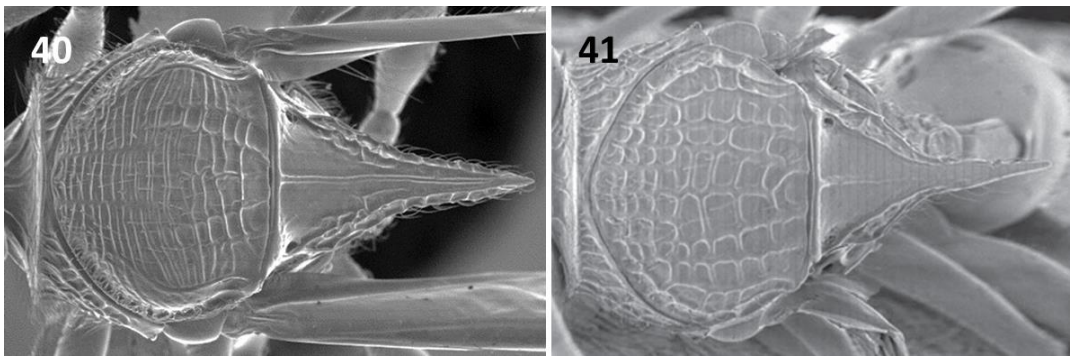


***Acanthaegilips* Ashmead, 1897**

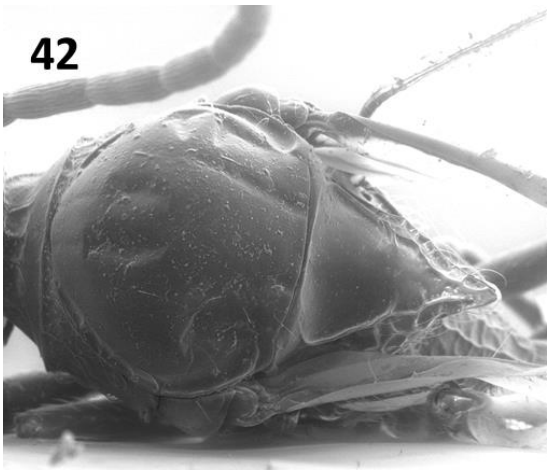
1. Mesoscutum smooth; notauli tenuous and incomplete [38, 39]. 2



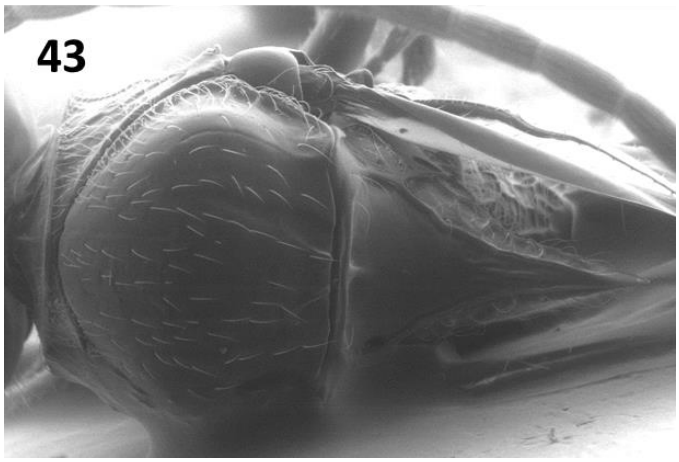
Mesoscutum carinate [40] or areolate [41]; notauli complete, although in some specimens are hard to distinguish from the heavily areolate sculpture [41]. 4



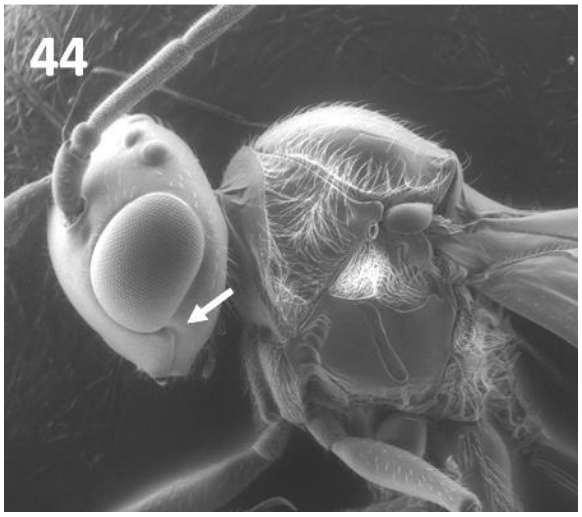
2. Scutellum shorter than mesoscutum in dorsal view [43]. ……..... ……..…….***A. timidus* Mata-Casanova & Pujade-Villar, 2017**



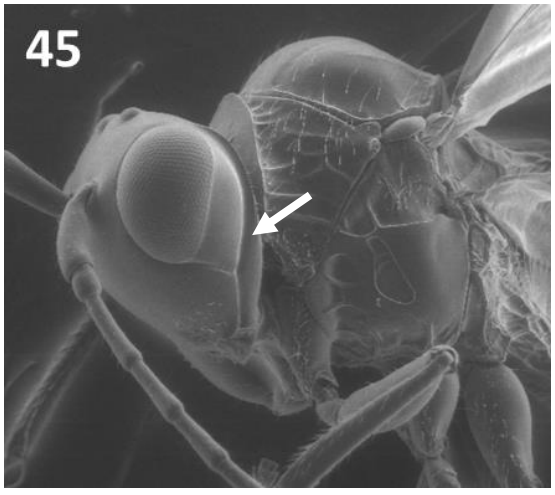
Scutellum longer than mesoscutum in dorsal view [43]. …..... 3



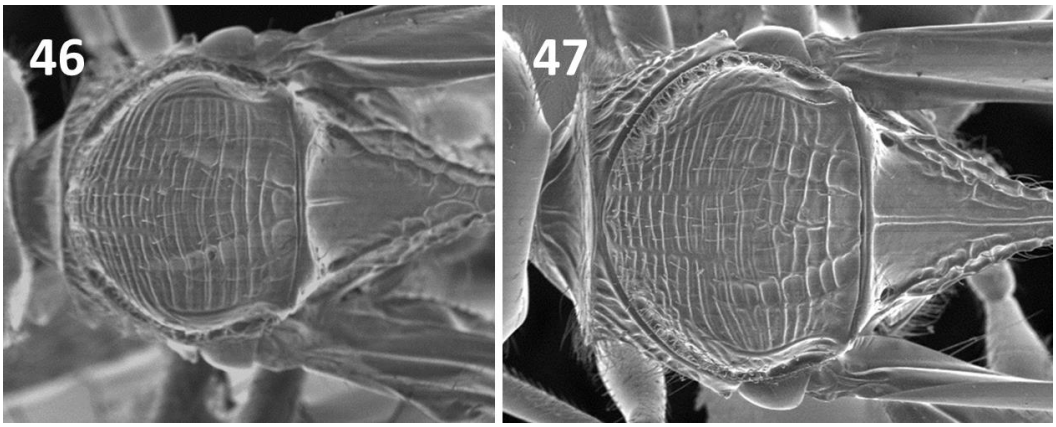
3. Radial cell closed; post-ocular furrow absent; malar furrow slightly curved [44] (only male known) ..... ***A. boyacensis*** **Mata-Casanova & Pujade-Villar, 2017**



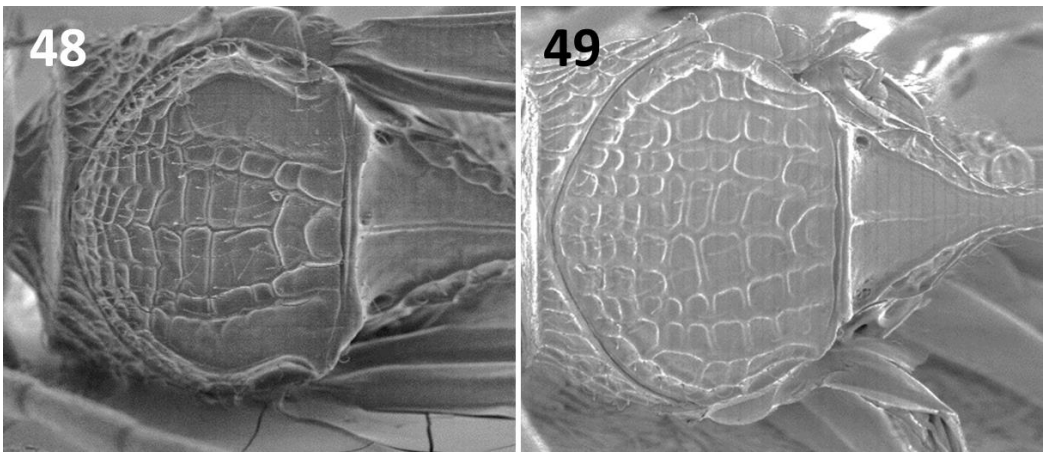
Radial cell open, post-ocular furrow present; malar furrow strongly curved and reaching the post-ocular furrow [45] (only female known). ……..... …. ***A. curvis*** **Mata-Casanova & Pujade-Villar, 2017**



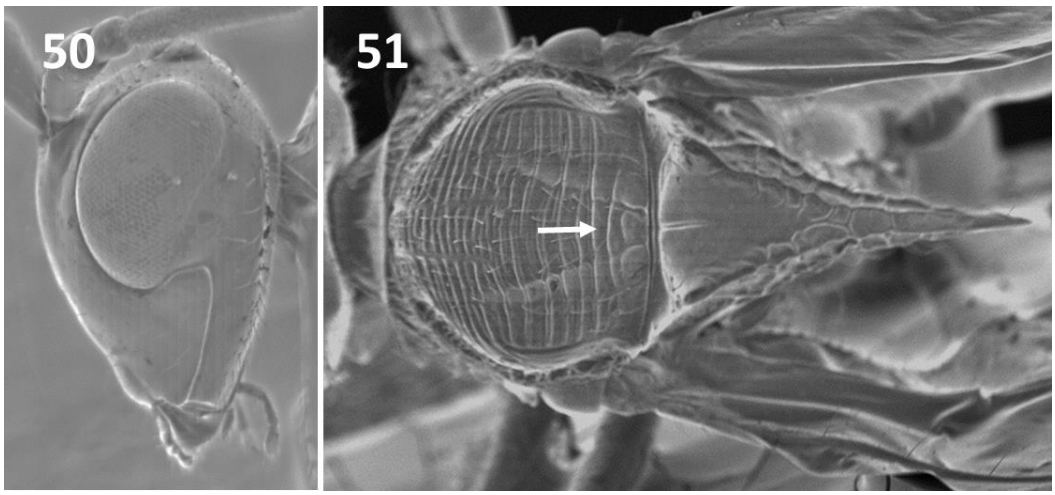
4. Mesoscutum transversely carinated [46, 47]. 5



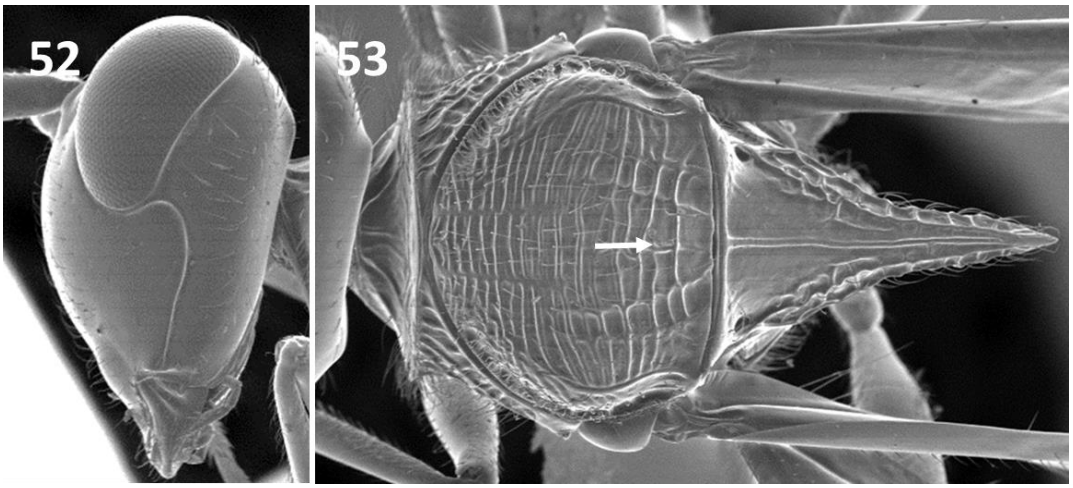
Mesoscutum areolate [48, 49]. 6



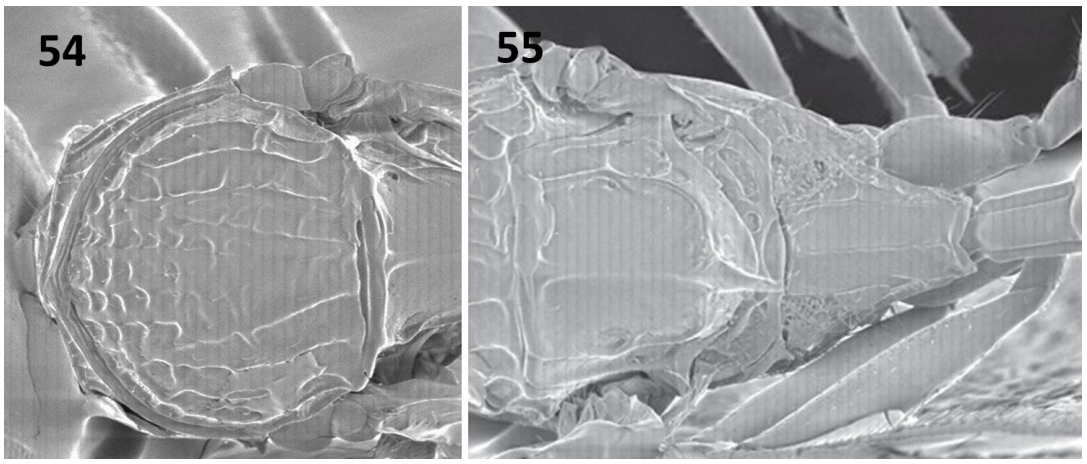
5. Malar furrow strongly curved [50]; median mesoscutal impression not divided [51]. ..... ***A. colombiensis* Pujade-Villar & Restrepo-Ortiz, 2010**



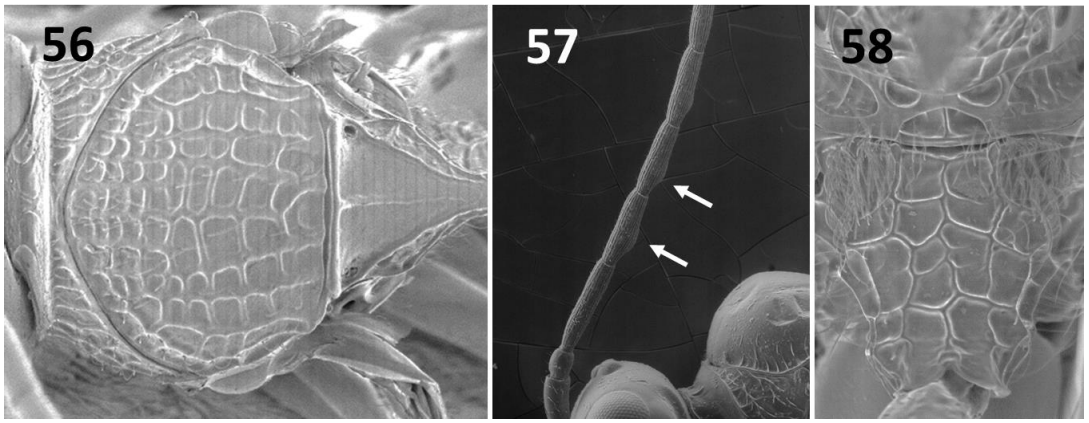
Malar furrow slightly curved [52], median mesoscutal impression internally divided into two cells [53]. …..... ***A. venezuelensis*** **Ros-Farré & García, 2010**



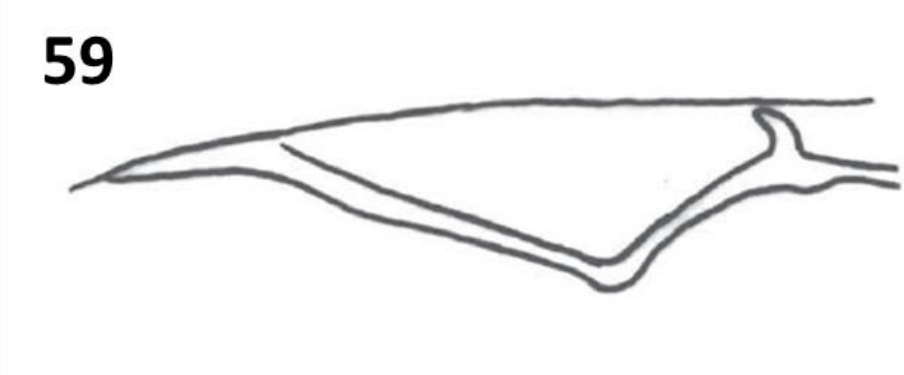
6. Scutellum concave, strongly inclined on each side of the median scutellar carina; male flagellomeres never modified, notauli not formed by a row of cells [54]; propodeum with three longitudinal ridges without any sculpture between [55]. ……..... ***A. alienus*** **Ros-Farré & Pujade-Villar, 2003**



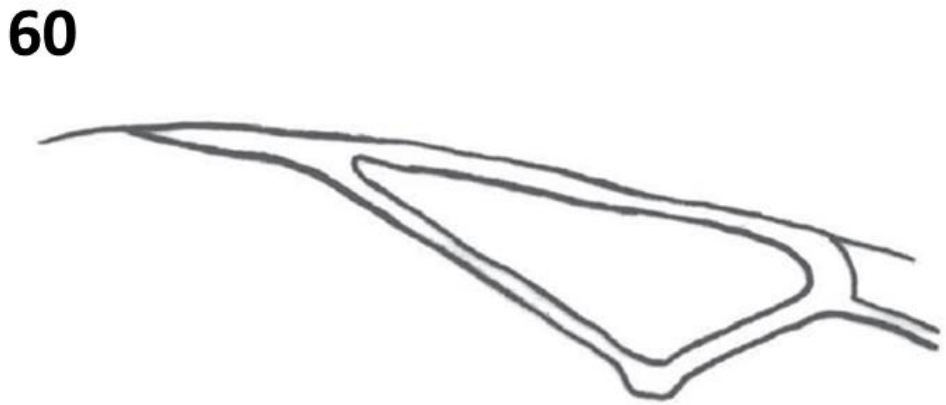
Scutellum flat, notauli consisting in a row of cells [56]; male antennae with some flagellomeres from F1 to F6 dorsolaterally expanded [57]; propodeum areolate [58]. ……..... 7



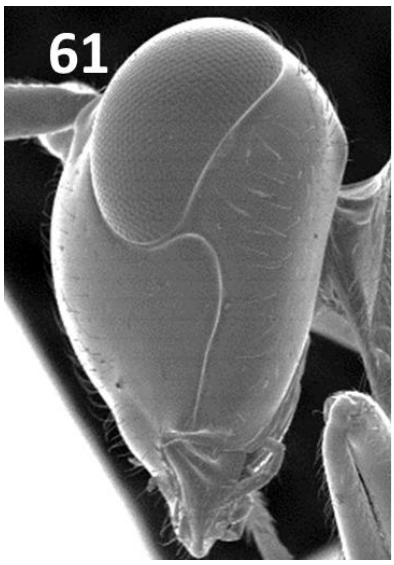
7. Radial cell open [59]. ….....8

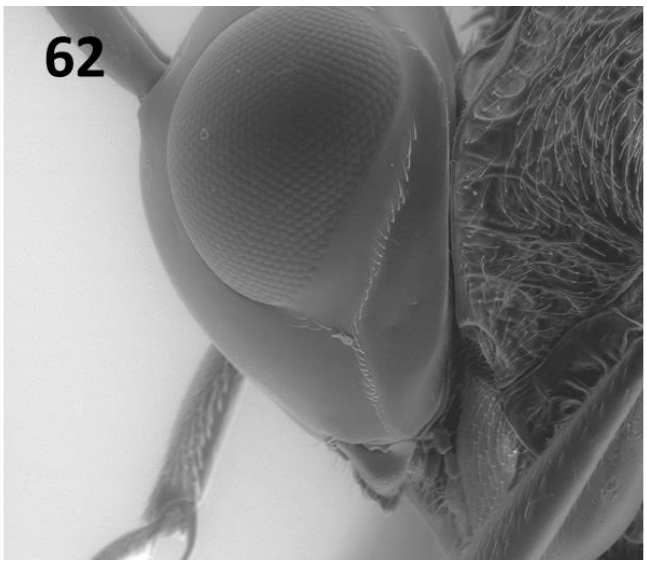


Radial cell closed [60]. ….....17



8. Malar furrow straight to slightly curved[61], usually connected with post-ocular furrow [62]. ……...…….....9

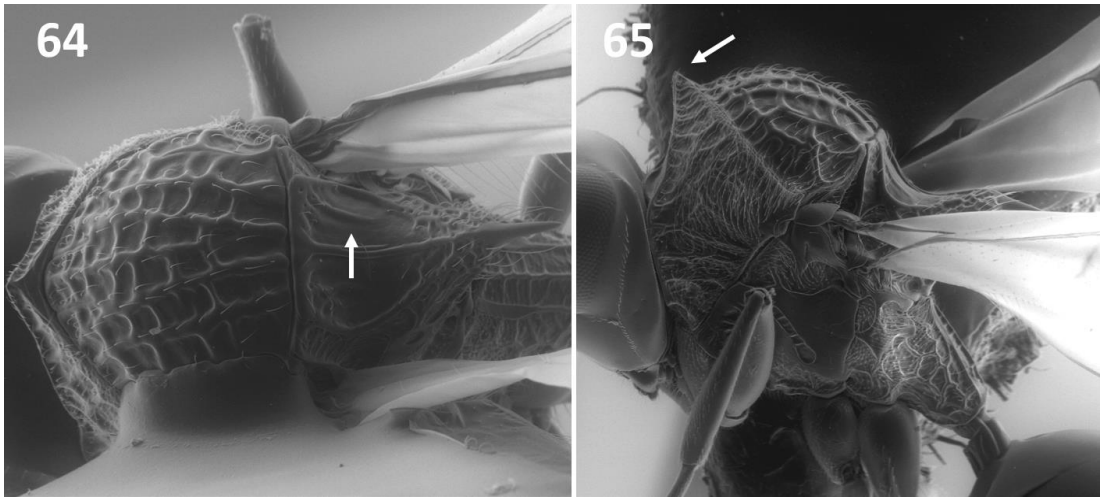




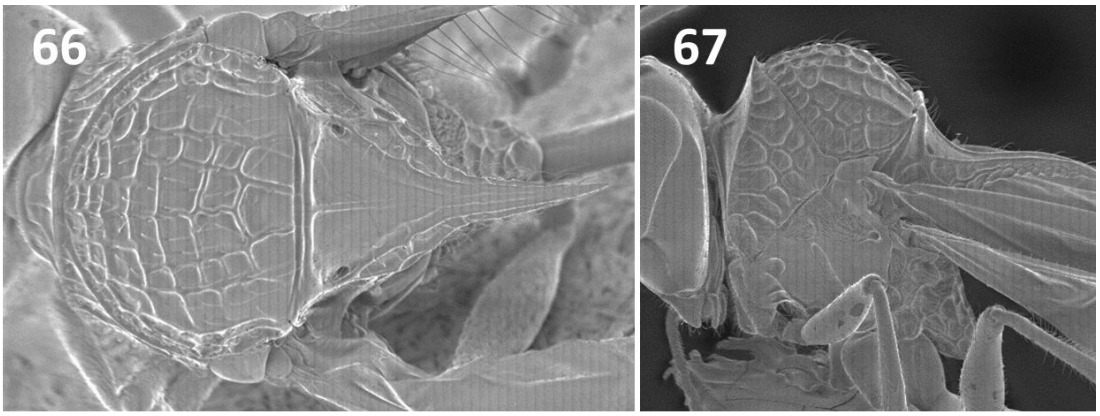
Malar furrow strongly curved, post-ocular furrow absent [63]. ….....15



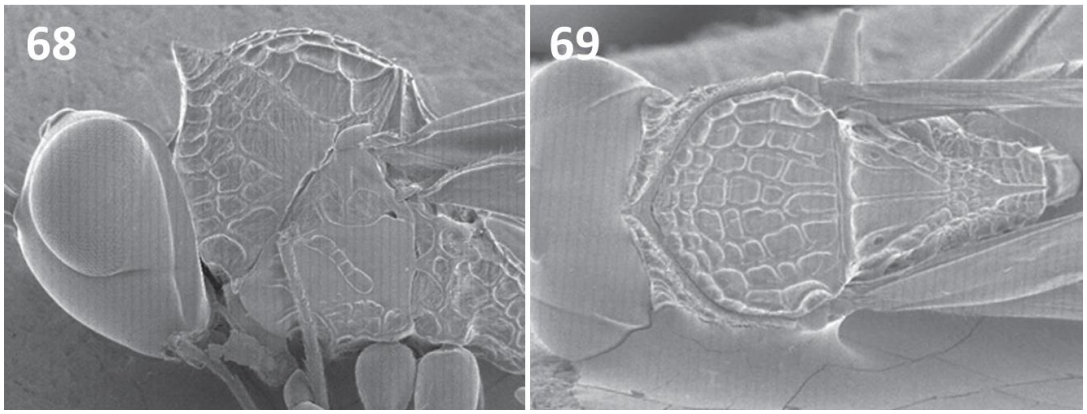
9. Scutellar foveae with an internal longitudinal carina (foveal carina) dividing them into two areas each [64]; pronotal plate produced into a sharp and strongly raised dorsal tooth in lateral view [65]; petiole as wide as long, sometimes slightly wider than long. ….....10



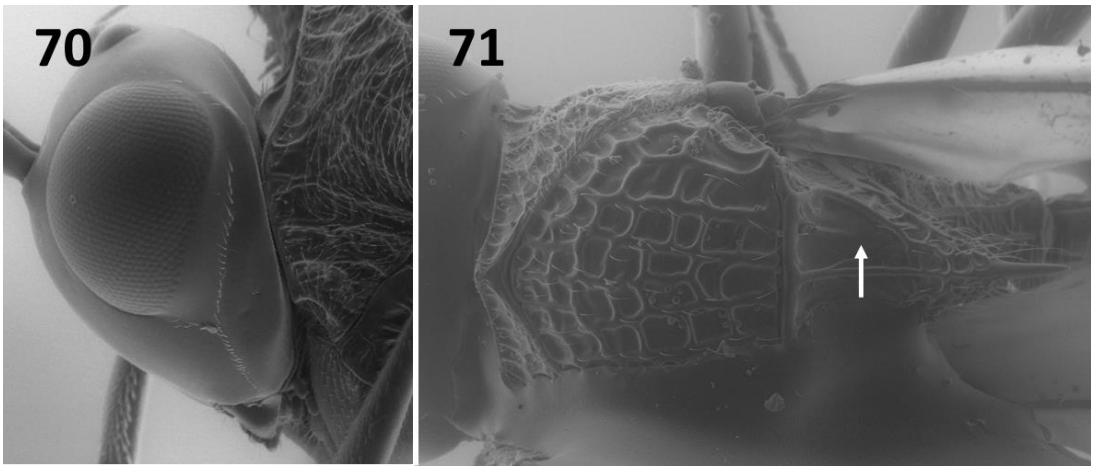
Scutellar foveae without any internal longitudinal carina dividing them [66]; pronotal plate with a small and short dorsal tooth in lateral view [67]; petiole 1.5 to 2 times wider than long. ….....13



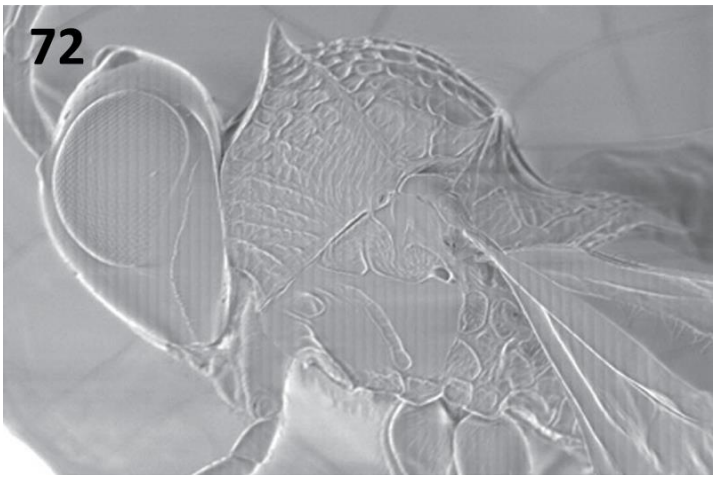
10. Malar and post-ocular furrows strongly impressed [68]; foveal carina reaching the posterolateral margin of the scutellar foveae [69] (only female known). ……..... ***A. dentis*** **Ros-Farré & Pujade-Villar, 2003**



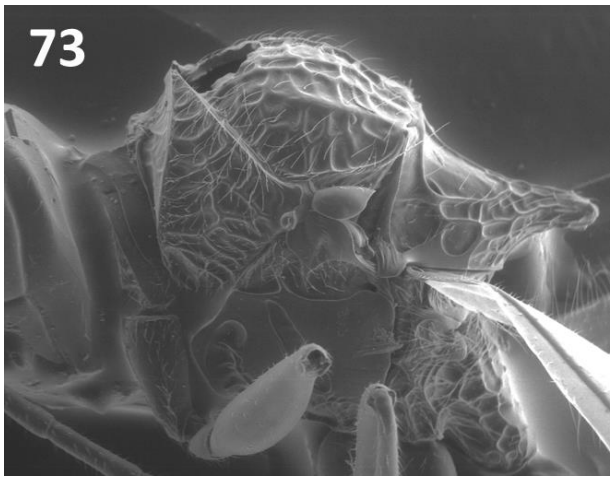
Malar furrow effaced; postocular furrow weak but with a line of hairs running below the postocular and malar furrows [70]; foveal carinae less evident and not reaching the posterolateral margin of the scutellar foveae [71]. ….....11



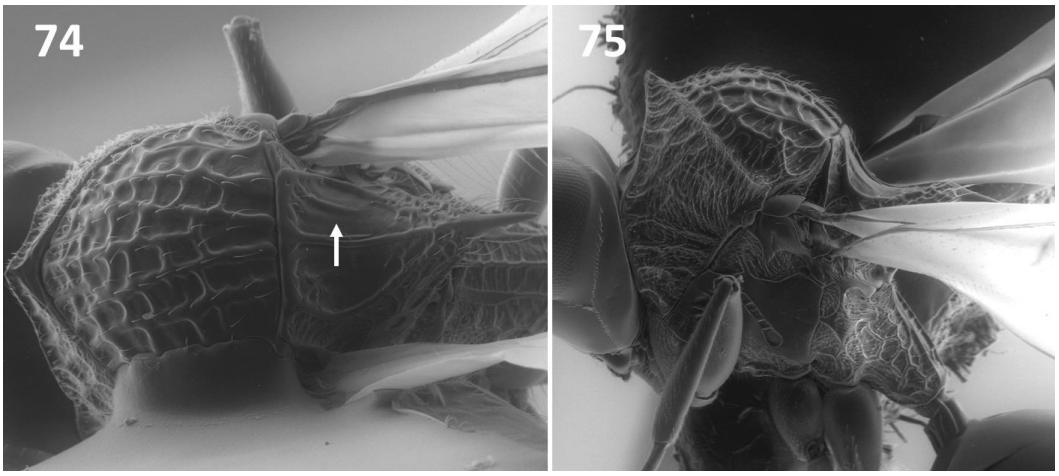
11. Lateral surface of pronotum with coarse transverse carina in ventral part and with areolate sculpture in dorsal part [72]. ……..... ……...***A. carinatus*** **Ros-Farré & Pujade-Villar, 2003**



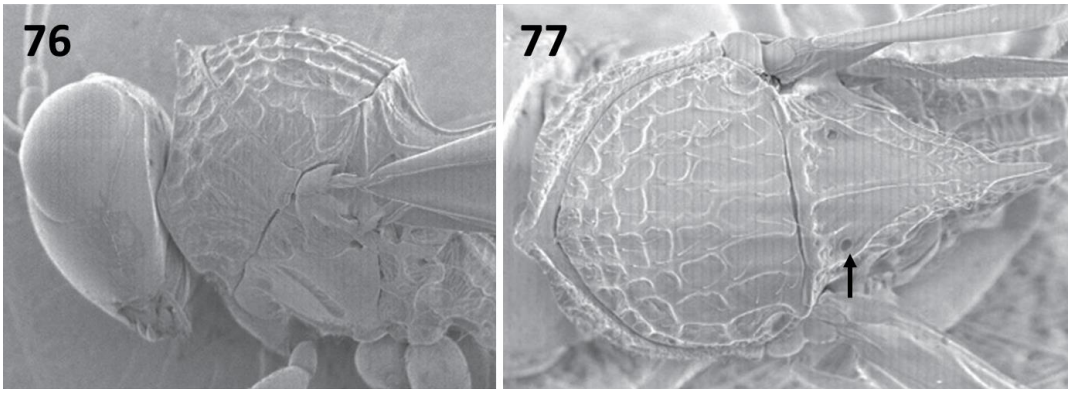
Lateral surface of pronotum completely areolate [73]. …….……....12



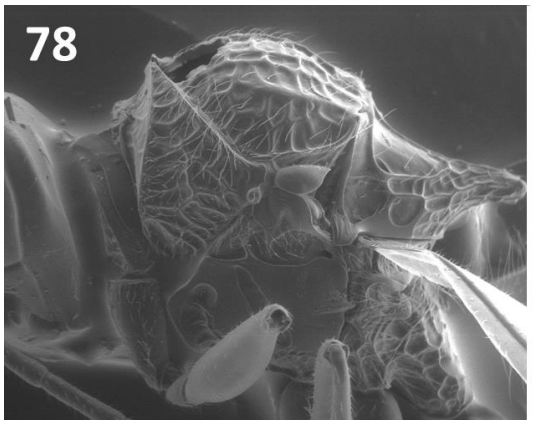
12. Median mesoscutal furrow ¼ to 1/3 of mesoscutum length; two or three foveal carinae present; lateral pits of scutellum absent [74]; scutellar spine curved downwards [75]. …..... ***A. notobiellus*** **Mata-Casanova & Pujade-Villar, 2014**



Median mesoscutal furrow ¼ or less than mesoscutum length, one foveal carina present, lateral pits of scutellum present [76]; scutellar spine straight in lateral view [77]. …..... ***A. occultus*** **Ros-Farré & Pujade-Villar, 2003**

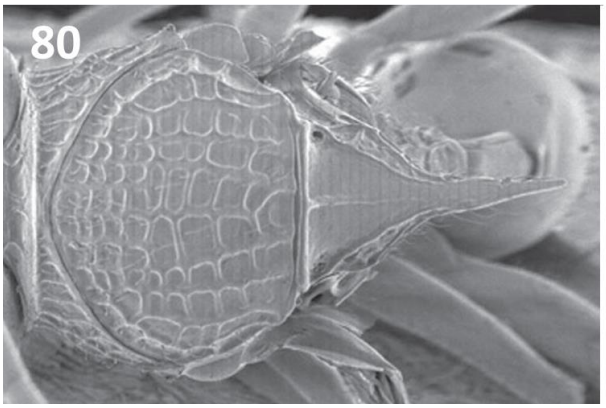


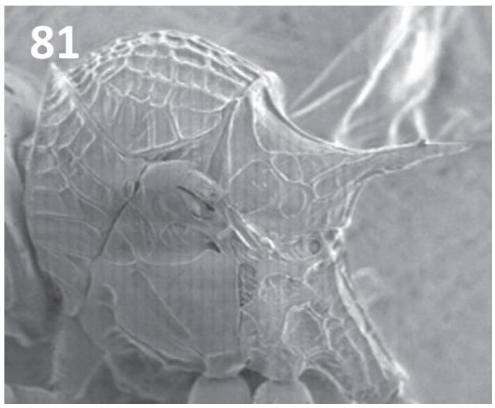
13. Scutellum shorter than mesoscutum in dorsal view [78]; scutellar spine blunt-ended [79]. ..... ***A. truncatus*** **Mata-Casanova & Pujade-Villar 2017**



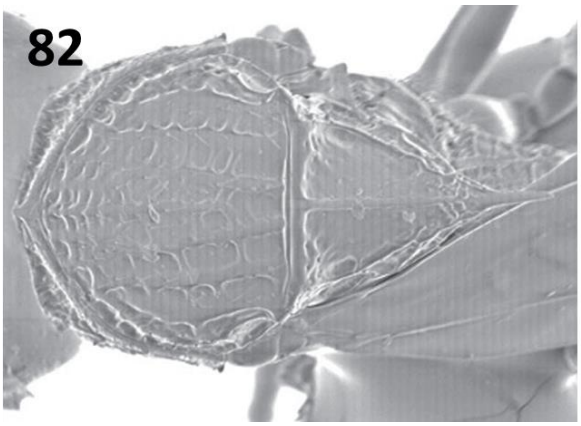


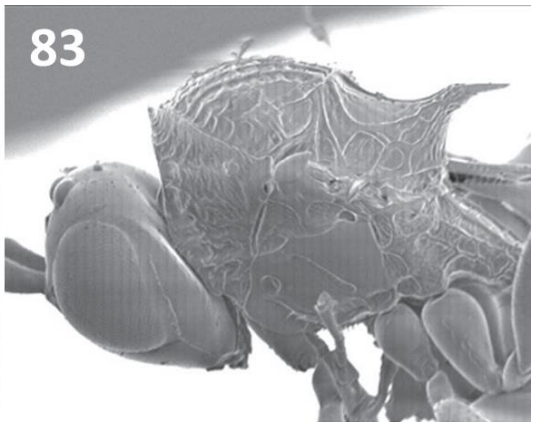
Scutellum as long as mesoscutum in dorsal view, sometimes longer [80]; scutellar spine spike-ended [81]. ...…….....14



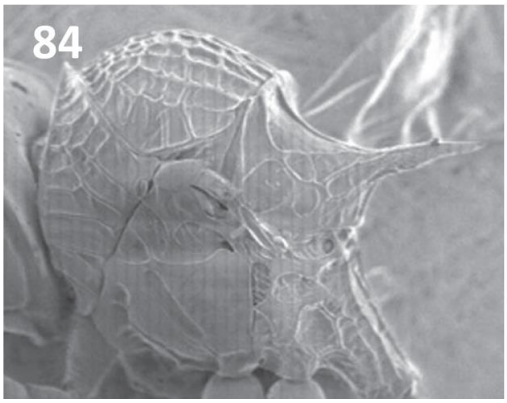


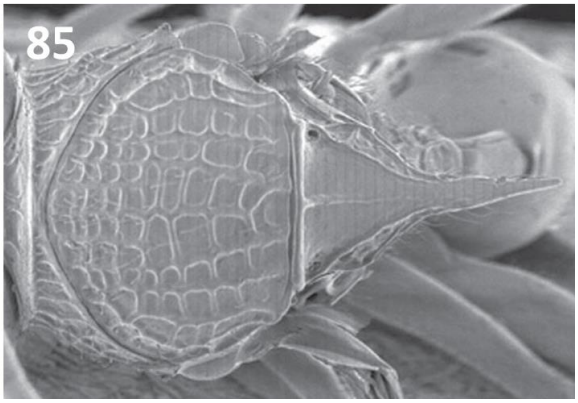
14. Scutellar spine narrowing abruptly before apex [82]; scutellar spine curved downwards in lateral view [83]; lateral pit of fovea superficial and indistinct (only male known). …..... ***A. exiguus*** **Ros-Farré & Pujade-Villar, 2003**



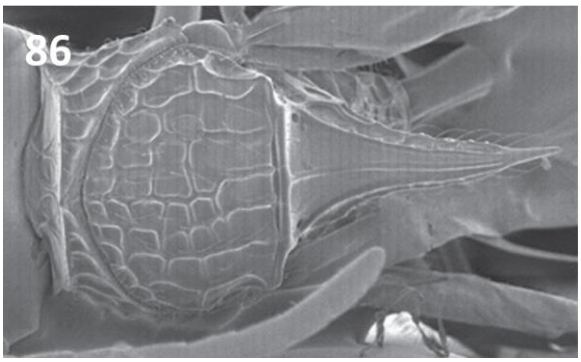


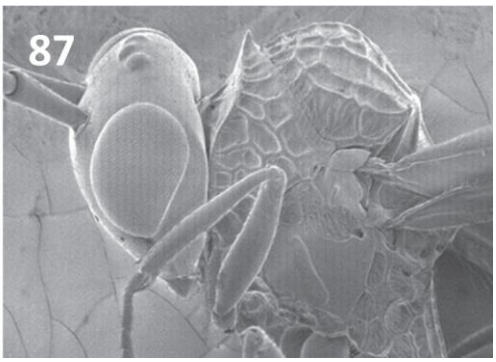
Scutellar disc narrows abruptly posteriorly and the scutellar spine is entirely slender; scutellar spine straight in lateral view [84]; lateral pit of scutellar fovea deep [85]. …..... ***A. huggerti*** **Sporrong & Ros-Farré, 2003**



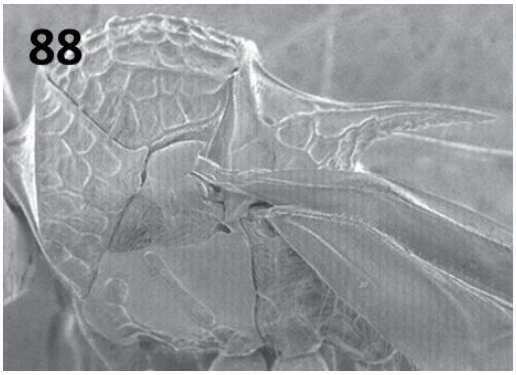


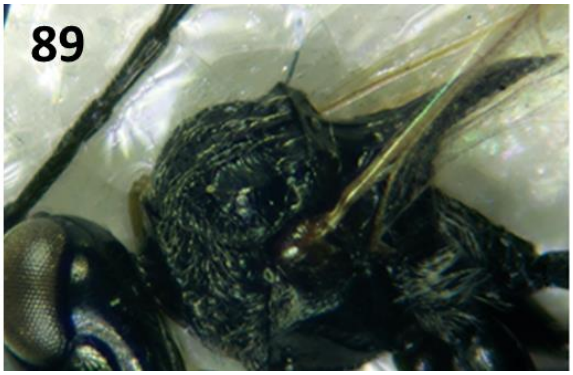
15. Scutellar carina visible, in lateral view, running from pronotum to median sulcus [86]; scutum in profile with a distinct hump; pronotal plate with a pointed dorsal tooth when viewed laterally [87]. ……..... ***A. braziliensis*** **Ashmead, 1896**



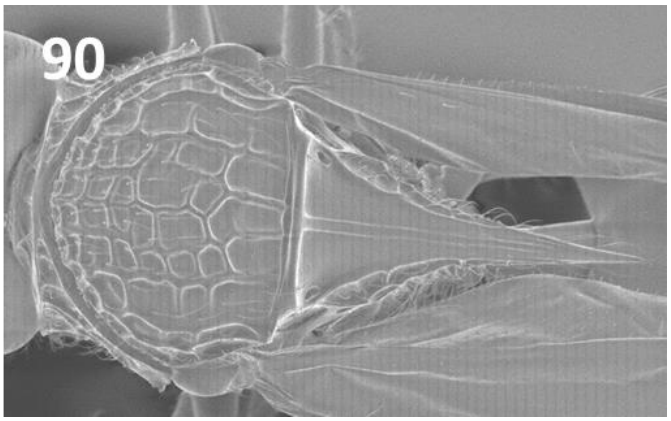


Scutellar carina absent; scutum curved in profile but not humped; pronotal plate dorsally raised but not ending in a pointed dorsal tooth when examined laterally [88, 89]. 16

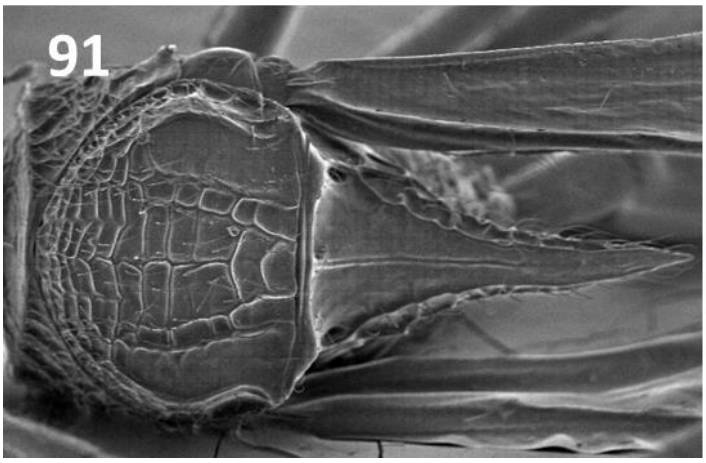




16. Mesoscutum completely areolate [90]; malar area smooth (only female known). …..... ***A. levis*** **Ros-Farré & Pujade-Villar, 2003**

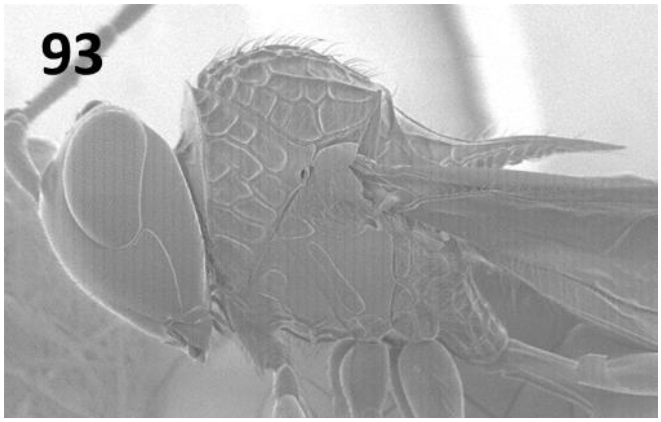


Mesoscutum surface between notauli and parapsidal signum smooth [91]; coriaceous line present anterior in front of malar furrow [92] (only female known). …..... ***A. palmirae*** **Mata-Casanova & Pujade-Villar, 2013**

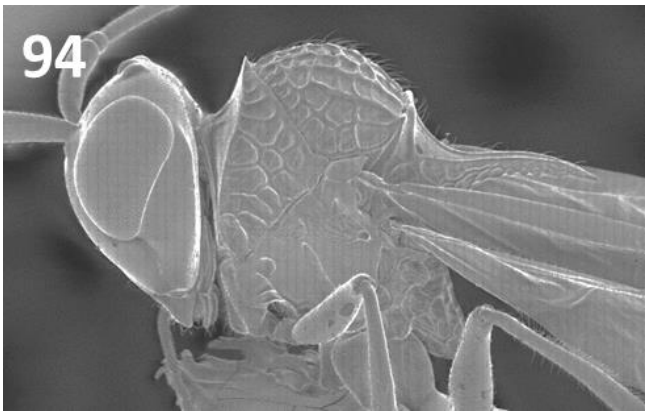




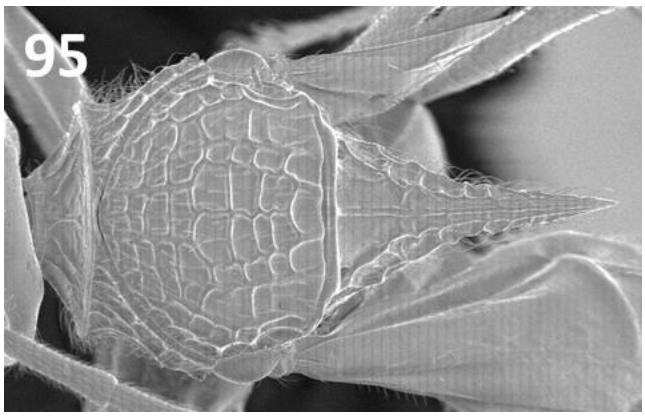
17. Pronotal plate ending dorsally in a small tooth; petiole laterally costate [93] (only female known). …..... ***A. masneri*** **Sporrong & Ros-Farré, 2003**



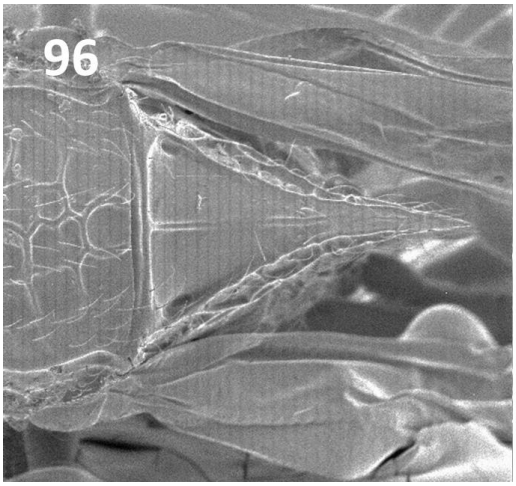
Pronotal plate rounded dorsally [94]; petiole laterally entirely smooth or slightly carinate anteriorly. ..…….....18

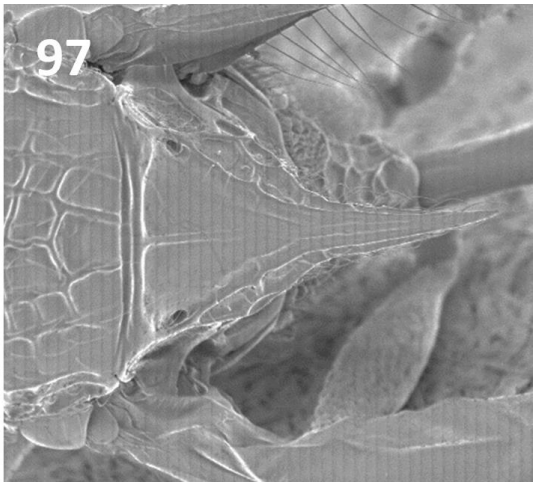


18. Scutellar foveae smooth anteriorly; reticulate posteriorly [95] (more clear on females), male placodeal sensilla present and abundant from F1 to the end of the antenna. …..... ***A. macropennis*** **Sporrong & Ros-Farré, 2003**

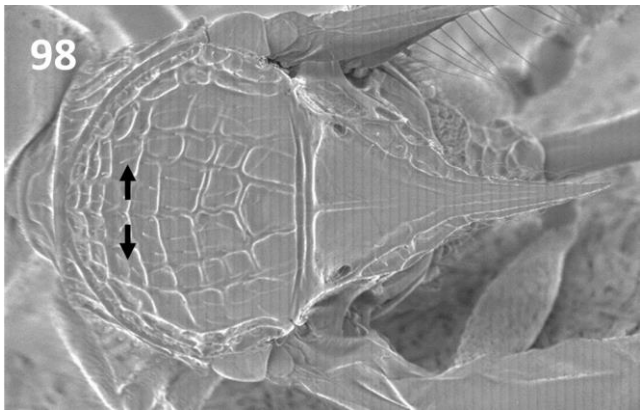


Scutellar foveae entirely smooth [96, 97]; male placodeal sensilla dorsally absent on F1 and dorsally scarce or absent on at least some of the following flagellomeres ….....19

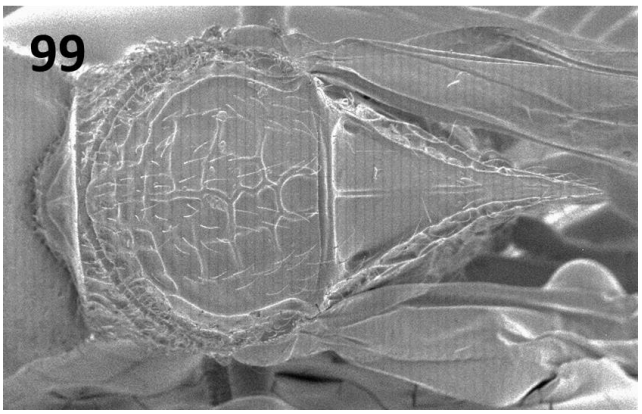




19. Notauli incomplete or not even present, reaching 1/2 the length of mesoscutum [98]; mesoscutum coarsely areolate; parapsidal signum quite conspicuous and not raised; male placodeal sensilla dorsally absent on F1 and F2, sometimes also on F3; and very scarce on F4..... ***A. ashmeadi*** **Ros-Farré & Pujade-Villar, 2003**

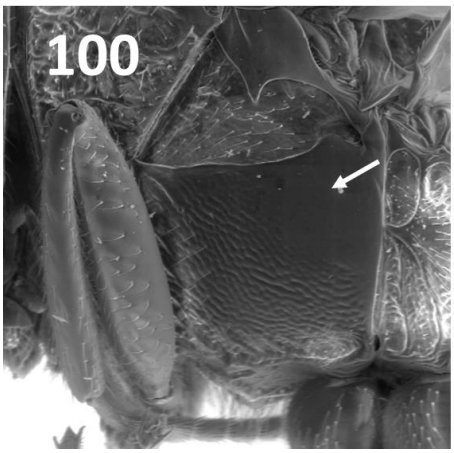


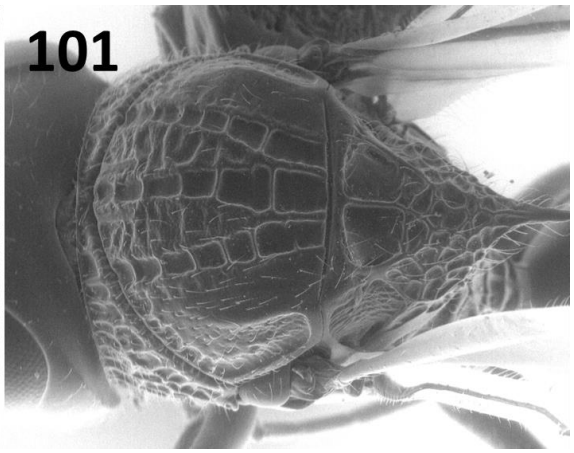
Notauli complete; mesoscutum with weak areolate sculpture, smooth between parapsidal signum and parascutal impression [99]; parapsidal signum strongly raised and conspicuous; male placodeal sensilla present on F1, dorsally absent from F1 to F5 and sparse from F6 to F7. …..... ***A. diazae*** **Ros-Farré & Pujade-Villar, 2003**



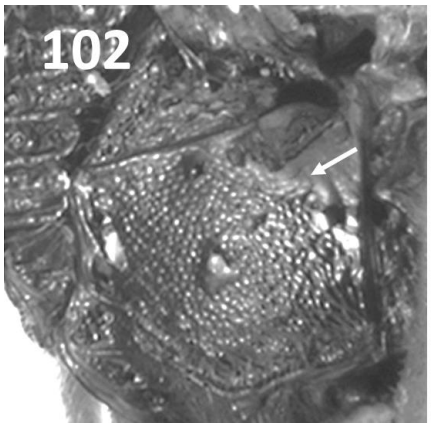
***Acanthaegilopsis* Pujade-Villar**

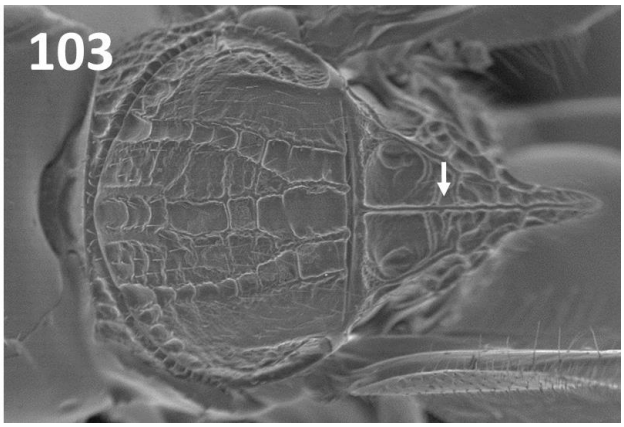
1. Dorsal mesopleuron smooth [100]; interfoveal carina short, not prolonged to reach the end of scutellum [101] ……..……...……... …… ***A. hemicoriaceus* Mata-Casanova & Pujade-Villar, 2014**





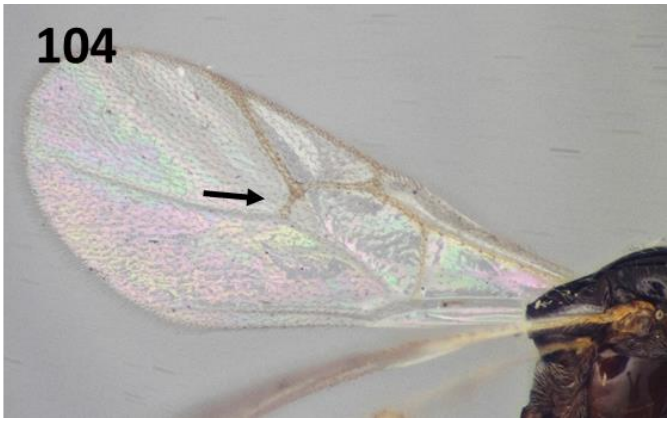
Mesopleuron completely coriaceous [102]; scutellum longitudinally divided by a median carina [103]. ..... ***A. malagasy* Mata-Casanova & Pujade-Villar, 2013**



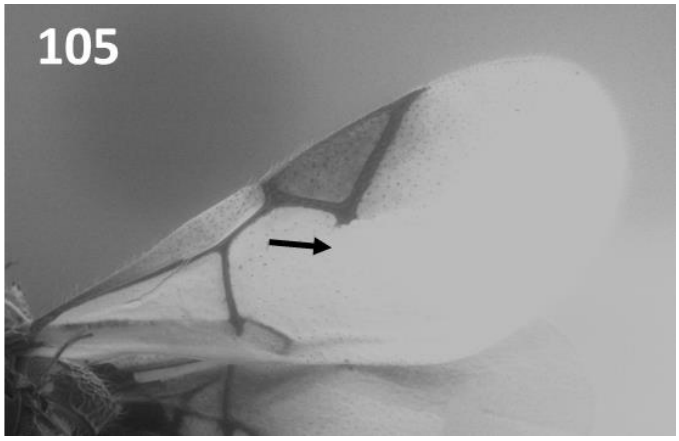


***Aegilips* Haliday, 1835**

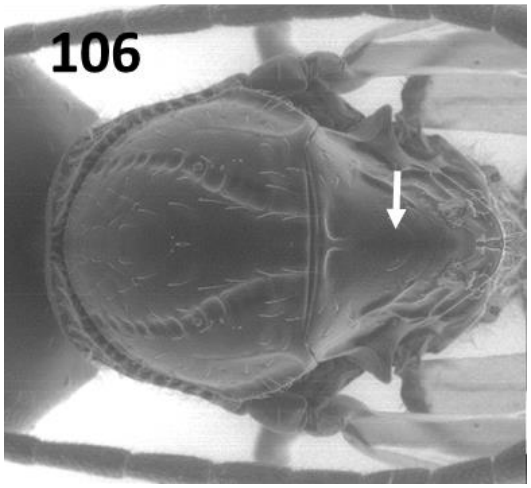
1. Vein 2rm present [104]. ..... ***A. zaitzevi* Kovalev, 1974**



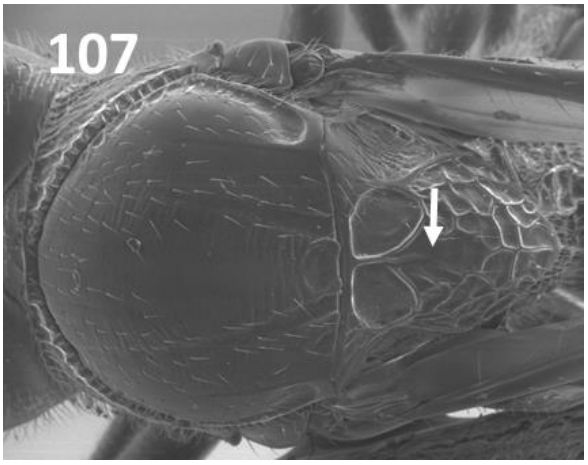
Vein 2rm absent [105]. ……..... 2



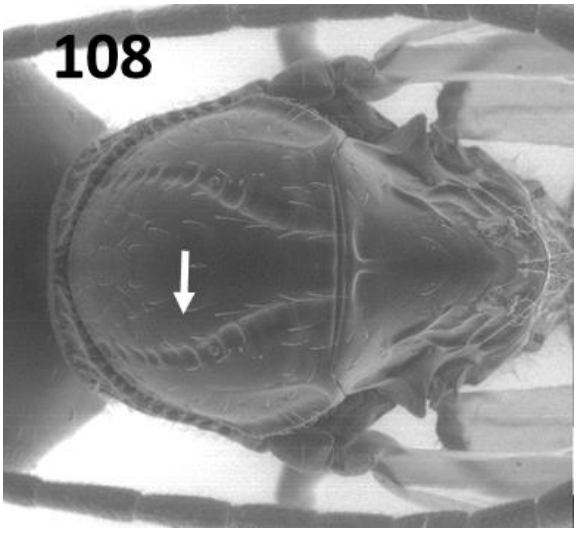
2. Scutellar foveae effaced, undistinguishable from rest of scutellum [106]. 3



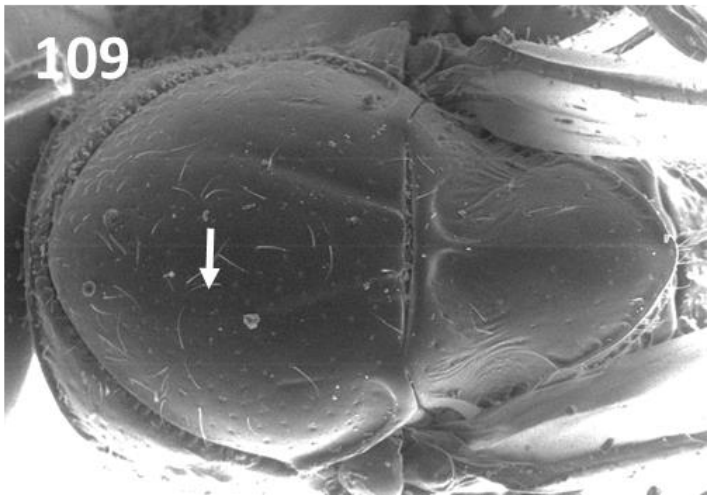
Scutellar foveae present and noticeable [107]. 6



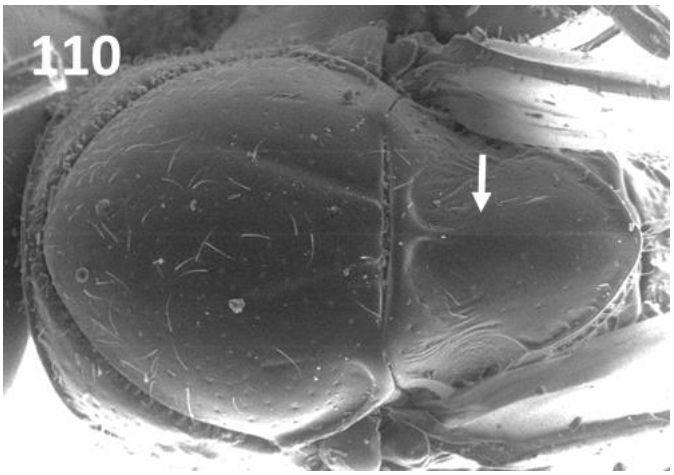
3. Strong, transversely carinate notauli [108]. ……..…….…
..... ***A. papuensis*** **Mata-Casanova & Pujade-Villar, 2015**



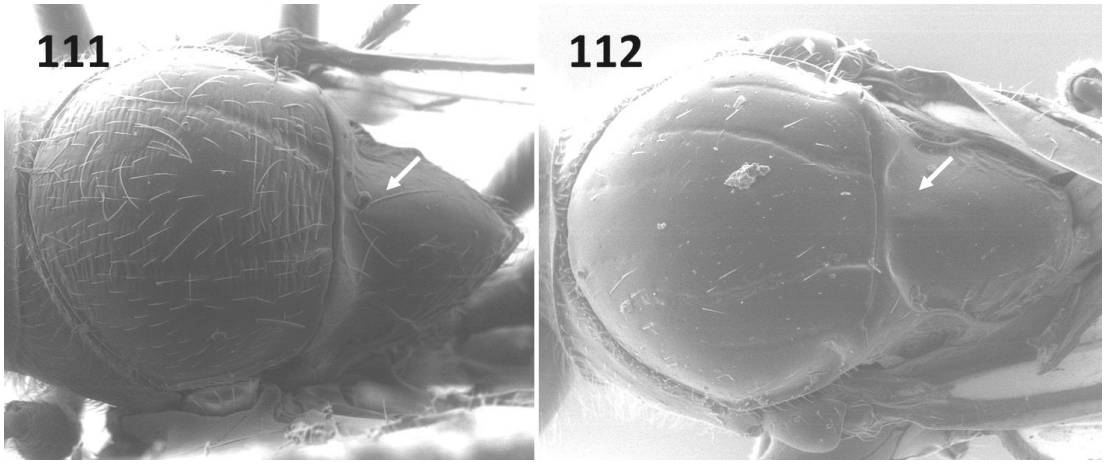
Weak notauli, not carinate [109]. 4



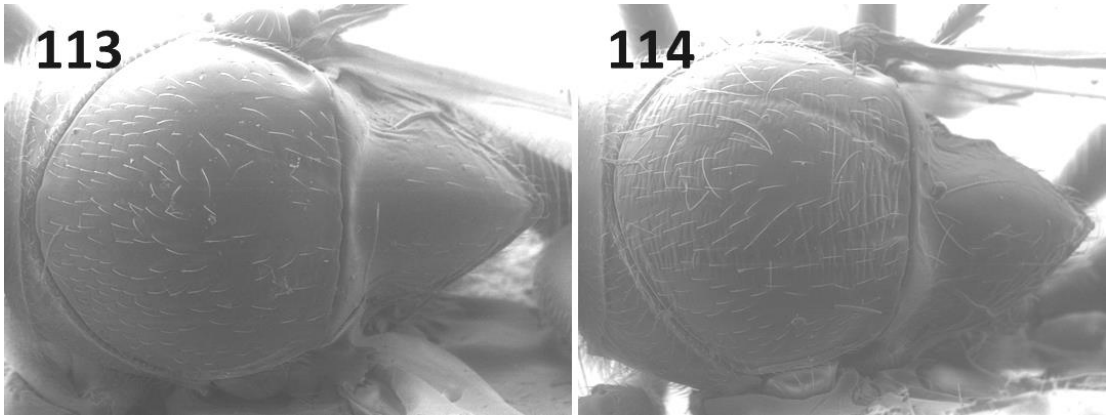
4. Interfoveal line present, albeit incomplete [110]. …..... ***A. clarimontis*** **Kieffer, 1907**



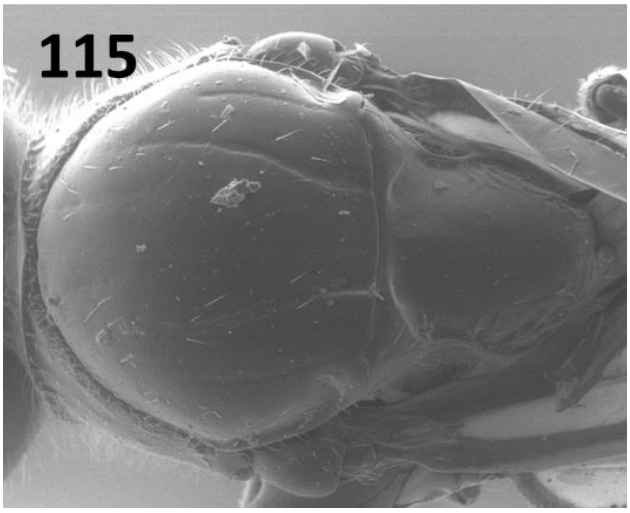
Interfoveal line absent [111, 112]. .....…….. 5



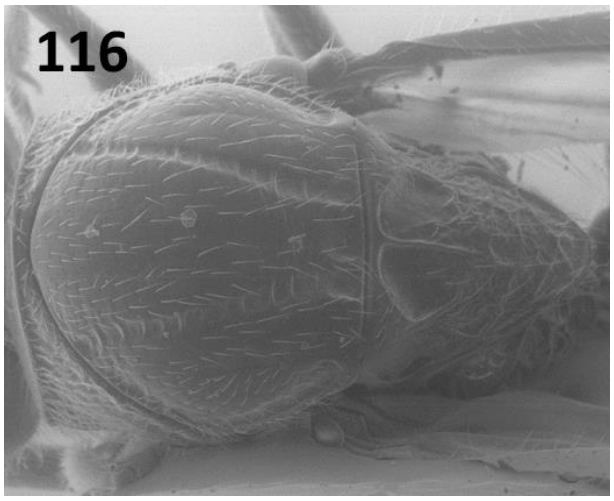
5. Notauli effaced; scutellar apex pointed [113, 114]; mesoscutum covered by weak transverse carinae in males [114]. …….. ……. ***A. insularis*** **Mata-Casanova & Pujade-Villar, n. sp.**



Notauli faded in anterior mesoscutum; scutellar apex flat, truncate; male unkown [115]. ……...…….. ***A. virungae*** **Mata-Casanova & Pujade-Villar, 2017**



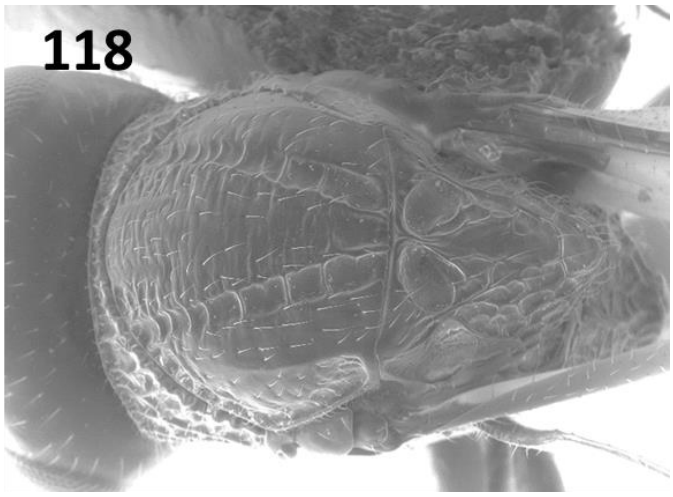
6. Notauli with strong transverse carinae [116]. 7



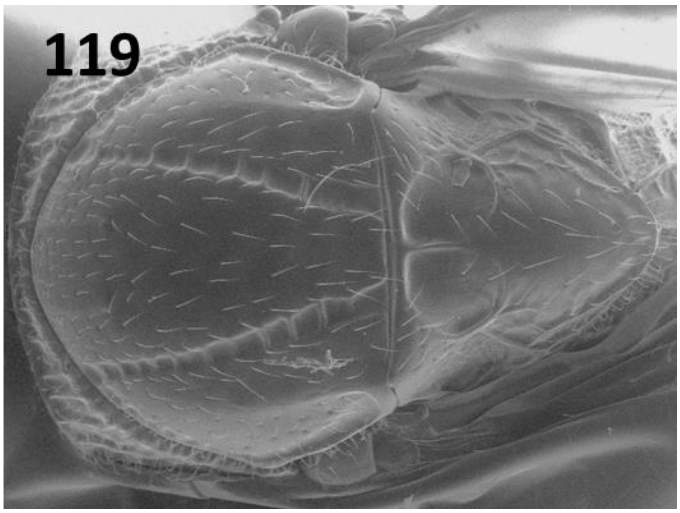
Notauli smooth, carinae, if present, are tenuous [117]. …….…...…..... 11



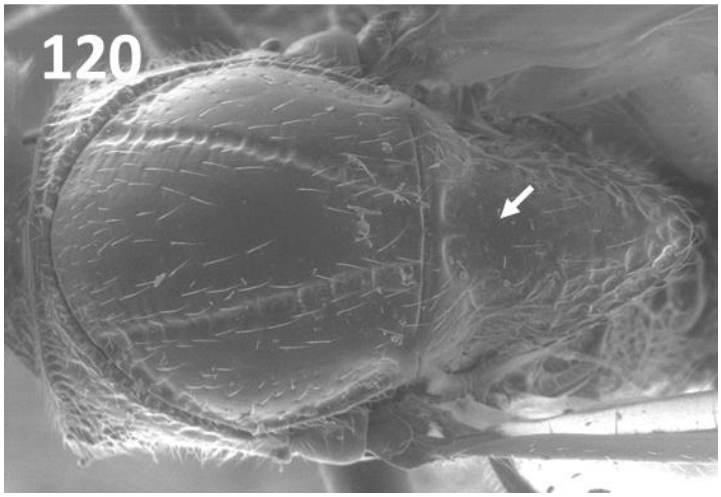
7. Internotaular space strongly carinate [118]. ..... ***A. kozlovi*** **Kovalev, 1974**



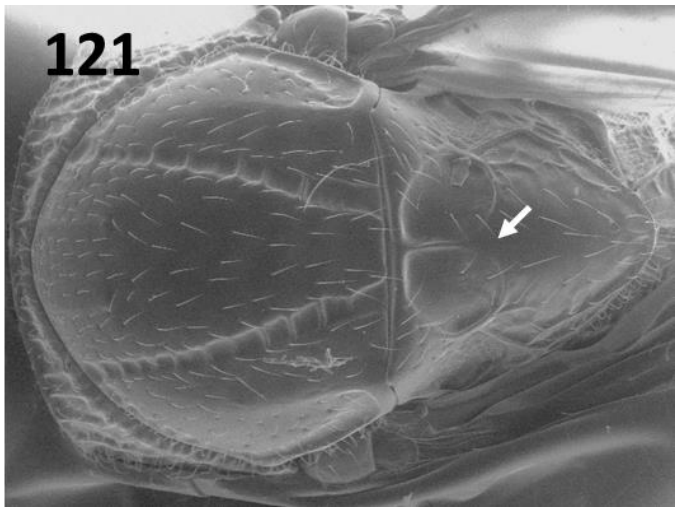
Internotaular space smooth; carinae, if present, are reduced to base and edges of notauli [119]. .....…….. 8



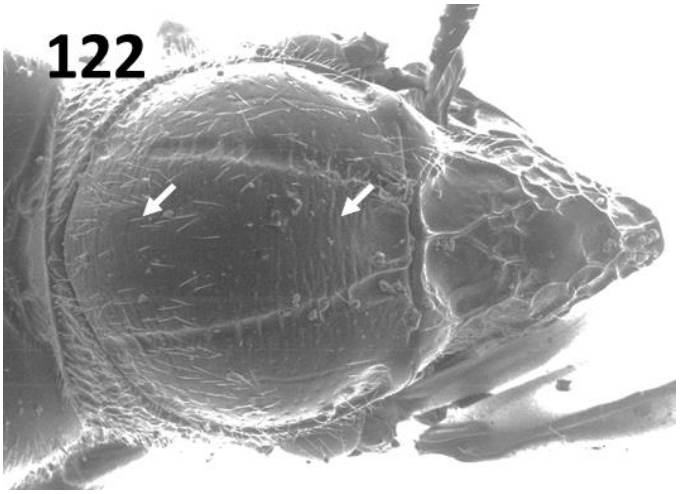
8. Scutellar foveae not posteriorly defined, interfoveal line incomplete [120]. ……... ***A. huberi*** **Mata-Casanova & Pujade-Villar, n. sp.**



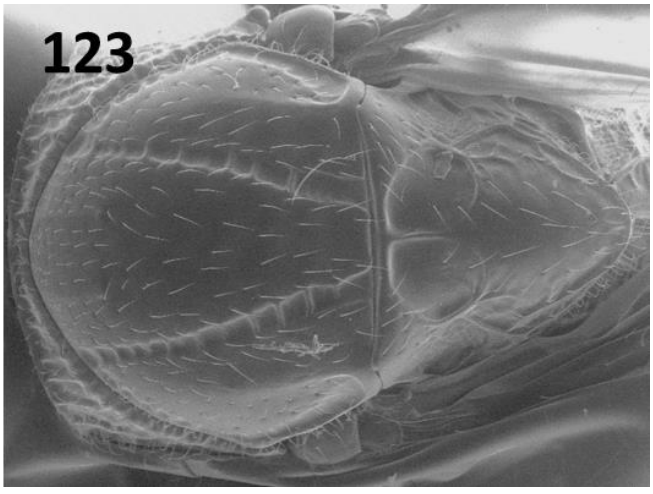
Scutellar foveae posteriorly defined by a carina, interfoveal line complete [121]. ……..……..... 9



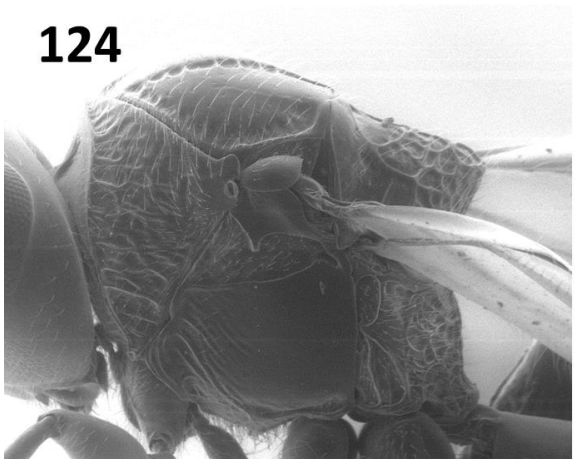
9. Mesoscutum with tenuous carinate sculpture, ranging from base of notauli to covering almost all mesoscutal surface [122]. ..... ***A. trisecta*** **Kieffer, 1907**

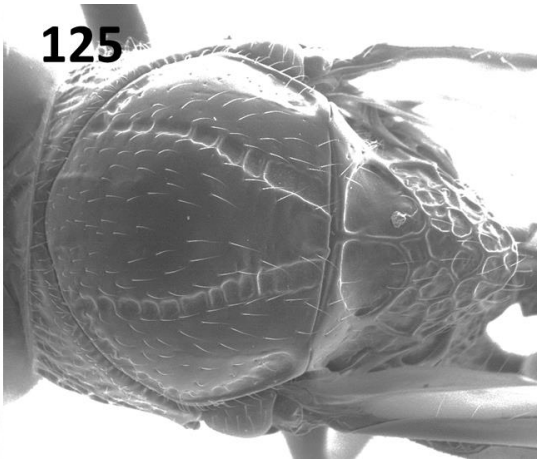


Mesoscutum smooth [123]. ……..……...…….. 10

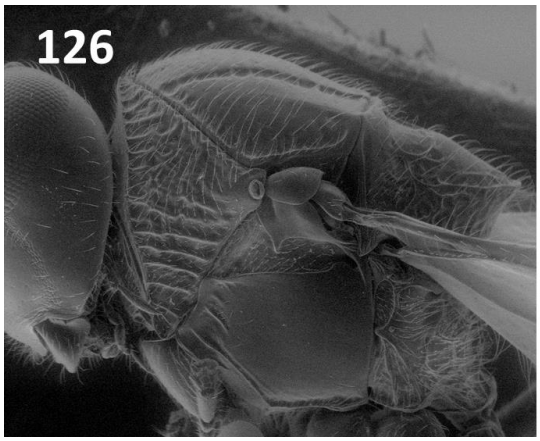


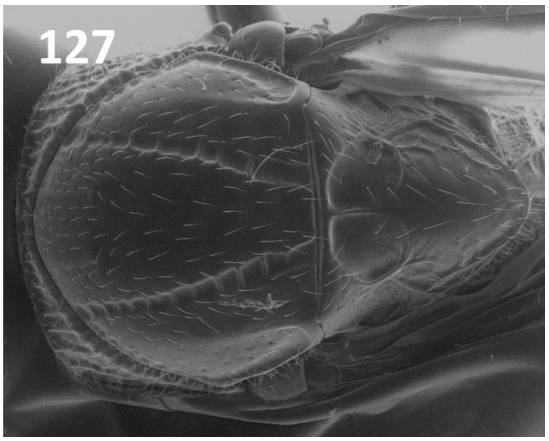
10. Pronotum [124] and central scutellum areolate [125]. ……
……..……...***A. aethiopicus*** **Mata-Casanova & Pujade-Villar, 2017**





Pronotum with oblique carinate sculpture [126]; central scutellum smooth to coarse [127]. ……..……... ***A. romseyensis*** **Fergusson, 1986**

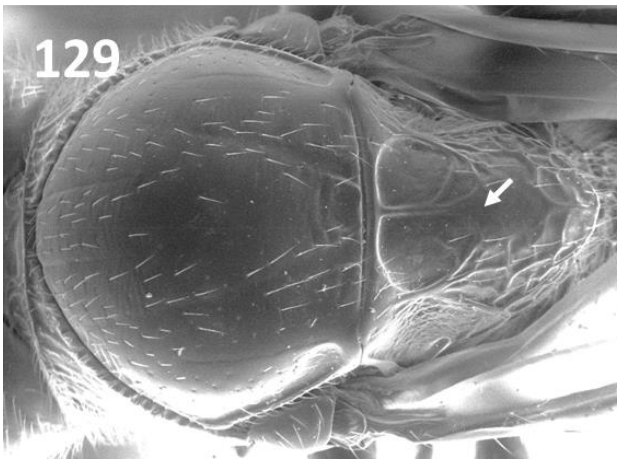




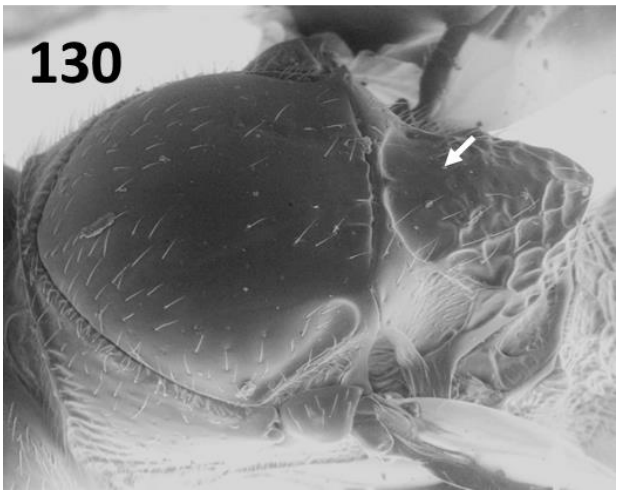
11. Central scutellum coarse to areolate [128]. 12



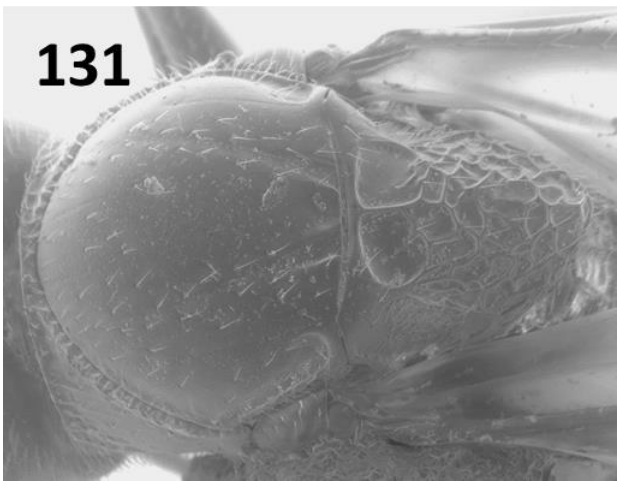
Central scutellum smooth [129]. ……..……..…….. 18



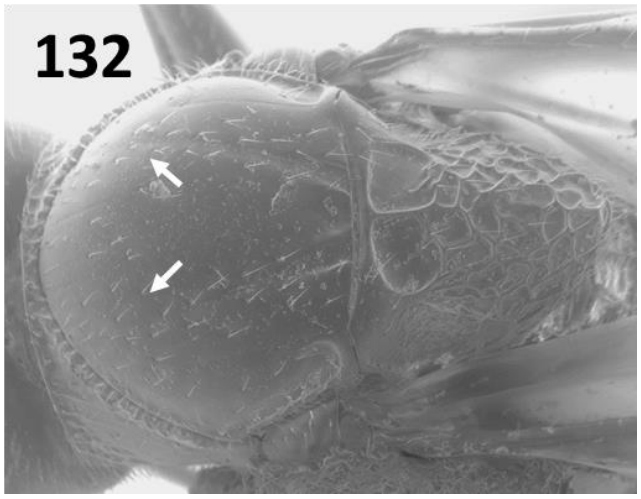
12. Scutellar foveae not posteriorly defined, interfoveal line incomplete [130]. ……...…….…….. ***A. longicellus*** **Belizin, 1951**



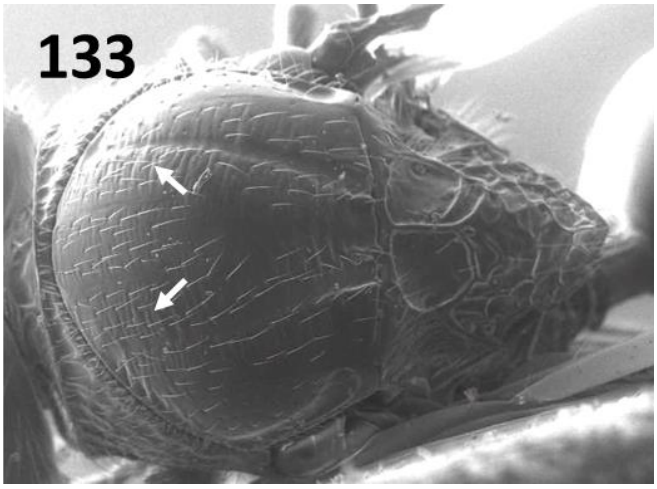
Scutellar foveae posteriorly defined by a carina, interfoveal line complete [131]. ……..….. 13



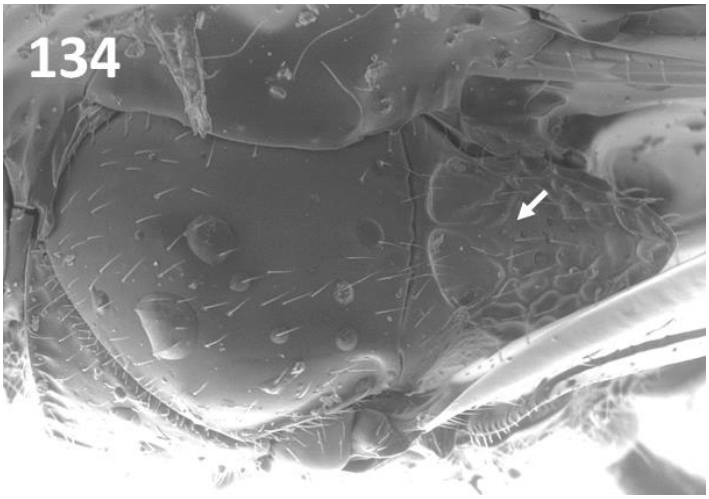
13. Notauli effaced [132]. 14



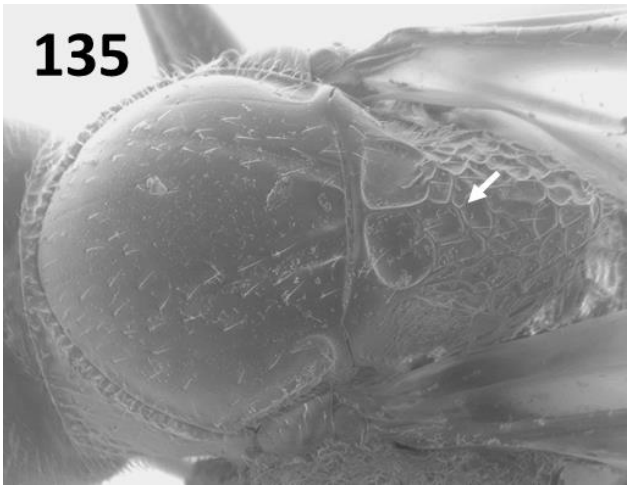
Notauli complete, or at least reaching anterior 1/3 of mesoscutum [133]. ……..… 15



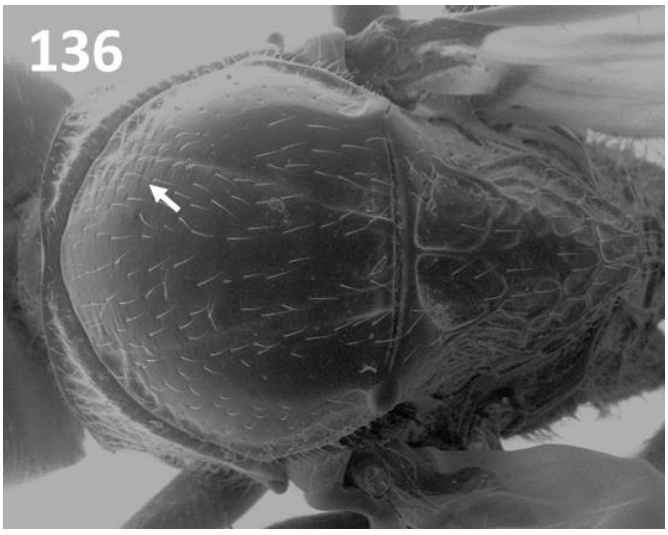
14. Central scutellum coriaceous [134]. ..... ***A. paucus* Belizin, 1961**



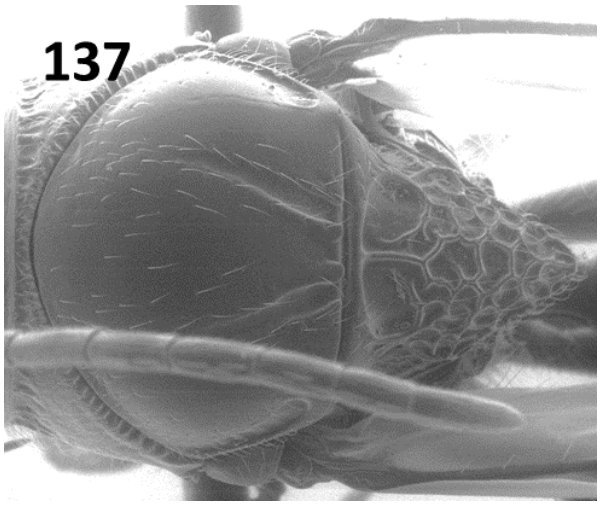
Central scutellum areolate [135]. …….. ***A. victoriae* Ashmead, 1896**



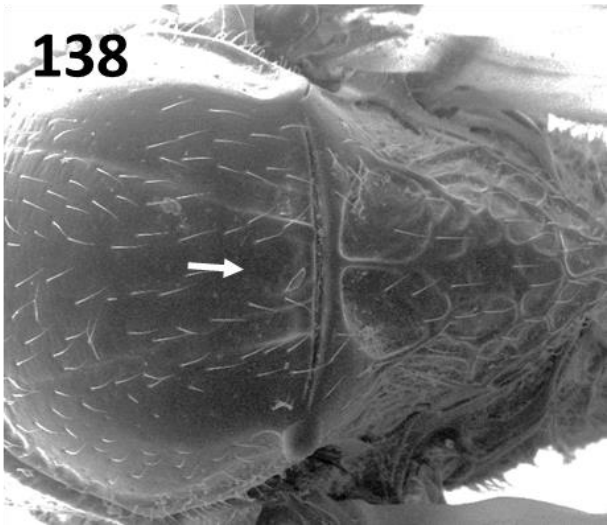
15. Notauli with soft transverse carinate sculpture [136]. 16



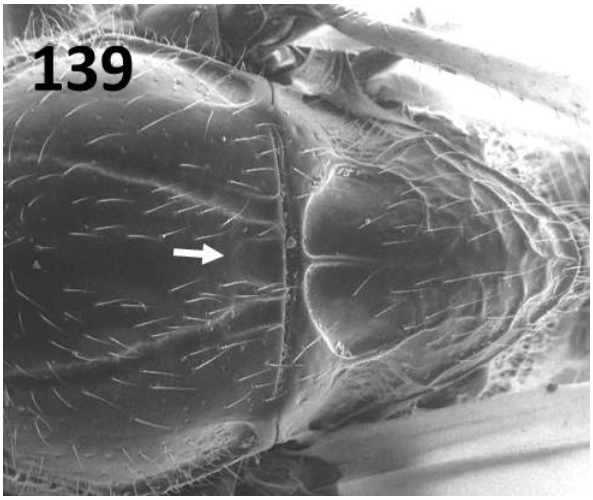
Notauli smooth, without transverse carinate sculpture [137]. 17



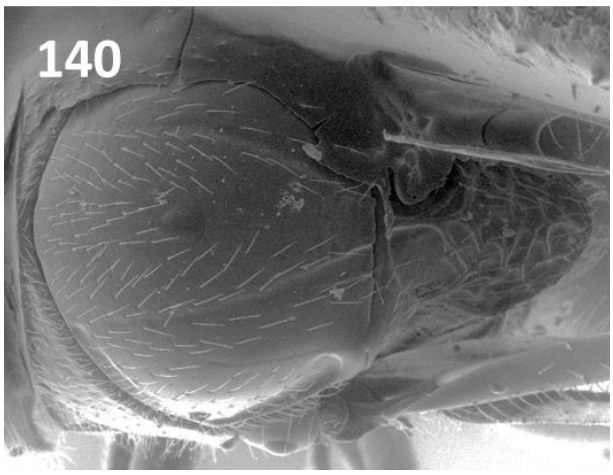
16. Median mesoscutal furrow absent [138]. ……..……..… ***A. rugatus* Kieffer, 1907**



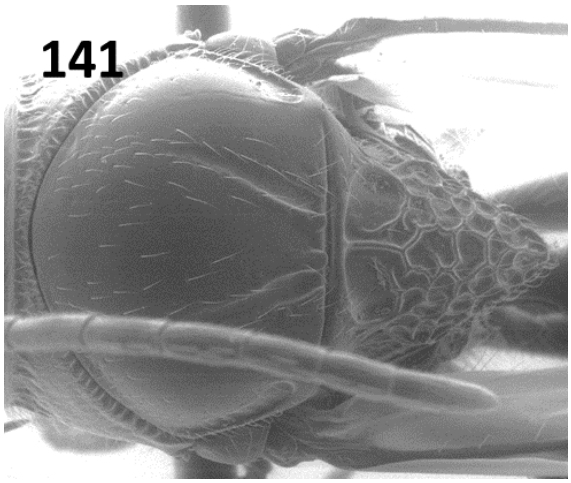
Median mesoscutal present [139]. ……..… ***A. nitidulus* (Dalman, 1823)**



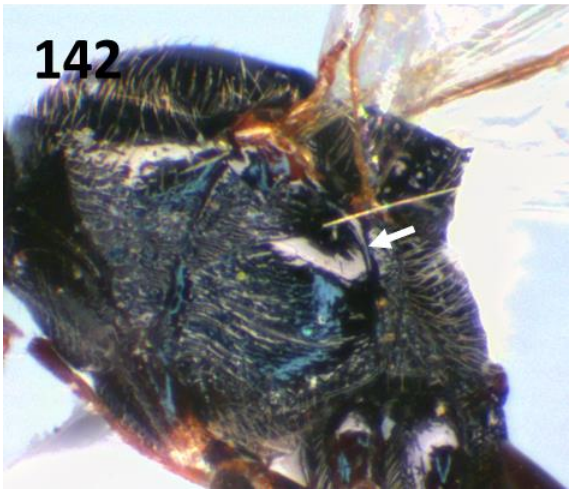
17. Mesoscutum alutaceous to softly carinate; notauli almost complete [140]. ……...……...…… ***A. atricornis* Fergusson, 1986**



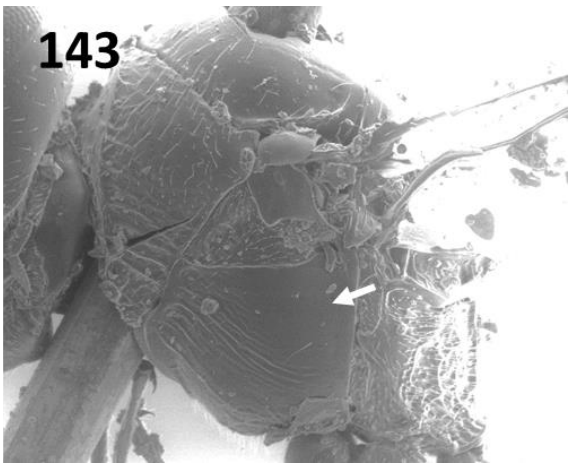
Mesoscutum smooth; notauli about ½ of mesoscutum total length [141]. ..... ***A. capensis* Kieffer, 1912**



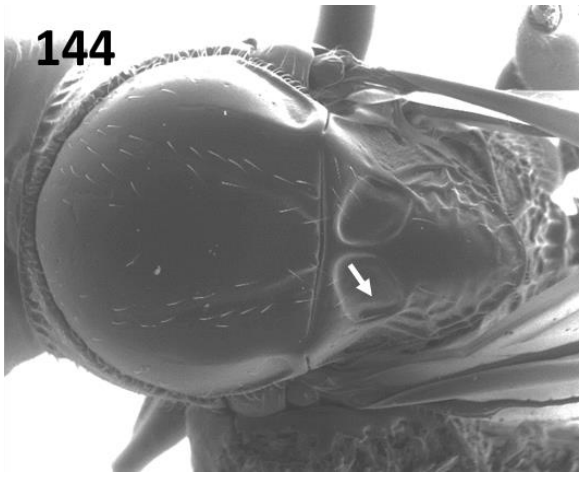
18. Mesopleuron densely wrinkled [142]. ..... ***X. ustulatus* Belizin, 1973**



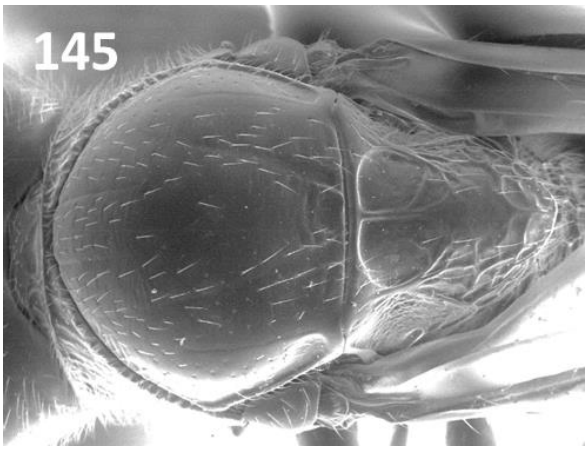
Mesopleuron ridges reduced to anteroventral region; central mesopleuron smooth [143]. ……..……..…….…….. 19



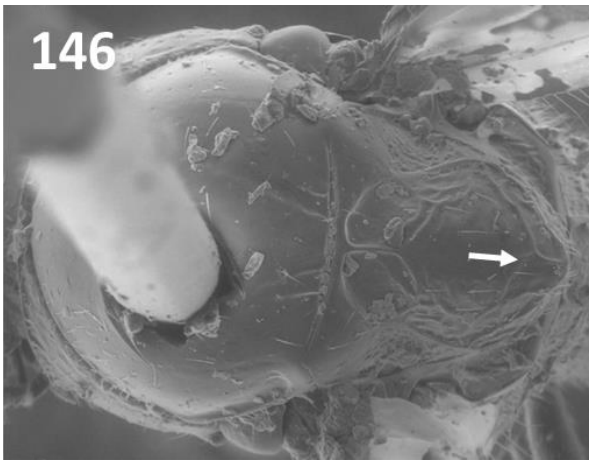
19. Scutellar pits big and elongate [144]……... …… ***X. foveata*** **Mata-Casanova & Pujade-Villar, 2017**



Scutellar pits absent [145]. 20



20. Mesoscutum completely smooth; scutellar apex pointed, ending in a raised tooth in lateral view [146]. ..... ***X. flavidicornis*** **(Kieffer, 1910)**

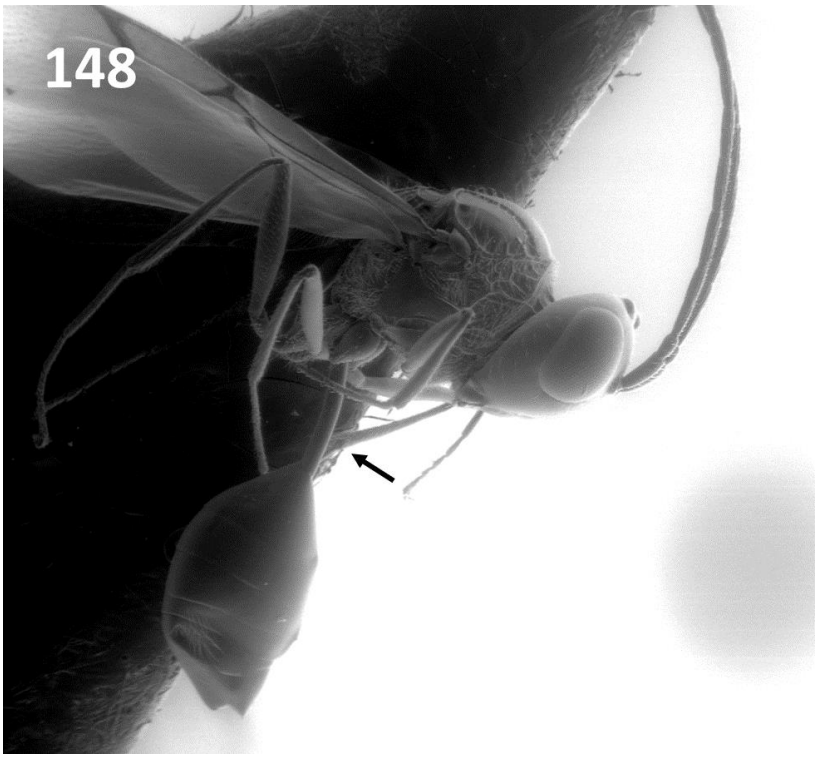


Mesosctum with some weak carina in anterior region and base of notauli; scutellar apex rounded, not raised [147]. ..... ……***A. cardinalae*** **Mata-Casanova & Pujade-Villar, n. sp.**

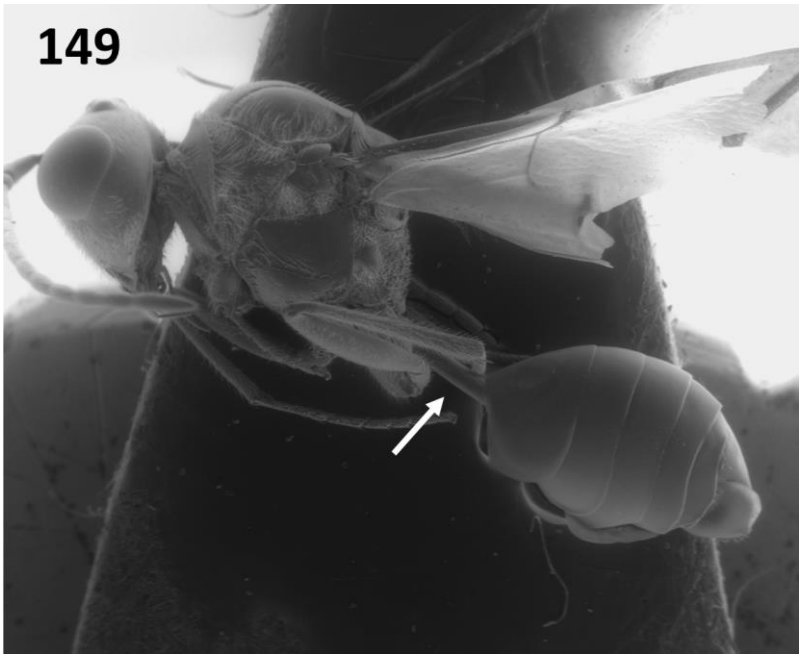


***Anacharis* Dalman, 1823**

1. Triangular head, malar area glabrous, petiole 2-2.5 times of metacoxa [148]. 2



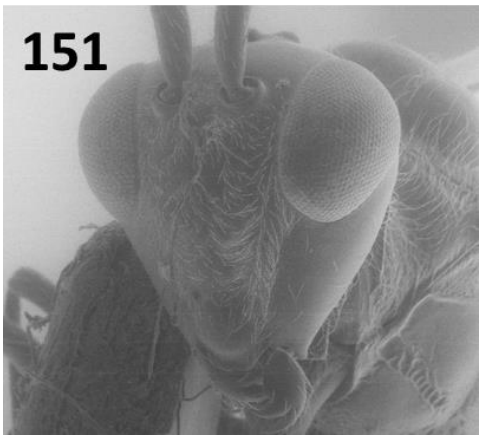
Sub-triangular head with malar area shortly expanded, malar area scarcely pubescent, petiole 2x or less than metacoxa [149]. 4



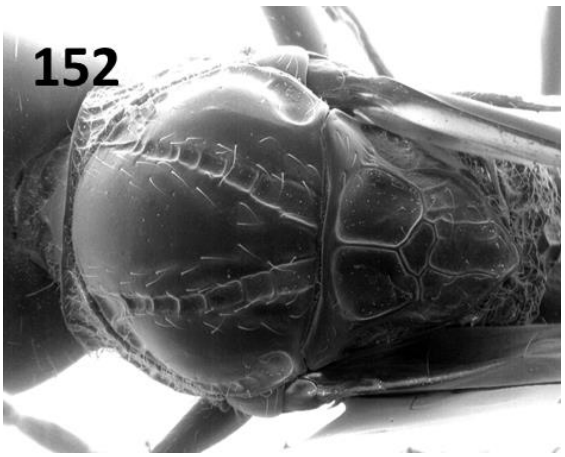
2. Head almost 2 times longer than wide, malar are straight [150] .....***A. mantocephala*** **Mata-Casanova & Pujade-Villar n. sp**



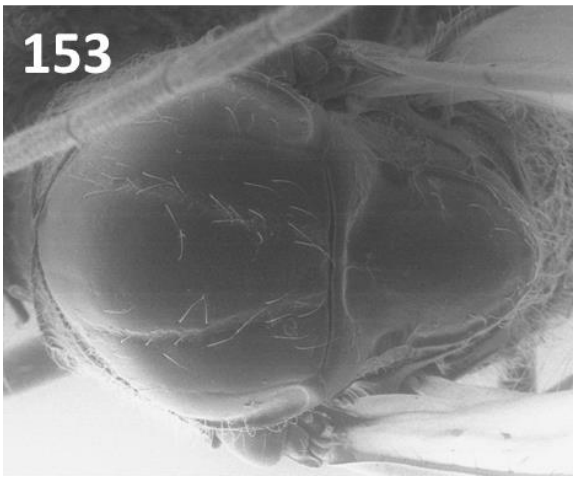
Head 1.5 times longer than wide, malar area rounded [151]. 3



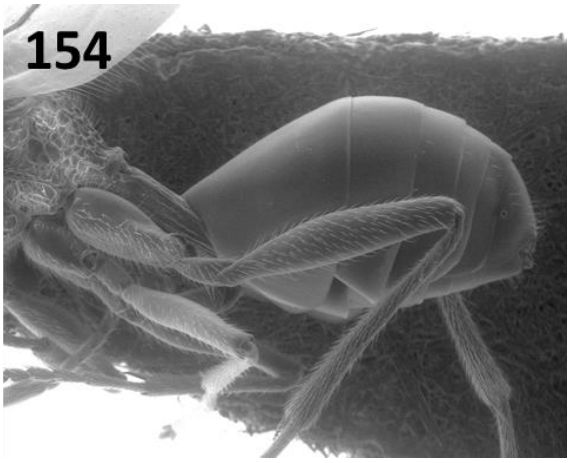
3. Notauli complete and carinate, scutellum areolate [152]. .....***A. luciae*** **Mata-Casanova & Pujade-Villar n. sp**



Notauli effaced, scutellum smooth [153]. ..... ***A. tucumana* Díaz, 1979**



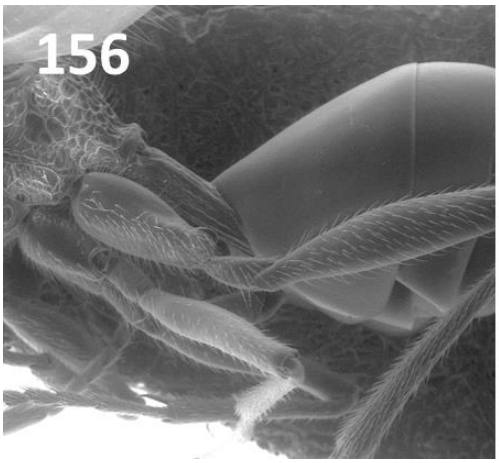
4. Petiole as long as metacoxa [154]. 5

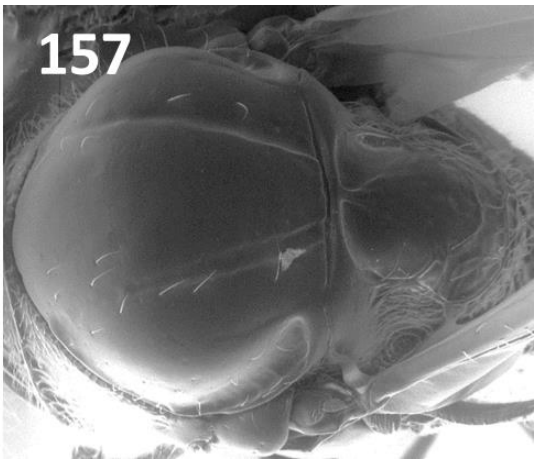


Petiole 1.3x to 2x times of metacoxa [155]. 9

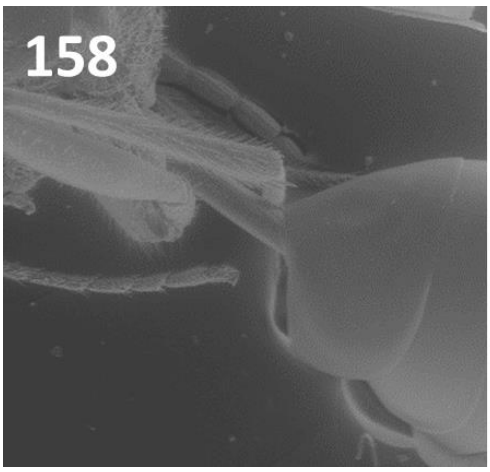


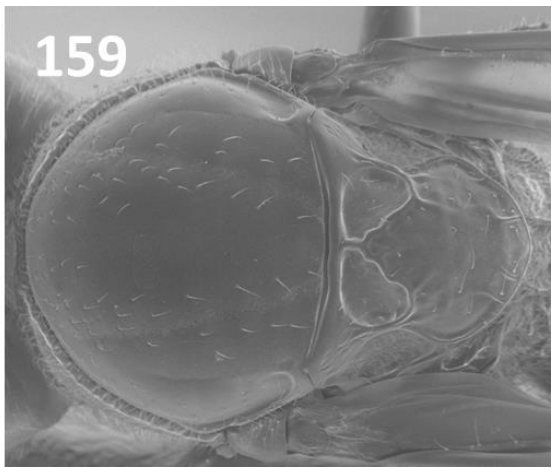
5. Petiole carinate [156], scutellar foveae effaced [157]. ....***A. tasmaniae*** **Mata-Casanova & Pujade-Villar, 2015**



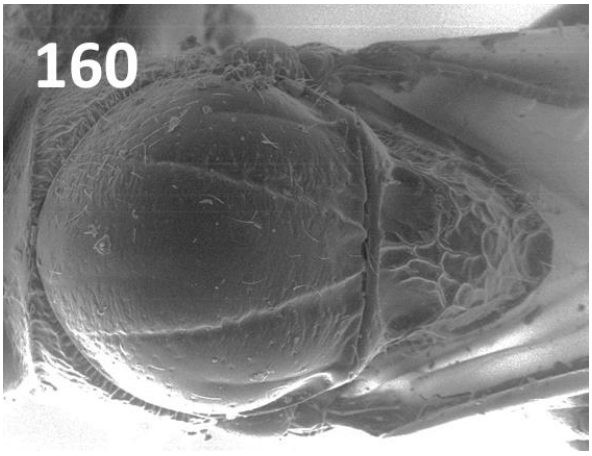


Petiole smooth to coarse [158], scutellar foveae may be tenuous but not effaced [159]. 6

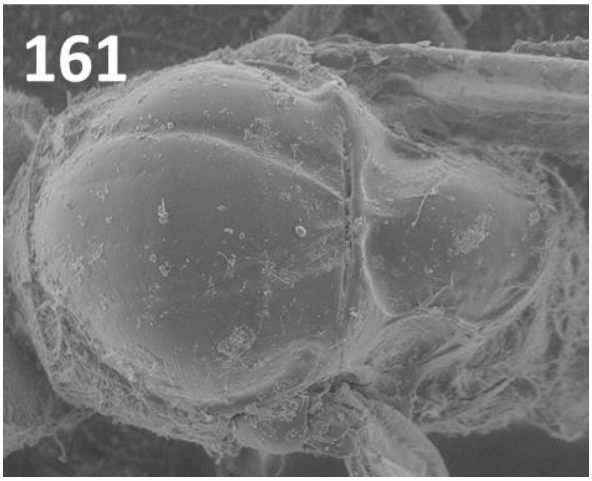




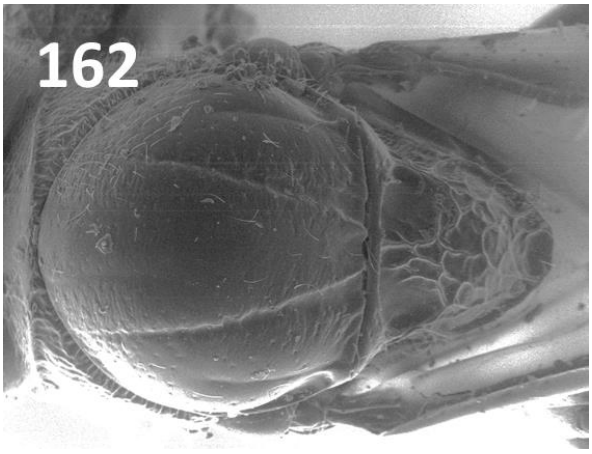
6. Scutellum strongly areolate, mesoscutum sometimes weakly carinate [160]. 7



Scutellum smooth or tenuously areolate, giving the impression of areolate sculpture, mesoscutum always smooth [161]. 8



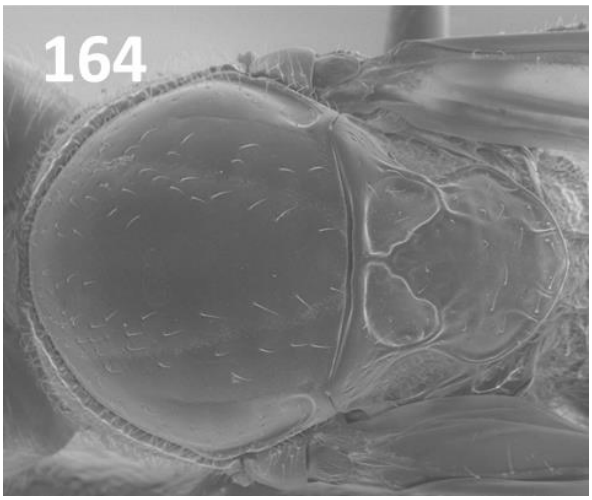
7. Notauli complete albeit tenuous, mesoscutal transverse carinae extended across all mesoscutum, usually stronger at base of notauliu, circumscutellar carina projected at apex [162]. ..... ***A. marginata*** **Provancher, 1887**



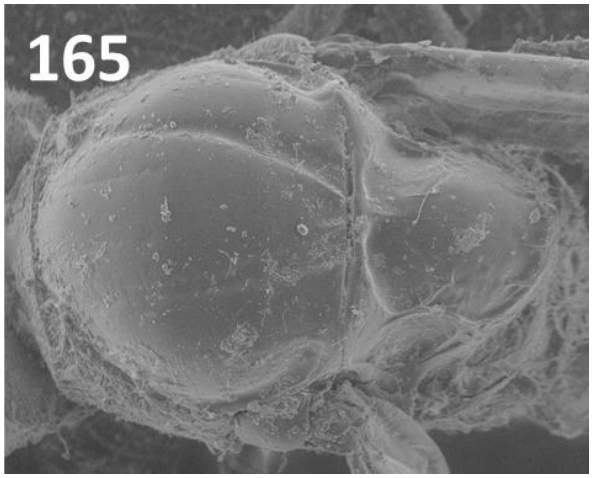
Notauli effaced in anterior mesoscutum, mesoscutal transverse carinae more pronounced in anterior mesoscutum, circumscutellar carina not projected at apex [163]. ..... ***A. norvegica*** **Mata-Casanova & Pujade-Villar, n. sp.**



8. Scutellar foveae defined by a posterior carina [164]. .... ***A. immunis*** **(Walker, 1835)**



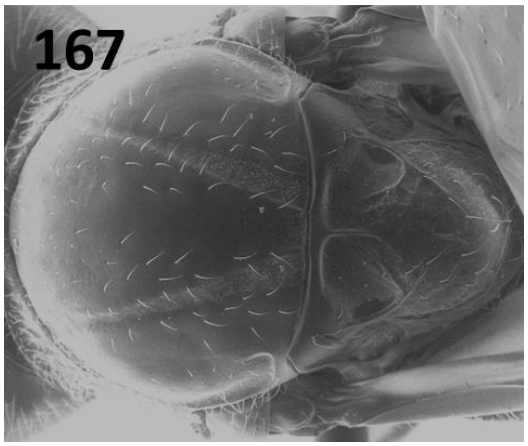
Scutellar foveae not posteriorly defined, continuous to scutellar surface [165]. ..... ***A. mexicana*** **(Cameron, 1884)**



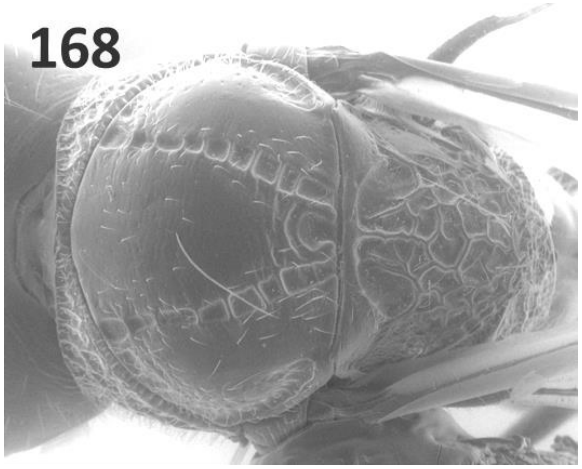
9. Scutellum strongly areolate [166]. 10



Scutellum smooth to weakly areolate, giving the impression of coarse sculpture [167]. 14



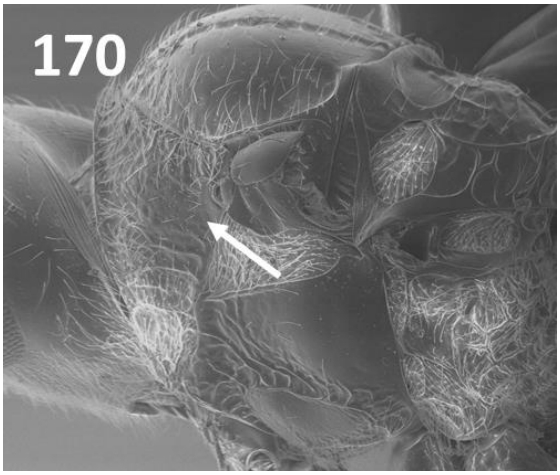
10. Scutellar foveae small, absence of clear posterior carina defining them, scutellar areolae penetrating into foveae, propodeum densely areolate, divided in small cells [168]. ..... ***A. afrotropica*** **Mata-Casanova & Pujade-Villar, 2015**



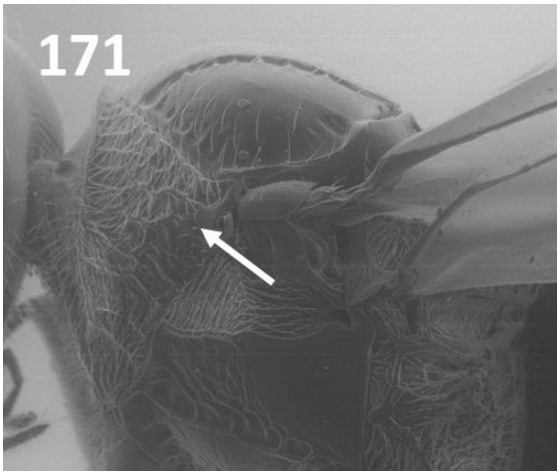
Scutellar foveae big, presence of clear posterior carina separating the foveae from rest of scutellar surface, propodeum areolate but central propodeum divided in big, clearlyvisible cells [169]. 11



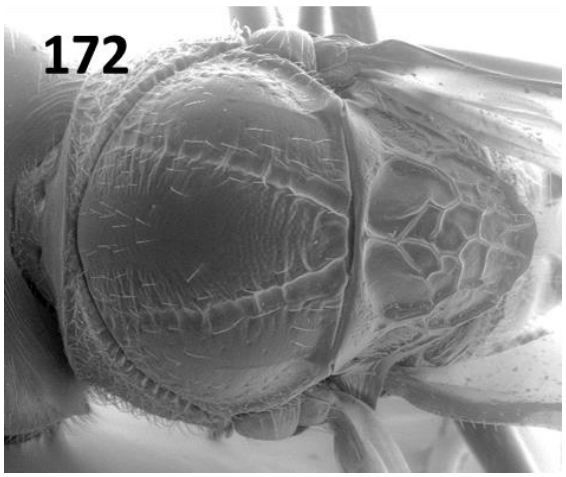
11. Pronotum smooth except for short ventral carinae [170]. .....***A. fergussoni* Mata-Casanova & Pujade-Villar, n. sp.**



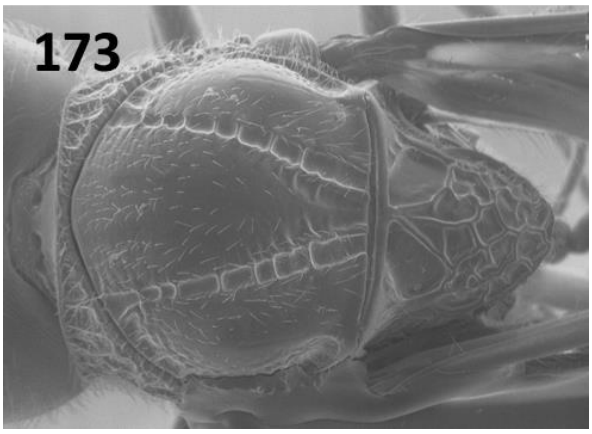
Dorsal pronotum coarse to stronly areolate [171]. 12



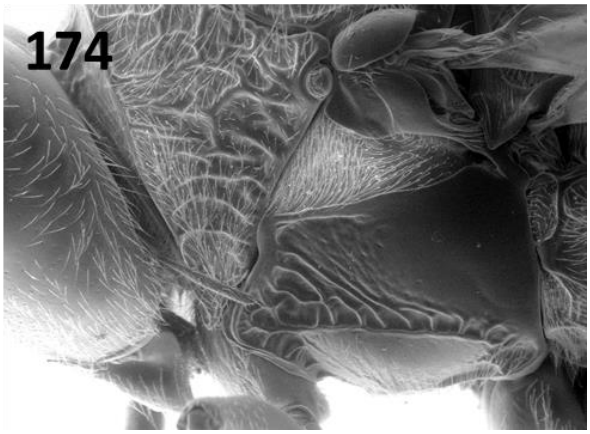
12. Petiole 1.5x to 2x of metacoxa, median mesoscutal furrow anterior margin defined, presence of tenuous coriaceous sculpture more or less extended in mesoscutum [172]. ..... ***A. melanoneura* Ashmead, 1887**



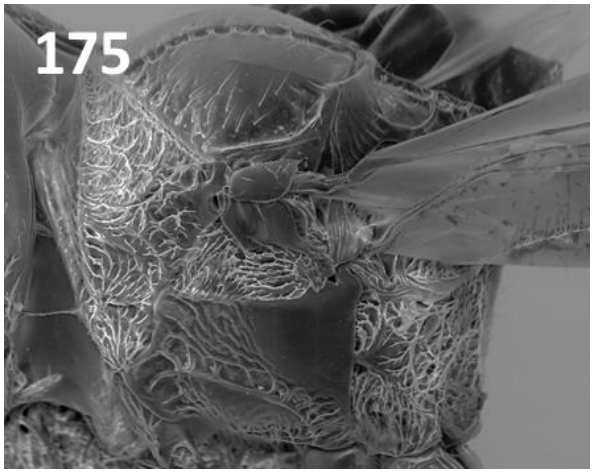
Petiole 2x of metacoxa, median mesoscutal furrow anterior margin effaced, not distinguished from rest of mesoscutum, mesoscutal surface smooth to softly carinate, but never coriaceous [173]. 13



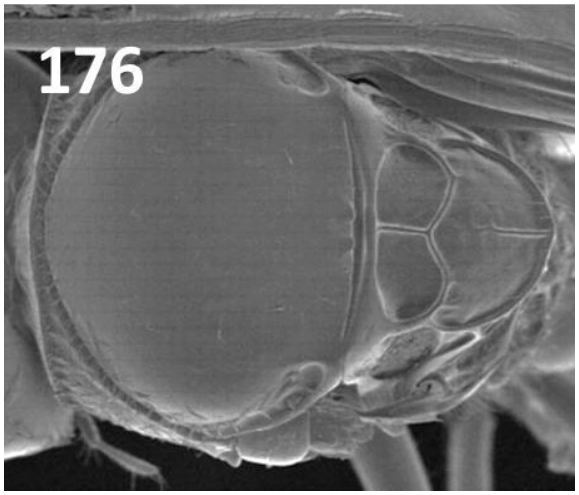
13. Anterior mesopleuron coriaceous but not wrinkled [174]. ....***A. parapsidalis*** **Belizin, 1951**



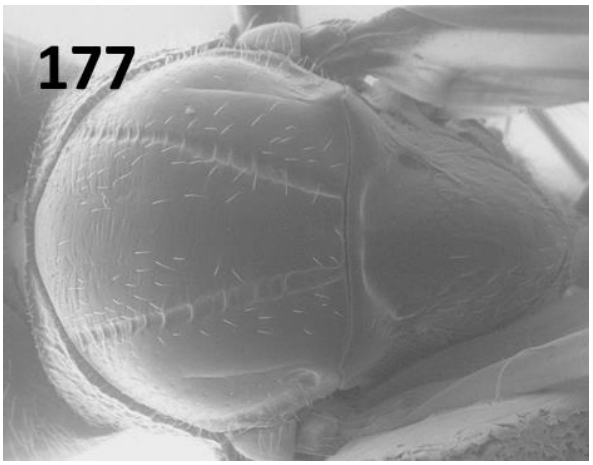
Anterior mesopleuron densely wrinkled (coriaceous sculpture, if present, very tenuous and circumscribed to wrinkled area) [175]. .... ***A. zealandica*** **Ashmead, 1900**



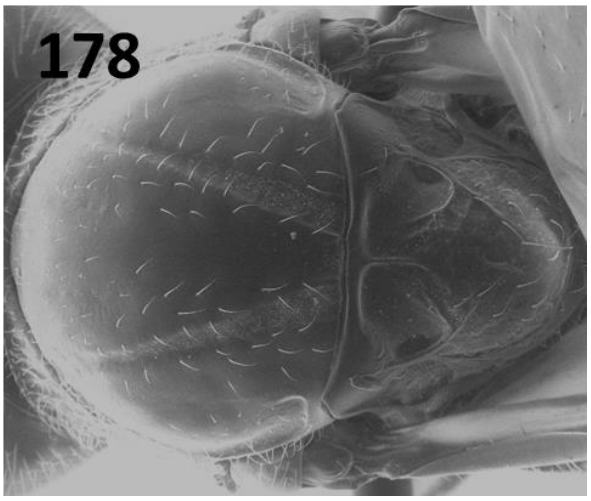
14. Notauli almost absent, just a small depression in posterior mesoscutum [176]. ..... ***A. madagascarensis* Pujade-Villar, 2012**



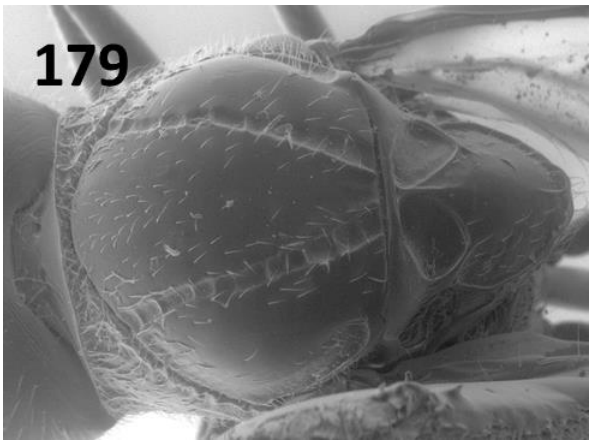
Notauli present, sometimes effaced in anterior mesoscutum [177]. 15



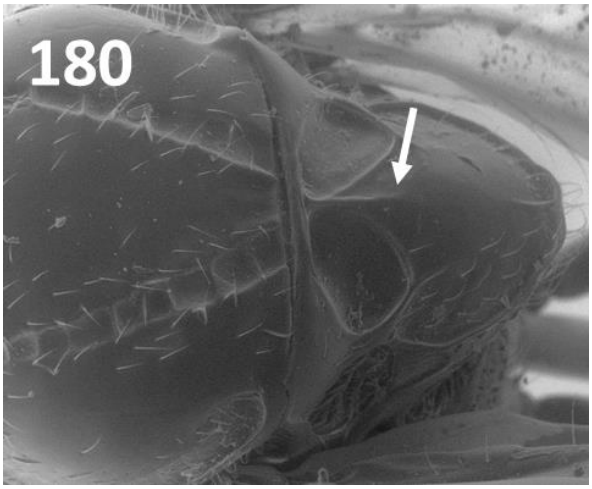
15. Notauli effaced in anterior mesoscutum [178]. .... ***A. eucharoides* (Dalman, 1818)**



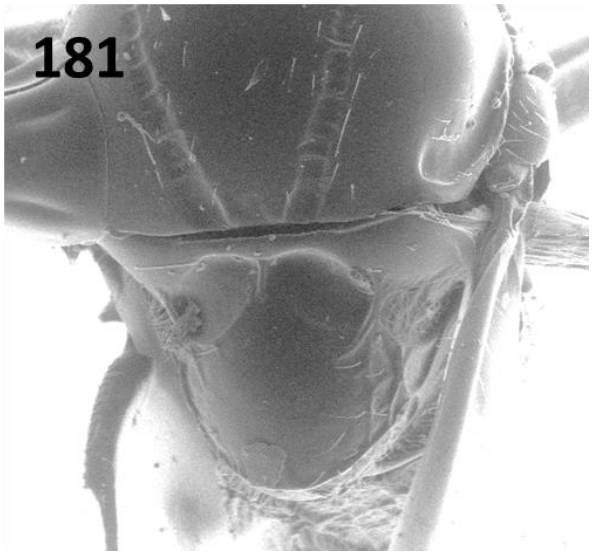
Notauli complete, reaching anterior margin of mesoscutum [179]. 16



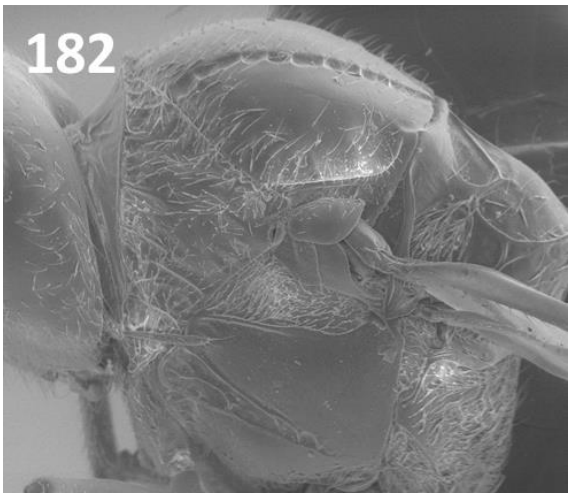
16. Interfoveal line elongate, projected into scutellum [180]. 17



Interfoveal line not elongate [181]. 18



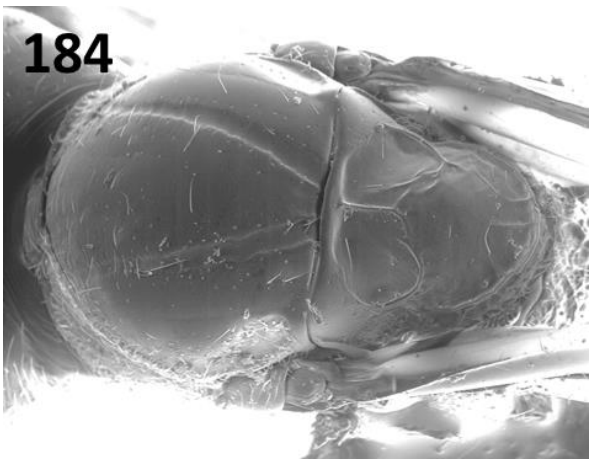
17. Pronotum smooth except for some ventral carinae, facial and malar pubescence short, sparce in malar area [182]. ..... ***A. antennata*** **Belizin, 1951**



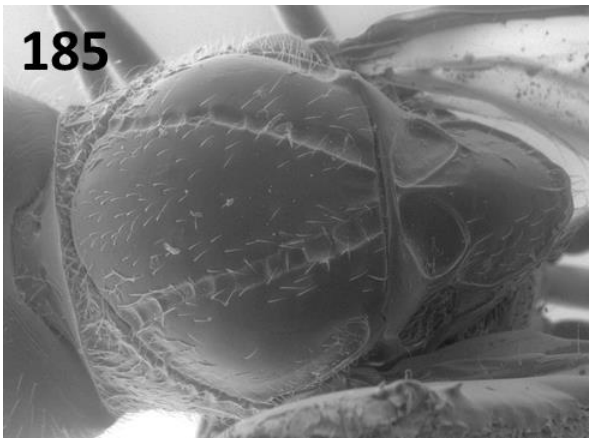
Pronotum covered by irregular carinae, face and malar are covered by dense long hyaline pubescence [183]. .... ***A. belizini*** **Mata-Casanova & Pujade-Villar, n. sp.**



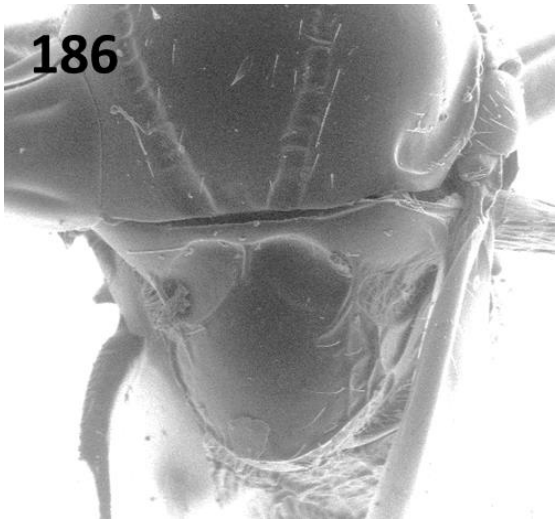
18. Notauli smooth, internal carinae, if ever present, very tenuous at anterior notauli [184]. ..... ***A. punctatifrons*** **Kieffer, 1907**



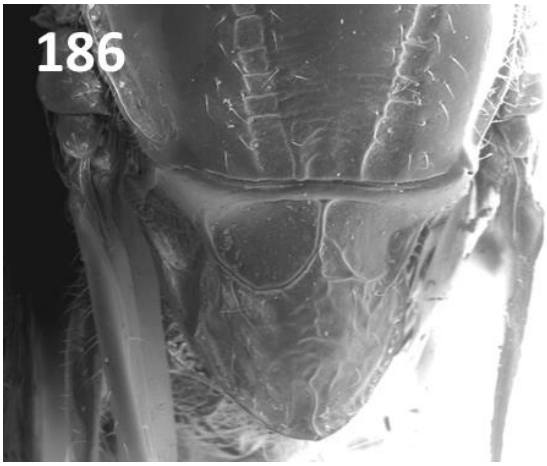
Notauli internally carinated in all its extension [185]. 19



19. Scutellum smooth, scutellar foveae not defined by posterior carina [186]. ..... ***A. rwenzori*** **Mata-Casanova & Pujade-Villar, 2015**

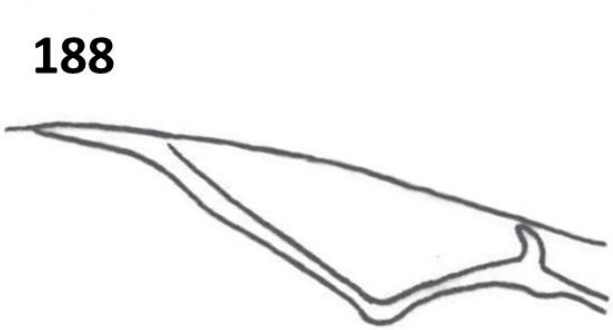


Scutellum coarse to tenuously areolate, scutellar foveae defined by posterior carina [187]. ..... ***A. tripartita*** **Kieffer, 1907**

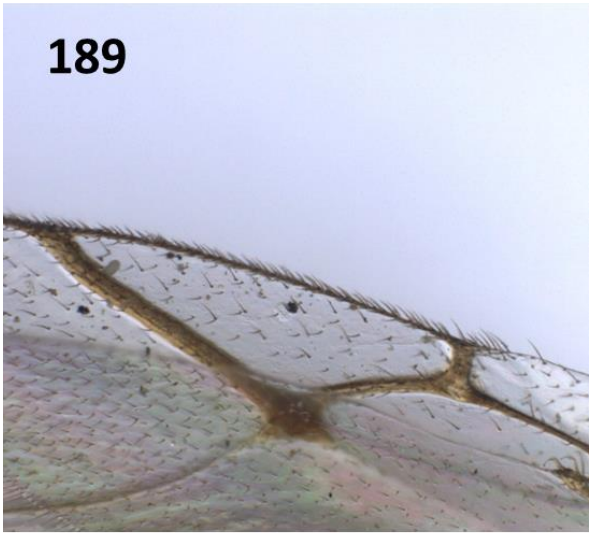


***Calofigites* Kieffer, 1909**

1. Radial cell open [188]. ..... ***C. neotropica* (Hedicke, 1914)**

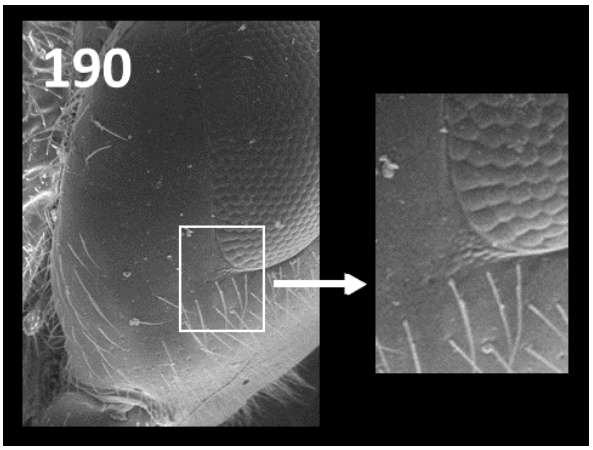


Radial cell closed [189]. ..... ***C. nitidus* Kieffer, 1909**

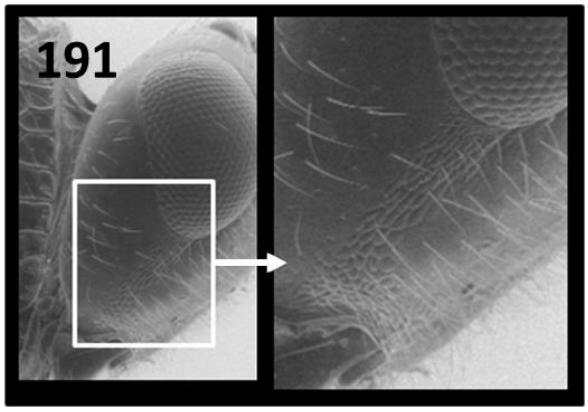


***Xyalaspis* Hartig, 1843**

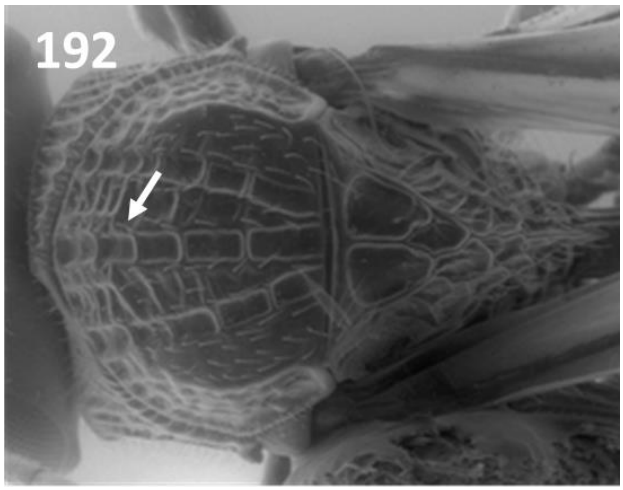
1. Malar coriaceous band incomplete, sometimes almost unnoticeable [190]. ..... ……..***X. aberrans* Mata-Casanova & Pujade-Villar, 2014**



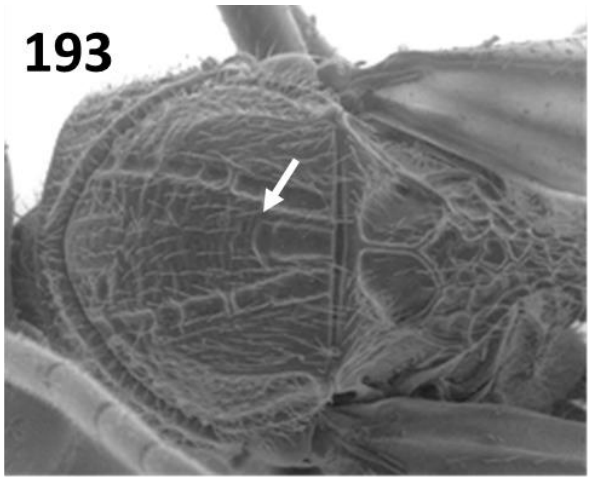
Malar coriaceous band complete [191]. 2



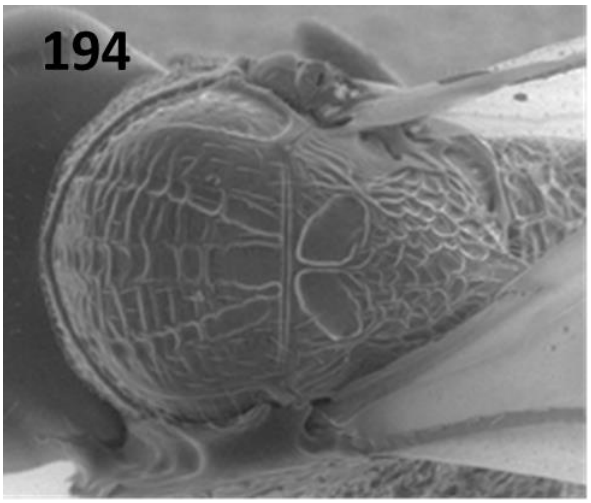
2. Median mesoscutal furrow complete, reaching pronotum [192]. 3



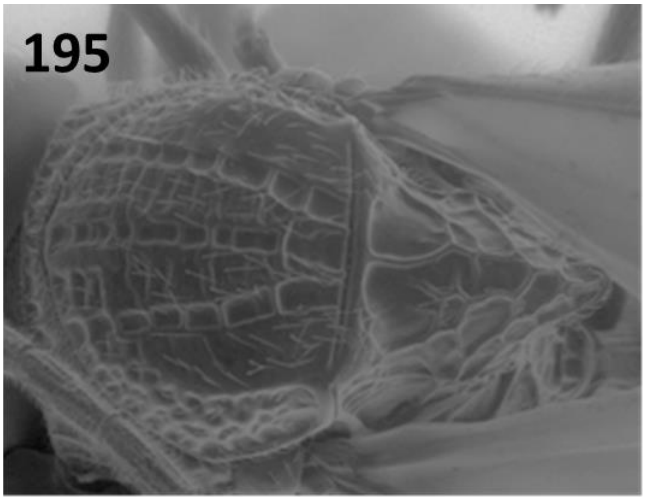
Median mesoscutal furrow incomplete, not reaching ½ of mesoscutum total length [193]. ……..... 5



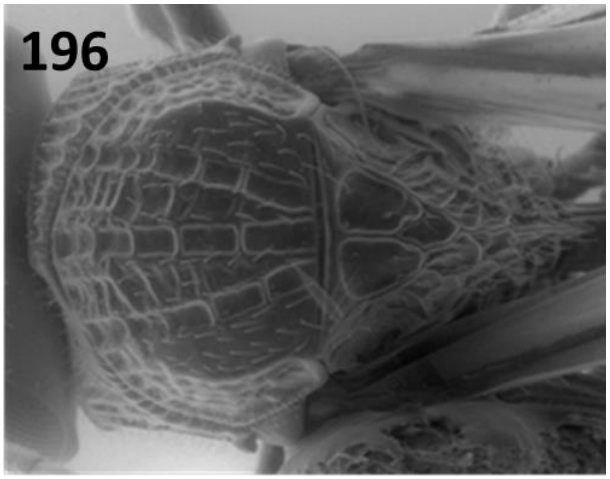
3. Scutellum divided in small cells; foveal pits present; scutellar spine thin [194]. …... .....……..***X. victoriensis*** **New, 1979**



Scutellum divided in big cells; foveal pits absent; scutellar spine blunt [195]. 4



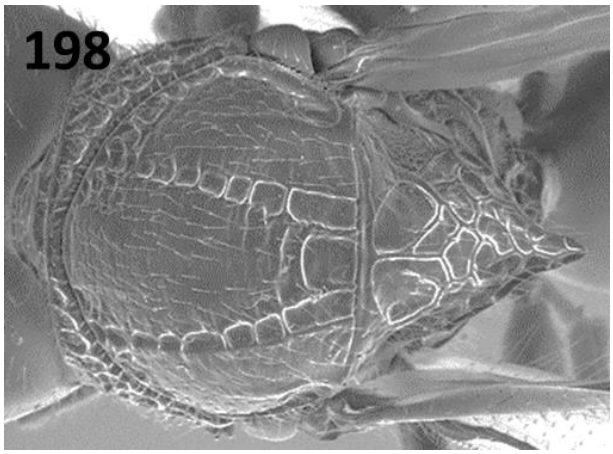
4. Petiole longer than broad; scutellar foveae big and posteriorly defined by a carina; scutellar spine length about ½ of scutellar length, being curved in females and straight in males [196]. …... ***X. dimorphica*** **Mata-Casanova & Pujade-Villar, 2014**



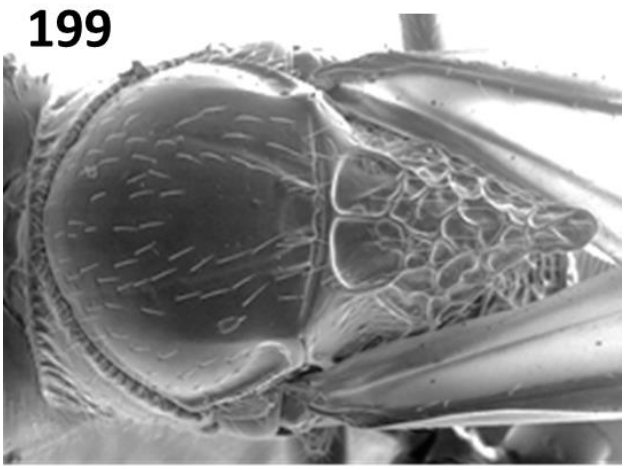
Petiole as long as broad; scutellar foveae small, not posteriorly defined by a carina; scutellar spine length about 1/3 of scutellar length, being straight in females (male unknown) [197]. .....…..***X. subsaharica*** **Mata-Casanova & Pujade-Villar, 2014**



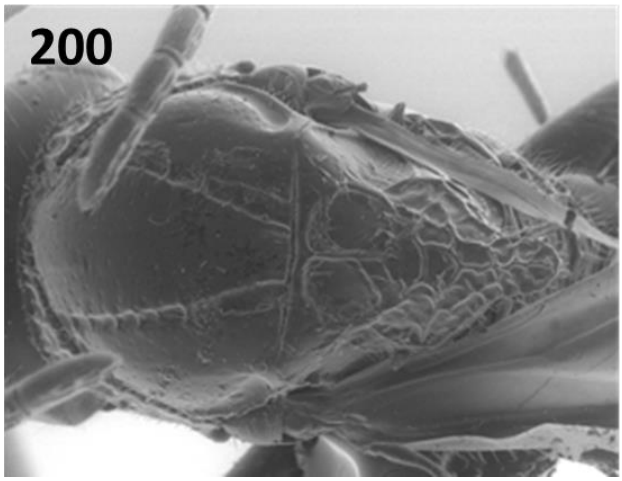
5. Notauli complete and transversely carinate [198]. 6



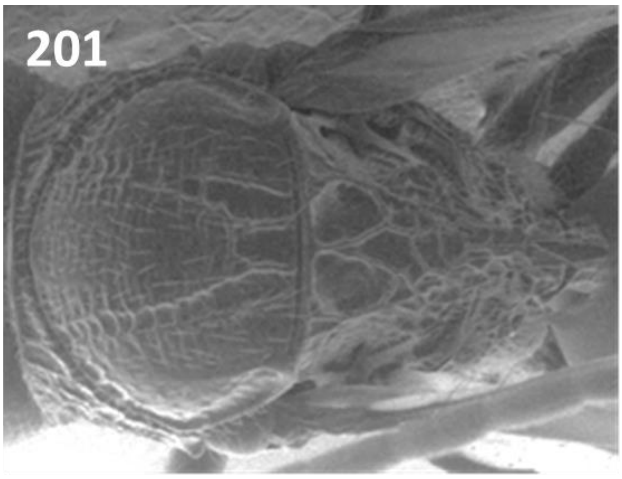
Notauli incomplete or faded in anterior mesoscutum; carinae, if present, are weak [199]. ……..... 17



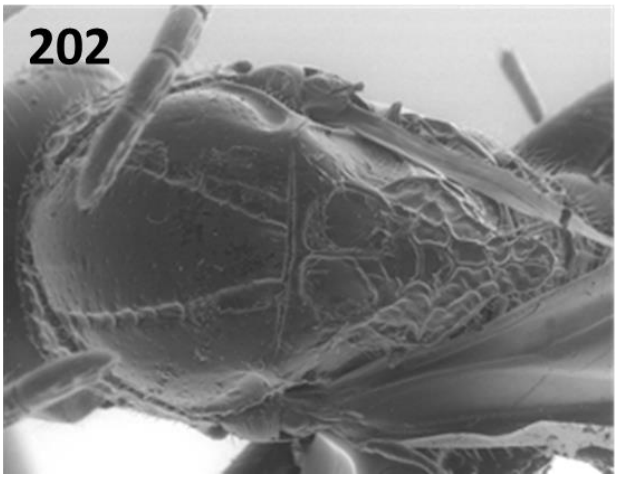
6. Mesoscutum smooth [200]. 7



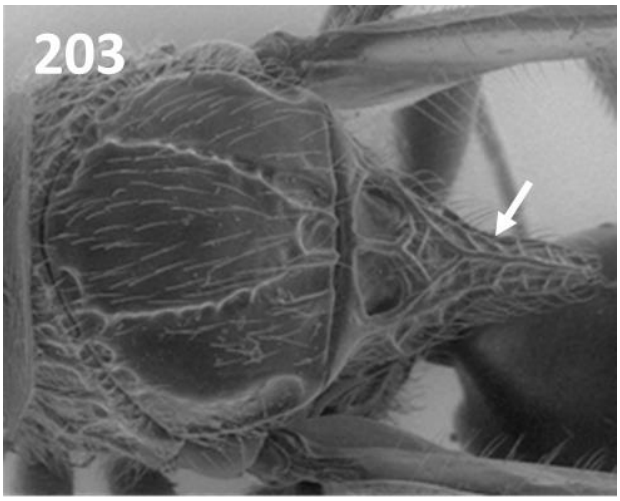
Mesoscutum with some degree of sculpture [201]. …….……...…..... 8



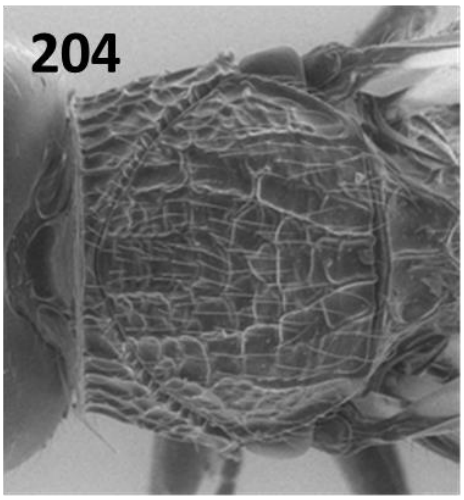
7. Scutellum shorter than mesoscutum, scutellar median carina absent; body glabrous; head triangular in front view [202]. .....……..***X. atemiensis*** **Ashmead, 1904**



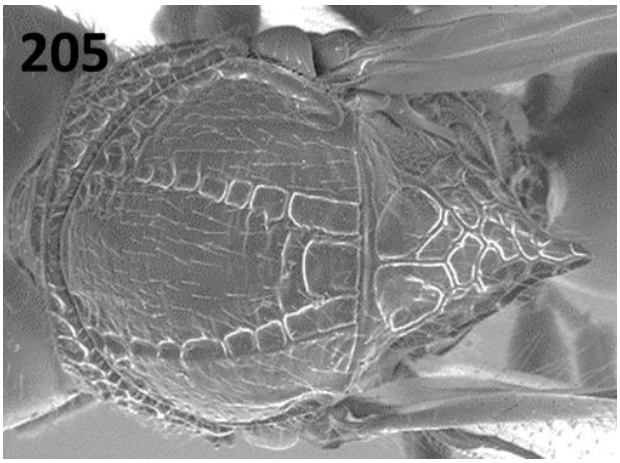
Scutellum longer than mesoscutum, scutellar spine longitudinally divided by a median carina; body densely pubescent; head quadrangular in front view [203]. .....……..***X. pilosa*** **Mata-Casanova & Pujade-Villar, 2014**



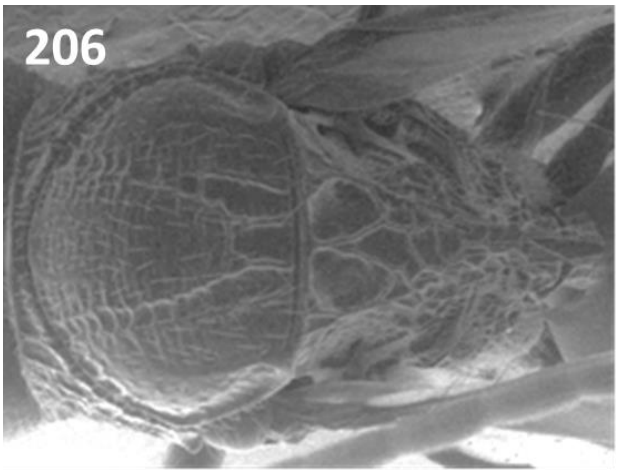
8. Mesoscutum areolate [204]. ... ***X. alveolata*** **Mata-Casanova & Pujade-Villar, 2014**



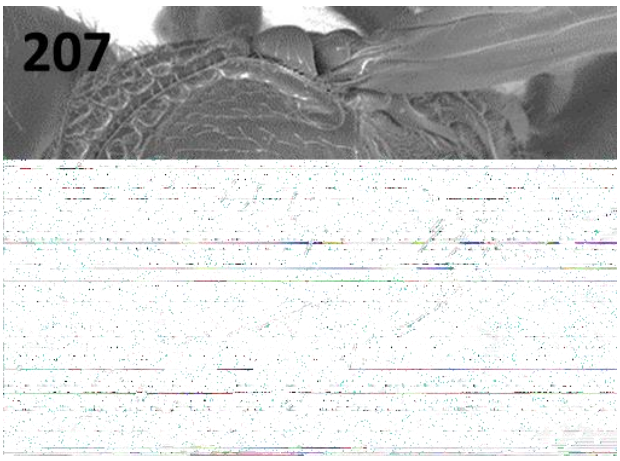
Mesoscutum with transverse carinate sculpture, ranging from being reduced to base of notauli to covering the whole mesoscutal surface [205]. ……..……..... 9



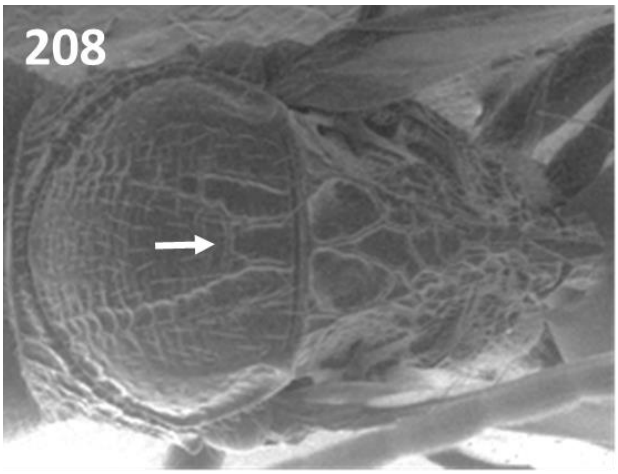
9. Scutellum as long as mesoscutum in dorsal view [206]. 10



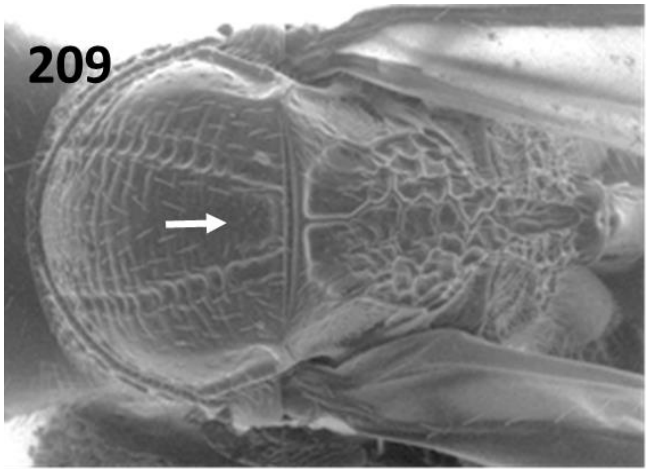
Scutellum shorter than mesoscutum in dorsal view [207]. ……..…….. 11



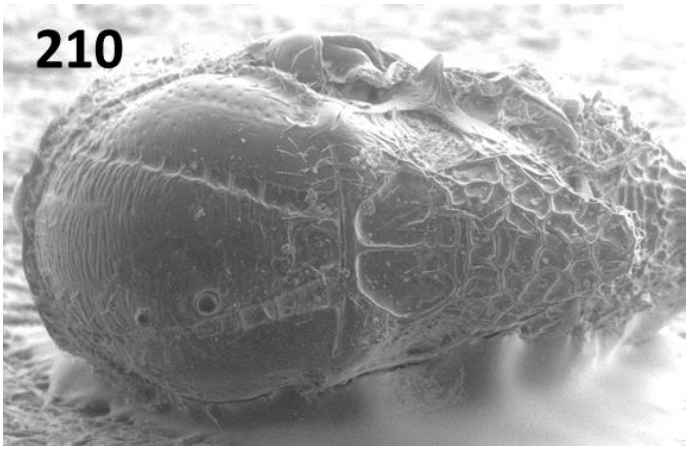
10. Pronotum divided in cells; scutellar foveae posteriorly defined by carina; median mesoscutal furrow elongate and excavated [208]. ..... ***X. rugosa*** **Hartig, 1843**



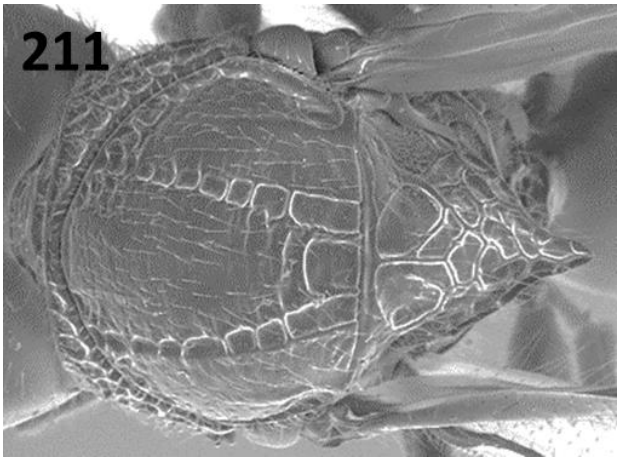
Pronotum with oblique carinate sculpture; scutellar foveae not posteriorly defined, median mesoscutal furrow short and superficial [209]. ……..……..... ……. ***X. arapahoe*** **Mata-Casanova & Pujade-Villar, 2014**



11. Mesoscutum longer than broad in dorsal view; scutellar spine short, rounded in dorsal view and truncate in lateral view [210]. ..... ……..…….. ***X. petiolata*** **Kieffer, 1901**



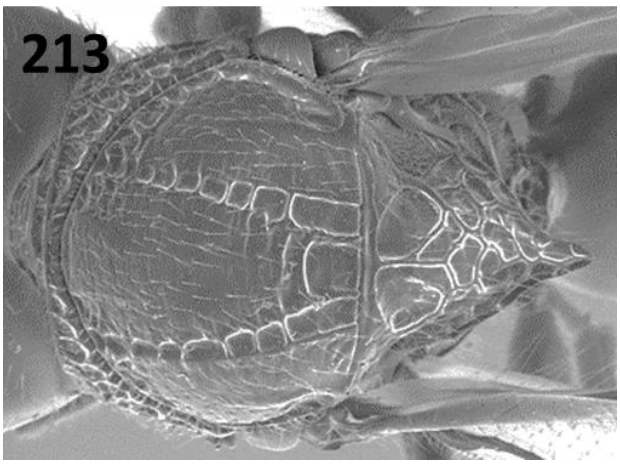
Mesoscutum broader than long in dorsal view; scutellar spine acute in dorsal view and not truncate in lateral view [211]. …….. 12



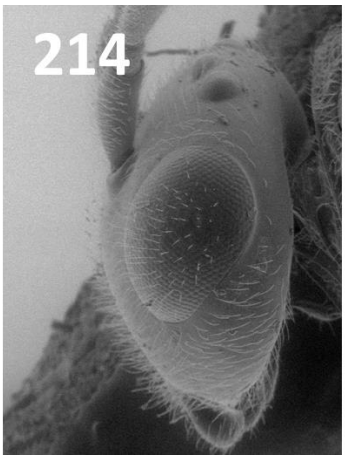
12. Mesoscutum strongly carinate in all its surface; median mesoscutal furrow about 1/3 of mesoscutal length [212]. 13

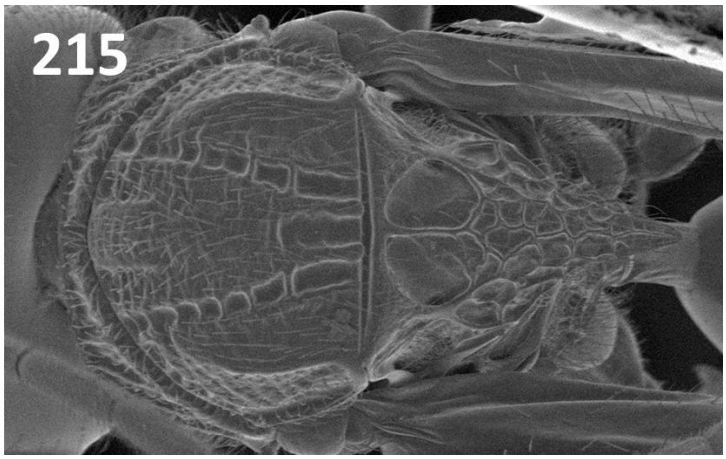


Mesoscutum carinate sculpture weak and variable in extension; median mesoscutal furrow less than 1/3 of mesoscutal length [213]. …….. 14

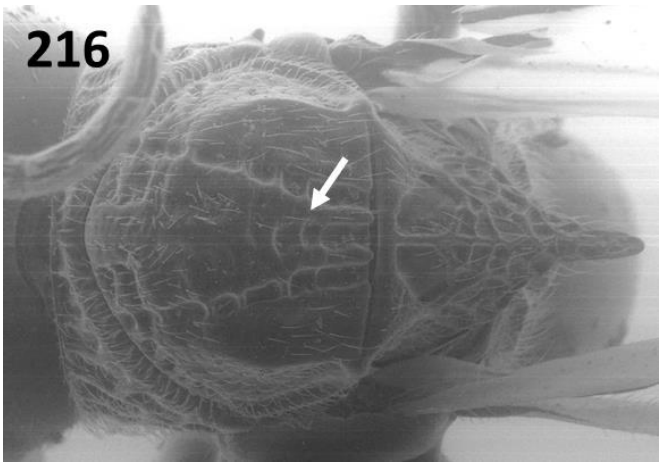


13. Eyes densely pubescent [214]; median mesoscutal furrow not carinate [215]; scutellar spine broad. ..... ***X. hirsuta*** **Mata-Casanova & Pujade-Villar, 2014**

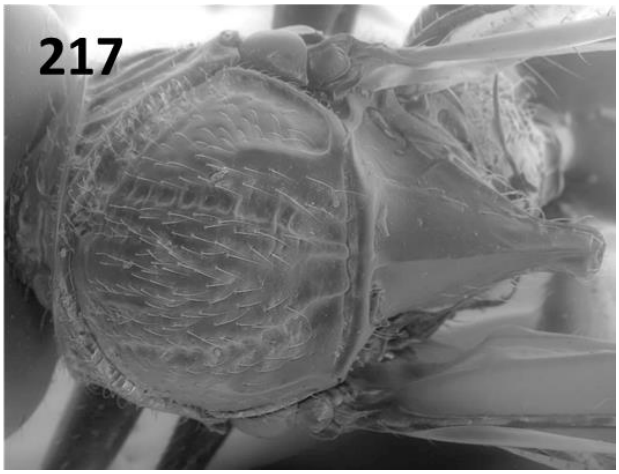




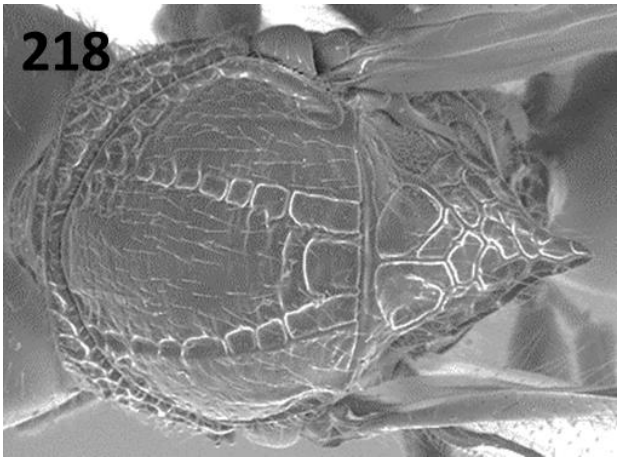
Eye pubescence sparce but present; median mesoscutal furrow with transverse carinae, divided in cells; scutellar spine thin [216]. …… ..…….*X. muzencaba* **Mata-Casanova & Pujade-Villar, 2015**



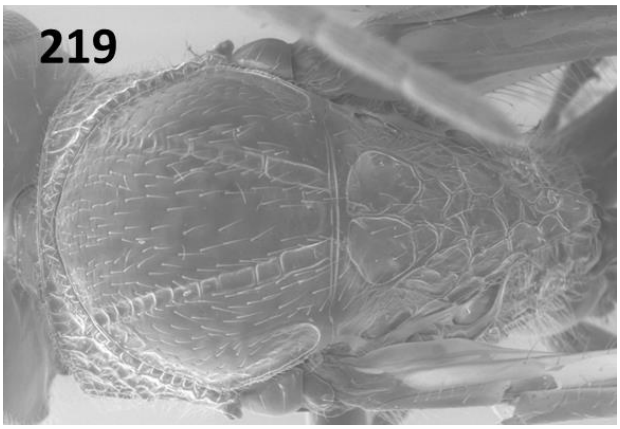
14. Scutellum smooth [217]. ..... ……...…….. ***X. dominicana*** **Mata-Casanova & Pujade-Villar, 2015**



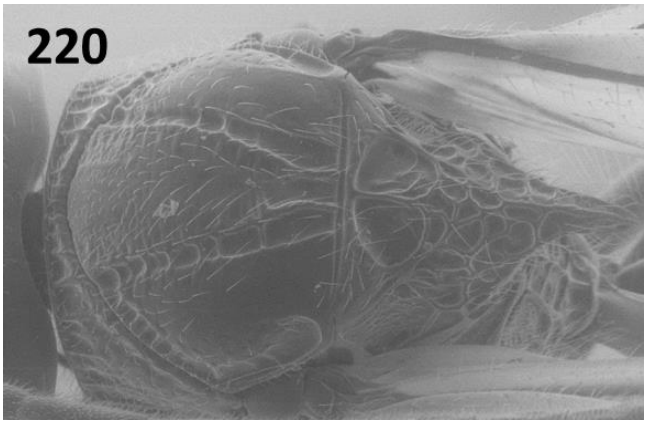
Scutellum areolate [218]. ……...….. 15



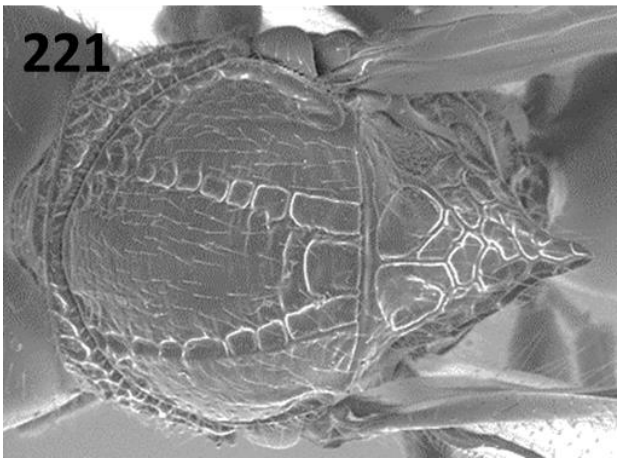
15. Pronotum ventrally carinate, dorsally smooth; mesopleuron ridges reduced to anterior margin; scutellar spine narrowing toward apex, never abruptly [219]. ..... ***X. orientalis*** **Mata-Casanova & Pujade-Villar, 2014**



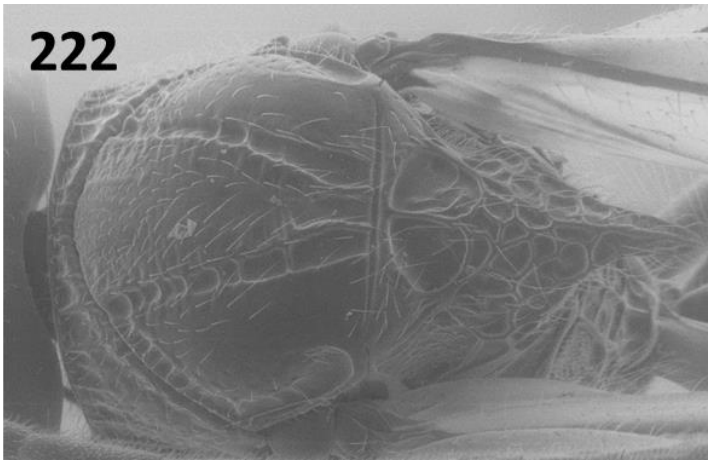
Pronotum surface completely carinate, mesopleuron ridges covering anterior half of mesopleural surface; scutellar spine clearly distinguishable from rest of scutellum [220]. ……..……..... 12



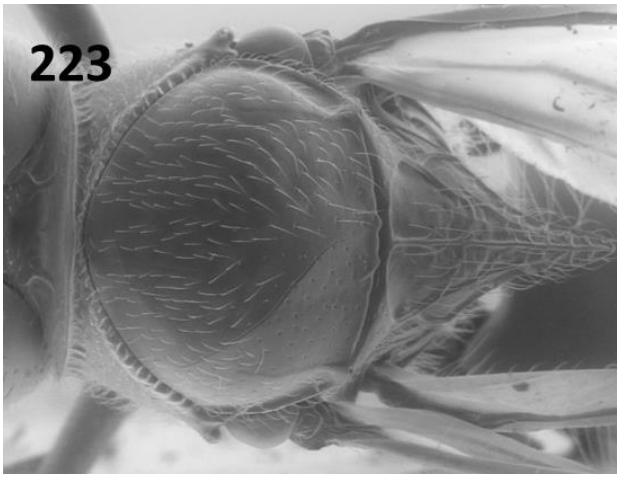
16. Median mesoscutal furrow short, scutellar spine blunt, straight in lateral view, eyes glabrous [221]. ..... ***X. flavipes* Ashmead, 1896**



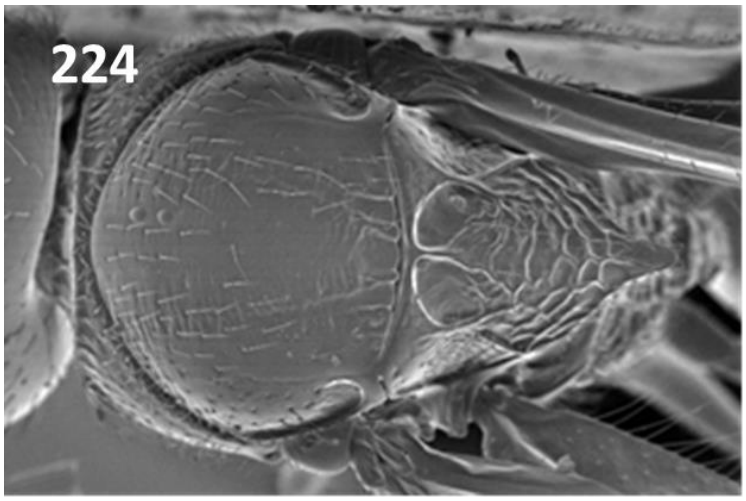
Median mesoscutal furrow elongated, scutellar spine thin and curved downwards in lateral view, eyes pubescent [222] ……. ……..…… ***X. ribesi* Mata-Casanova & Pujade-Villar, 2015**



17. Mesoscutum smooth [223]. 18



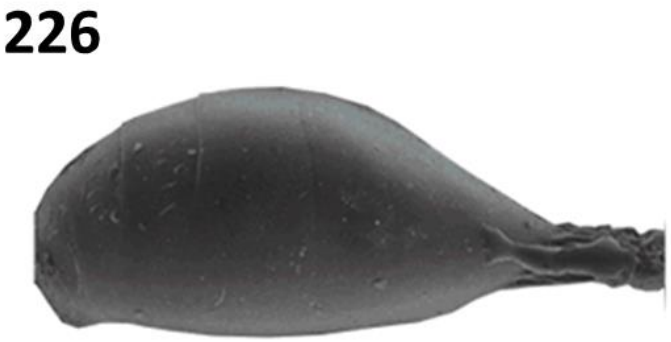
Mesoscutum transversely carinate; carinae ranging from all scutellar surface to being reduced at base of notauli [224]. ……..…….. 20



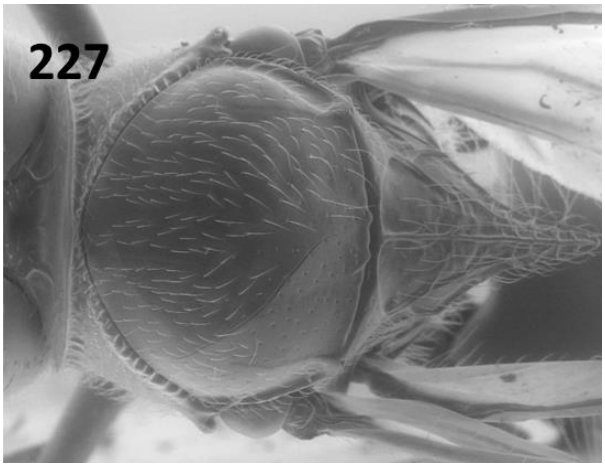
18. Petiole broader tan long [225]. ..... ***X. armata* (Giraud, 1860)**



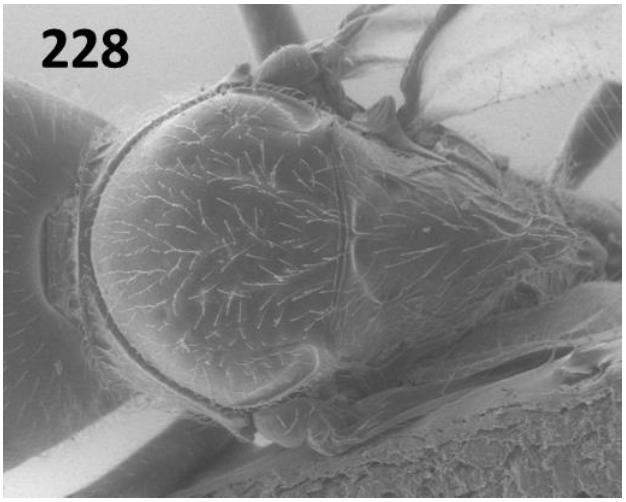
Petiole 2x longer tan broad [226]……...……..…….. 19



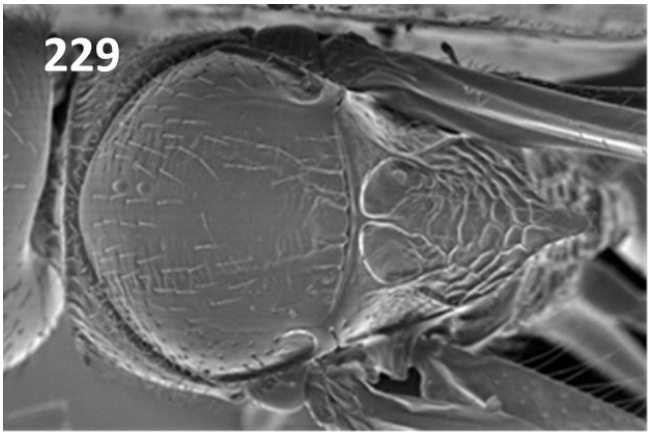
19. Scutellar foveae posteriorly defined by a carina, scutellum longitudinally divided by median carina; scutellar spine curved downwards in lateral view [227]. ...…….. ***X. esbelta*** **Mata-Casanova & Pujade-Villar, 2014**



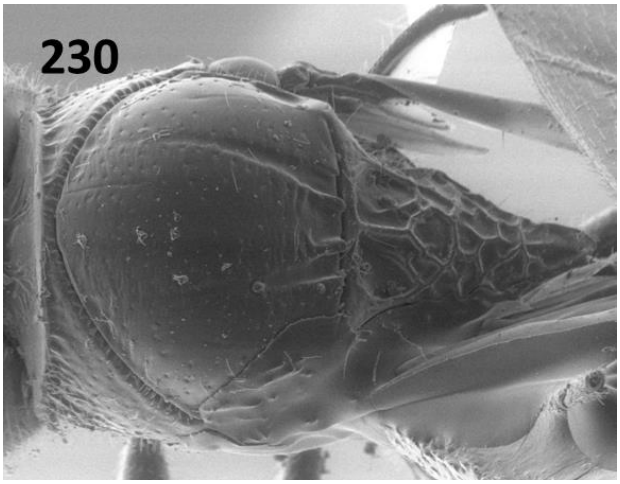
Scutellar foveae not posteriorly defined by a carina, median carina not reaching end of scutellum; scutellar spine curved straight in lateral view [228]. ..... ……..... ***X. siamensis*** **Mata-Casanova & Pujade-Villar, 2014**



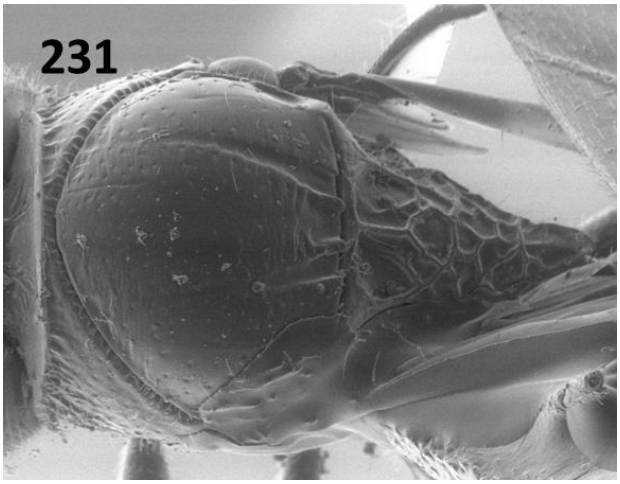
20. Notauli incomplete, effaced in anterior mesoscutum; antennae longer tan body [229]. ..... ***X. hialina*** **Belizin, 1951**



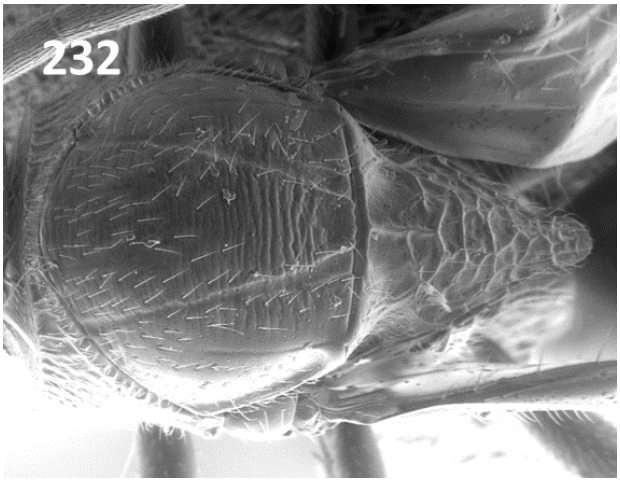
Notauli tenuous but complete; antennae shorter than body [230]. ……..... 21



21. Mesoscutal transverse carinae stronger in posterior mesoscutum, anterior mesoscutum usually smooth; wings hyaline [231]. ..... ***X. laevigata*** **Hartig, 1843**



Mesoscutum completely covered by transverse carinae; wings smoked [232]. ..... ***X. pseudolaevigata*** **Mata-Casanova & Pujade-Villar, 2014**



4.4. New Anacharitinae updated catalog

Prior to the start of the present Doctoral Thesis taxonomical state of most Anacharitinae species was confused. A preliminary study was done by Restrepo-Ortiz (unpublished data), and it supposed the most reliable source for Anacharitinae taxonomy.

The exhaustive taxonomical revision carried on along the last four years have changed the taxonomical status of some species, added new species, and extended our knowledge on the fields of biology and distribution areas. All disposable of type material has been examined. Regarding lost type material, original descriptions have been consulted in order to assess its position, whether a valid species or *incertae sedis*.

In order to summarize all the taxonomical changes presented in the previous papers and give a useful tool for studying Anacharitinae biodiversity, a catalog of the subfamily is presented. The information presented for each valid species is as follows: (i) name, author, year and publication page, along with the depository institution of the type material; (ii) synonyms, with the aforementioned information for each of them; (iii) distribution, where all countries with records are included – references for records included; (iv) hosts – references for records included – in case they are known; (v) comments on special taxonomical issues for each species.

Acanthaegilips Ashmead, 1897

Acanthaegilips Ashmead, 1897: 67. Type species: *Acanthaegilips braziliensis*, by original designation.

alienus Ros-Farré & Pujade-Villar, 2003

Acanthaegilips alienus Ros-Farré & Pujade-Villar, 2003: 16. Holotype: MZLU-MS.

DISTRIBUTION: Neotropical. Dominican Republic (Ros-Farré *et al.*, 2003).

ashmeadi Ros-Farré & Pujade-Villar, 2003

Acanthaegilips ashmeadi Ros-Farré & Pujade-Villar, 2003: 18. Holotype: MZLU-MS.

DISTRIBUTION: Neotropical. Perú, Venezuela (Ros-Farré *et al.*, 2003), Colombia (Mata-Casanova *et al.*, 2013b).

boyacensis Mata-Casanova & Pujade-Villar, 2017

Acanthaegilips boyacensis Mata-Casanova & Pujade-Villar, 2017: 652. Holotype: IAVH.

DISTRIBUTION: Neotropical. Colombia (Mata-Casanova *et al.*, 2017a).

braziliensis Ashmead, 1897

Acanthaegilips braziliensis Ashmead, 1897: 67. Holotype: USNM.

DISTRIBUTION: Neotropical. Brazil (Ashmead, 1897), Ecuador (Díaz, 1979), Argentina (Díaz, 1983), Venezuela (Pujade-Villar *et al.*, 2009), Nicaragua and Panama (Restrepo-Ortiz *et al.*, 2010c).

carinatus Ros-Farré & Pujade-Villar, 2003

Acanthaegilips carinatus Ros-Farré & Pujade-Villar, 2003: 19. Holotype: col. JP-V, UB.

DISTRIBUTION: Neotropical. Brazil (Ros-Farré *et al.*, 2003)..

colombiensis Pujade-Villar & Restrepo-Ortiz, 2009

Acanthaegilips colombiensis Pujade-Villar *et al.*, 2009: 58. Holotype: CNC.

DISTRIBUTION: Neotropical. Colombia (Pujade-Villar *et al.*, 2009; Mata-Casanova & Pujade-Villar, 2013b).

curvis Mata-Casanova & Pujade-Villar, 2017

Acanthaegilips curvis Mata-Casanova & Pujade-Villar, 2017: 653. Holotype: IAVH.

DISTRIBUTION: Neotropical. Colombia (Mata-Casanova *et al.*, 2017a).

dentis Ros-Farré & Pujade-Villar, 2003

Acanthaegilips dentis Ros-Farré & Pujade-Villar, 2003: 20. Holotype: UCR.

DISTRIBUTION: Neotropical. Costa Rica (Ros-Farré *et al.,* 2003), Venezuela (Pujade-Villar *et al.*, 2009).

diazae Ros-Farré & Pujade-Villar, 2003

Acanthaegilips diazae Ros-Farré & Pujade-Villar, 2003: 21. Holotype: MLPA.

DISTRIBUTION: Neotropical. Argentina (Ros-Farré *et al.,* 2003), Colombia (Mata-Casanova & Pujade-Villar, 2013b).

exiguus Ros-Farré & Pujade-Villar, 2003

Acanthaegilips exiguus Ros-Farré & Pujade-Villar, 2003: 22. Holotype: USNM.

DISTRIBUTION: Neotropical. Jamaica (Ros-Farré *et al.*, 2003).

huggerti Sporrong & Ros-Farré, 2003

Acanthaegilips huggerti Sporrong & Ros-Farré, 2003: 23. Holotype: MZLU-MS.

DISTRIBUTION: Neotropical. Ecuador and Nicaragua (Ros-Farré *et al.*, 2003), Venezuela (Pujade-Villar *et al.*, 2009), Colombia (Mata-Casanova & Pujade-Villar, 2013b).

levis Ros-Farré & Pujade-Villar, 2003

Acanthaegilips levis Ros-Farré & Pujade-Villar, 2003: 24. Holotype: UCR.

DISTRIBUTION: Neotropical. Ecuador and Nicaragua (Ros-Farré *et al.*, 2003), Venezuela (Pujade-Villar *et al.*, 2009), Colombia (Mata-Casanova & Pujade-Villar, 2013b).

macropennis Sporrong & Ros-Farré, 2003

Acanthaegilips macropennis Sporrong & Ros-Farré, 2003: 25. Holotype: CNC.

DISTRIBUTION: Neotropical. Ecuador (Ros-Farré *et al.*, 2003), Venezuela (Pujade-Villar *et al.,* 2009), Bolivia and Colombia (Restrepo-Ortiz *et al.*, 2010c).

masneri Sporrong & Ros-Farré, 2003

Acanthaegilips masneri Sporrong & Ros-Farré, 2003: 26. Holotype: CNC.

DISTRIBUTION: Neotropical. Ecuador (Ros-Farré *et al.*, 2003), Venezuela (Pujade-Villar *et al.,* 2009).

notiobiellus Mata-Casanova & Pujade-Villar, 2014

Acanthaegilips notiobiellus Mata-Casanova & Pujade-Villar, 2014: 462. Holotype: col. JP-V, UB .

DISTRIBUTION: Neotropical. Venezuela (Mata-Casanova *et al.*, 2014a).

HOSTS: *Notiobiella cixiiformis* (Gerstaecker, 1888) (Neuroptera: Hemerobiidae) (Mata-Casanova *et al.*, 2014a).

occultus Ros-Farré & Pujade-Villar, 2003

Acanthaegilips occultus Ros-Farré & Pujade-Villar, 2003: 27. Holotype: MZLU-MS.

DISTRIBUTION: Neotropical. Venezuela (Ros-Farré *et al.*, 2003; Pujade-Villar *et al.*, 2009).

palmirae Mata-Casanova & Pujade-Villar, 2013

Acanthaegilips palmirae Mata-Casanova & Pujade-Villar, 2013: 73. Holotype: IAVH.

DISTRIBUTION: Neotropical. Colombia (Mata-Casanova & Pujade-Villar, 2013b).

timidus Mata-Casanova & Pujade-Villar, 2017

Acanthaegilips timidus Mata-Casanova & Pujade-Villar, 2017: 654. Holotype: IAVH.

DISTRIBUTION: Neotropical. Colombia (Mata-Casanova & Pujade-Villar, 2017a).

truncatus Mata-Casanova & Pujade-Villar, 2017

Acanthaegilips truncatus Mata-Casanova & Pujade-Villar, 2017: 655. Holotype: IAVH.

DISTRIBUTION: Neotropical. Colombia (Mata-Casanova & Pujade-Villar, 2017a).

venezuelensis Pujade-Villar & Restrepo-Ortiz, 2009

Acanthaegilips venezuelensis Pujade-Villar *et al.*, 2009: 59. Holotype: MIZA.

DISTRIBUTION: Venezuela (Pujade-Villar *et al.*, 2009), Colombia (Mata-Casanova & Pujade-Villar, 2013b).

Acanthaegilopsis Pujade-Villar, 2013

Acanthaegilopsis Pujade-Villar, 2013: 161. Type species: *Acanthaegilopsis malagasy*, by original designation.

hemicoriaceus Mata-Casanova & Pujade-Villar, 2014

Acanthaegilopsis hemicoriaceus Mata-Casanova & Pujade-Villar, 2014: 546. Holotype: NHM.

DISTRIBUTION: Afrotropical. Uganda and Zimbabwe (Mata-Casanova *et al.*, 2014d).

malagasy Mata-Casanova & Pujade-Villar, 2013

Acanthaegilopsis malagasy Mata-Casanova & Pujade-Villar, 2013: 162. Holotype: MNHN.

DISTRIBUTION: Afrotropical. Comoros and Madagascar (Mata-Casanova *et al.*, 2013a).

Aegilips Haliday, 1835

Aegilips Haliday in Walker, 1835: 160. Type species: *Cynips nitidula* Dalman, 1823, by subsequent designation (Westwood, 1840: 56).

Oegilips Haliday in Westwood, 1840: 56 (misspelling).

aethiopicus Mata-Casanova & Pujade-Villar, 2017

Aegilips aethiopicus Mata-Casanova & Pujade-Villar, 2017: 66. Holotype: NHM.

DISTRIBUTION: Afrotropical. Democratic Republic of Congo, South Africa, Yemen and Zimbabwe (Mata-Casanova *et al.*, 2017b).

atricornis Fergusson, 1985

Aegilips atricornis Fergusson, 1985: 813. Holotype: NHM.

DISTRIBUTION: Holarctic and Indomalayan. United Kingdom (Fergusson, 1985), China (Gansu, Guangxi, Hubei, Neimenggu) (Mata-Casanova *et al.*, 2015e), Andorra, Austria, Cyprus, France, Hungary, India, Ireland, Morocco, Pakistan, Portugal (Madeira), Romania, Slovakia, Slovenia, Spain, Sweden and Switzerland (Mata-Casanova *et al.*, in press-c).

HOSTS: *Wesmaelius betulinus* (Ström, 1788) and *W. subnebulosus* (Stephens, 1836) (Neuroptera: Hemerobiidae) (Fergusson, 1985).

capensis Kieffer, 1912

Aegilips capensis Kieffer, 1912: 451. Holotype: ZMHB (Lost). Status revised, Mata-Casanova *et al.*, 2017b: 63.

Xyalaspis capensis (Kieffer) Van Noort *et al.*, 2015: 34.

DISTRIBUTION: Afrotropical. South Africa (Kieffer, 1912), Zimbabwe (Van Noort *et al.*, 2015; Mata-Casanova *et al.*, 2017), Kenya and Malawi (Mata-Casanova *et al.*, 2017b).

HOSTS: Unknown Hemerobiidae (Mata-Casanova *et al.*, 2017b).

cardinalae Mata-Casanova & Pujade-Villar **n. sp.**, in press

Aegilips cardinalae Mata-Casanova *et al.,* in press-b. Holotype: CNC.

DISTRIBUTION: Nearctic. Canada (British Columbia, Ontario, Quebec), Costa Rica, Guatemala and USA (Alaska, New Hampshire, North Carolina, Missouri, Washington) (Mata-Casanova *et al.*, in press-b).

clarimontis Kieffer, 1907

Aegilips clarimontis Kieffer, 1907: 143. Holotype: CAS.

DISTRIBUTION: Nearctic aqnd Neotropical. USA (California) (Kieffer, 1907), Canada (Ontario), Mexico (Chiapas) and USA (New Mexico) (Mata-Casanova *et al.*, in press-b).

flavidicornis (Kieffer, 1910)

Anacharis flavicornis Kieffer, 1910: 335. Holotype: ZMHB.

Anacharis flavidicornis Kieffer, 1911: 121. New name from *Anacharis flavicornis* Kieffer, 1910 non *Anacharis flavicornis* Kieffer, 1909

Aegilips flavidicornis (Kieffer) Mata-Casanova *et al.,* 2017c: xxxx.

DISTRIBUTION: Palaearcitc. China (Xinjiang Uyghur Autonomous Region) (Kieffer, 1910), China (Beijing) (Mata-Casanova *et al.*, 2015e).

foveata Mata-Casanova & Pujade-Villar, 2017

Aegilips foveata Mata-Casanova & Pujade-Villar, 2017: 66. Holotype: NHM.

DISTRIBUTION: Afrotropical. Kenya and Zimbabwe (Mata-Casanova *et al.*, 2017b).

huberi Mata-Casanova & Pujade-Villar **n. sp.**, in press

Aegilips huberi Mata-Casanova *et al.,* in press-b. Holotype: CNC.

DISTRIBUTION: Nearctic. Canada (British Columbia, New Brunswick, Ontario, Yukon) and USA (Alaska, Arizona, Washington) (Mata-Casanova *et al.*, in press-b).

insularis Mata-Casanova & Pujade-Villar **n. sp.**, in press

Aegilips insularis Mata-Casanova *et al.,* in press-c. Holotype: col. JP-V, UB.

DISTRIBUTION: Palaearctic. Portugal (Madeira) (Mata-Casanova *et al.*, in press-b).

kozlovi Kovalev, 1974

Aegilips kozlovi Kovalev, 1974: 283. Holotype: ZIN.

DISTRIBUTION: Palaearctic. Mongolia (Kovalev, 1974), Hungary and Romania (Mata-Casanova *et al.*, in press-c).

longicellus Belizin, 1951

Aegilips longicellus Belizin, 1951: 372. Holotype: ZIN.

DISTRIBUTION: Palaearctic. Tajikistan (Belizin, 1951); Russia (Chelyabisnk oblast) (Belizin, 1961).

nitidulus (Dalman, 1823)

Cynips nitidula Dalman, 1823: 96. Holotype: NHRS (Lost). Neotype: NHRS, designated by Fergusson, 1985.

Anacharis fumipennis Westwood, 1833. Type: OUMNH. Synonymized by Fergusson, 1985: 812.

Anacharis rufipes Westwood, 1833. Type: OUMNH. Synonymized by Fergusson, 1985: 812.

Aegilips nitidula (Dalman) Westwood, 1840.

Aegilips curvipes Giraud, 1860. Type: MNHN. Synonymized by Mata-Casanova *et al.*, in press-c.

Aegilips dalmani Reinhard, 1860. Type: MNHU. Synonymized by Fergusson, 1985: 812.

Aegilips rugicollis Reinhard, 1860. Type: MNHU. Synonymized by Fergusson, 1985: 812.

Aegilips ruficornis Cameron, 1883. Type: NHM. Synonymized by Fergusson, 1985: 812.

Aegilips striolata Cameron, 1883. Type: NHM. Synonymized by Fergusson, 1985: 812.

Aegilips bicolorata Cameron, 1887. Type: NHM. Synonymized by Fergusson, 1985: 812.

Omalaspis laevis Hedicke, 1914. Type: MNHN. Synonymized by Mata-Casanova *et al.*, in press-c.

Aegilips montanus Belizin, 1951. Type: ZIN. Synonymized by Mata-Casanova *et al.*, in press-c.

Aegilips punctatus Belizin, 1951. Type: ZIN. Synonymized by Mata-Casanova *et al.*, in press-c.

Aegilips gemellus Belizin, 1961. Type: ZIN. Synonymized by Mata-Casanova *et al.*, in press-c.

Xyalaspis laevis (Hedicke) Ros-Farré & Pujade-Villar, 2011.

Aegilips laevis (Hedicke) Mata-Casanova *et al.*, 2015a.

DISTRIBUTION: Palaearctic. Sweden (Dalman, 1823), Austria and France (Giraud, 1860), United Kingdom (Cameron, 1883), Germany and Romania

(Hedicke, 1914), Russia (Chelyabinsk oblast, Sakha Republic), Ukraine (Belizin, 1951), Armenia and Georgia (Belizin, 1961), Moldova (Belizin, 1966), Andorra, Bosnia and Herzegovina, Czech Republic, Hungary, Ireland, Italy, Norway, Slovenia and Spain (Mata-Casanova *et al.*, in press-c).

HOSTS: *Wesmaelius betulinus* and *W. subnebulosus* (Neuroptera: Hemerobiidae) (Fergusson, 1985).

paucus Belizin, 1961

Aegilips paucus Belizin, 1961: 153. Holotype: ZIN.

DISTRIBUTION: Palaeartic. Kazakhstan (Belizin, 1961), Kovalev (1974).

papuensis Mata-Casanova & Pujade-Villar, 2015

Aegilips papuensis Mata-Casanova & Pujade-Villar, 2015: 3. Holotype: MNHN.

DISTRIBUTION: Australasian. Papua New Guinea (Mata-Casanova *et al.*, 2015d).

romseyensis Fergusson, 1985

Aegilips romseyensis Fergusson, 1985: 815. Holotype: NHM.

DISTRIBUTION: Palaearctic. United Kingdom (Fergusson, 1985), China (Zhejiang) (Mata-Casanova *et al.*, 2015e), Austria, Czech Republic, France, Hungary, Italy, Romania and Slovakia (Mata-Casanova *et al.*, in press-c).

rugatus Kieffer, 1907

Aegilips rugata Kieffer, 1907: 144. Holotype: CAS.

DISTRIBUTION: Nearctic and Neotropical. USA (Colorado) (Kieffer, 1907), Canada (Alberta, British Columbia, Northwest Territory, Ontario), Guatemala and USA (Alaska, Arizona, California, Virginia, Washington) (Mata-Casanova *et al.*, in press-b).

trisectus Kieffer, 1907

Aegilips trisecta Kieffer, 1907: 144. Holotype: CAS.

Aegilips reticutala Kieffer, 1908: 63. Type: CAS. Synonymized by Mata-Casanova *et al.*, in press-b.

DISTRIBUTION: Nearctic. USA (Wisconsin) (Kieffer, 1907), (California) (Kieffer, 1908), Canada (Alberta, British Columbia, Ontario, Yukon Territory) and USA (Alaska, California, Colorado, New Hampshire, North Carolina,Virginia, Washington) (Mata-Casanova *et al.*, in press-b).

ustulatus Belizin, 1973

Aegilips ustulatus Belizin, 1973: 31. Holotype: ZIN.

DISTRIBUTION: Palaearctic. Kyrgystan (Belizin, 1973).

victoriae Ashmead, 1896

Aegilips victoriae Ashmead, 1896: 184. Holotype: USNM.

DISTRIBUTION: Nearctic. Canada (British Columbia) (Ashmead, 1896), Canada (Alberta, Northwest Territory) and USA (Alaska, Colorado, New Mexico) (Mata-Casanova *et al.*, in press-b).

virungae Mata-Casanova & Pujade-Villar, 2017

Aegilips virungae Mata-Casanova & Pujade-Villar, 2017: 68. Holotype: NHM.

DISTRIBUTION: Afrotropical. Democratic Republic of Congo (Mata-Casanova *et al.*, 2017b).

zaitzevi Kovalev, 1974

Aegilips zaitzevi Kovalev, 1974: 284.

Aegilips vena Fergusson, 1985. Type: NHM. (See chapter 4.2.15)

DISTRIBUTION: Holarctic. Mongolia (Kovalev, 1974), United Kingdom (Fergusson, 1985), Canada (Ontario), Russia (Primorskiy Krai) and USA (Alaska) (Mata-Casanova *et al.*, in press-b).

Anacharis Dalman, 1823

Anacharis Dalman: 1823: 96. Type species: *Cynips eucharoides* Dalman, 1818 by monotypy.

Megapelmus Hartig, 1840: 186. Type species: *Megapelmus spheciformis* Hartig, 1840 by monotypy (Synonimized by Dalla-Torre & Kieffer, 1910: 37)

Synapsis Förster, 1869: 361 (rejected by Dalla-Torre & Kieffer, 1910 due to homonymy of *Synapsis* Bates, 1868 in Coleoptera).

Anachares (Dalman) Ashmead, 1903: 13 (Typographical error).

Prosynapsis Dalla-Torre & Kieffer, 1910: 45. Type species: *Synapsis aquisgranensis* Förster, 1869 (Replacement name for *Synapsis* Förster nec Bates) (Synonimized by Kierych, 1984: 337).

afrotropica Mata-Casanova & Pujade-Villar, 2015

Anacharis afrotropica Mata-Casanova & Pujade-Villar, 2015c: 315. Holotype: NHM.

DISTRIBUTION: Afrotropical. Democratic Republic of Congo, Kenya, South Africa and Uganda (Mata-Casanova *et al.*, 2015c).

antennata Belizin, 1951

Anacharis antennata Belizin, 1951: 569. Holotype: ZIN.

DISTRIBUTION: Palaearctic. Tajikistan (Belizin, 1951), China (Guangxi, Neimenggu, Ningxia, Yunnan) (Mata-Casanova *et al.*, 2015e), Japan (Mata-Casanova *et al.*, 2017c).

belizini Mata-Casanova & Pujade-Villar, 2017

Anacharis belizini Mata-Casanova *et al.*, 2017c: XX. Holotype: CNC.

DISTRIBUTION: Indomalayan. Thailand (Mata-Casanova *et al.*, 2017c).

eucharoides (Dalman, 1818)

Cynips eucharoides Dalman, 1818: 78. Holotype: NHRS (Lost).

Anacharis eucharoides Dalman, 1823

Anacharis tinctus Walker, 1835: 520. Type: NHM. Synonymized by Fergusson, 1986: 13.

Anacharis typicus Walker, 1835: 520. Type: NHM. Synonymized by Fergusson, 1986: 13.

Megapelmus spheciformis Hartig, 1840: 202. Type: ZSBS (Designated by Fergusson, 1986).

Anacharis spheciformis (Hartig) Giraud, 1860. Synonymized by Fergusson, 1986: 13.

Anacharis typica (Walker) Reinhard, 1860: 215.

Anacharis gracilipes Ionescu, 1969: 75. Type: MGAB. Synonymized by Mata-Casanova *et al.*, 2017c: XX.

DISTRIBUTION: Palaearctic. Sweden (Dalman, 1818; Zetterstedt, 1838); United Kingdom (Walker, 1835); Austria (Giraud, 1860); France (Hedicke, 1914); Germany and Netherlands (Dalla-Torre & Kieffer, 1910); Russia (Kostromskaya oblast, Yaroslavskaya oblast) (Belizin, 1951); Georgia (Belizin, 1961), Moldova (Belizin, 1966), Romania (Ionescu, 1969), Andorra, Belgium, Czech Republic, Hungary, Italy, Morocco, Norway and Switzerland (Mata-Casanova *et al.*, 2017c).

HOSTS: *Hemerobius micans* Olivier, 1792 and *Wesmaelius betulinus, W. subnebulosus* (Neuroptera: Hemerobiidae) (Fergusson, 1986).

fergussoni Mata-Casanova & Pujade-Villar, 2017

Anacharis fergussoni Mata-Casanova *et al.*, 2017c: XX. Holotype: CNC.

DISTRIBUTION: Palaearctic. Andorra, France, Germany, Hungary, Romania, Slovakia and Spain (Mata-Casanova *et al.*, 2017).

immunis Walker, 1835

Anacharis immunis Walker, 1835: 521. Holotype: NHM.

Anacharis ensifer Walker, 1835: 522. Type: NHM. Synonymized by Fergusson, 1986: 13.

Cynips petiolata Zetterstedt, 1838: 409. Type: NHRS. Synonymized by Fergusson, 1986: 13.

Megapelmus rufiventris Hartig, 1841: 358. Type: ZSBS. Synonymized by Fergusson, 1986: 13.

Anacharis staegeri Dahlbom, 1842: 4. Type: MZLU. Synonymized by Dalla-Torre, 1893: 13.

Anacharis ensifera (Walker) Reinhard, 1860.

Anacharis rufiventris (Hartig) Giraud, 1860: 171.

Synapsis aquisgranensis Förster, 1869: 361. Type: ZMHB. Synonymized by Kierych, 1984: 337.

Prosynapsis aquisgranensis (Förster) Dalla-Torre & Kieffer, 1910.

DISTRIBUTION: Palaearctic. United Kingdom (Walker, 1835; Evenhuis, 1964; Fergusson, 1986); Austria, Germany, Norway and Sweden (Dalla-Torre & Kieffer, 1910) Latvia and Russia (Irkustakya oblast, Kostromskaya oblasta, Moskovskaya oblast, Murmanskaya oblast) (Belizin, 1951); Armenia and Ukraine (Belizin, 1961); Finland and Poland (Kierych, 1984), Andorra, Belgium, Denmark and Japan (Mata-Casanova *et al.*, 2017c).

HOSTS: *Wesmaelius nervosus* (Fabricius, 1793) and *W. subnebulosus* (Neuroptera: Hemerobiidae) (Kierych, 1984).

luciae Mata-Casanova & Pujade-Villar **n. sp.**, in press

Anacharis luciae Mata-Casanova *et al.*, in press-d. Holotype: CNC.

DISTRIBUTION: Nearctic. Brazil, Colombia, Dominican Republic and Venezuela (Mata-Casanova *et al.*, in press-d).

madagascarensis Pujade-Villar, 2012

Anacharis madagascarensis Pujade-Villar, 2012: 120. Holotype: CAS.

DISTRIBUTION: Afrotropical. Madagascar (Pujade-Villar, 2012).

mantocephala Mata-Casanova & Pujade-Villar **n. sp.**, in press

Anacharis mantocephala Mata-Casanova *et al.*, in press-d. Holotype: CNC.

DISTRIBUTION: Nearctic and Neotropical. Bolivia, Colombia, Costa Rica and USA (South Carolina) (Mata-Casanova *et al.*, in press-d).

marginata Provancher, 1889

Anacharis marginata Provancher, 1889: 168. Holotype: ULQC.

Acothyreus mellipes Provancher, 1889: 320. Type: ULQC. Synonymized by Mata-Casanova *et al.*, in press-d.

Anacharis levifrons Kieffer, 1907: 143. Type: CAS. Synonymized by Mata-Casanova *et al.*, in press-d.

Aegilips nevadensis Kieffer, 1908: 57. Type: CAS. Synonymized by Mata-Casanova *et al.*, in press-c.

Anacharis flavicornis Kieffer, 1909: 80. Type: CAS. Synonymized by Mata-Casanova *et al.*, in press-d.

Anacharis mellipes (Provancher) Restrepo-Ortiz and Pujade-Villar, 2010

DISTRIBUTION: Nearctic. Canada (Quebec) (Provancher, 1889); USA (Nevada, Pennsylvania) (Kieffer, 1907), USA (Wisconsin) (Kieffer, 1909), Canada (Alberta, British Columbia, New Brunswick, Newfoundland and Labrador, Northwest Territories, Nova Scotia, Ontario), Mexico (Chihuahua) and USA (Alaska, Florida, Michigan, New Hampshire, New York, North Carolina, Ohio Virginia) (Mata-Casanova *et al.*, in press-d).

HOSTS: *Hemerobius humulinus* Linnaeus, 1758 and *Micromus* sp. Rambur, 1842 (Neuroptera: Hemerobiidae) (Mata-Casanova *et al.*, in press-d).

COMMENTS: Sex determination of *A. mellipes* by Provancher was wrong. Type material of *A. mellipes* is not a female but a male instead.

melanoneura Ashmead, 1887

Anacharis melanoneura Ashmead, 1887: 158. Holotype: USNM.

DISTRIBUTION: Nearctic and Neotropical. USA (Florida) (Ashmead, 1887), USA (Alabama) (Cave & Miller, 1987) (USA), Canada (Alberta, British Columbia, Manitoba, New Brunswick, Newfoundland and Labrador, Northwest Territories, Ontario, Quebec ,Yukon Territory), Colombia, Dominican Republic, Jamaica, Mexico (Chihuahua, Nuevo León), Panama and USA (Alaska, Arizona, California, Colorado, Georgia, Michigan, Missouri, Nebraska, New Hampshire, New Mexico, New York, North Carolina, Ohio, South Carolina, Texas, Virginia, Washington) (Mata-Casanova *et al.*, in press-d).

HOSTS: *Hemerobius stigma* Stephens, 1835 (Neuroptera: Hemerobiidae) (Miller & Lambdin, 1985) and *Micromus posticus* (Neuroptera: Hemerobiidae)(Walker, 1853) (Cave & Miller, 1987).

mexicana (Cameron, 1884)

Megapelmus mexicanus Cameron, 1884: 487. Holotype: NHM.

Anacharis mexicana (Cameron) Dalla-Torre, 1893: 13.

Anacharis mexicana Ashmead, 1896. Type: USNM. Homonymy of *Anacharis mexicana* (Cameron, 1884).

Anacharis lamyi Cockerell, 1899 (replacement name for *Anacharis mexicana* Ashmead nec Cameron). Synonymized by Mata-Casanova *et al.* (in press-d).

Anacharis ashmeadi Dalla Torre & Kieffer, 1910 (unjustified replacement name for *Anacharis mexicana* Ashmead nec Cameron)

DISTRIBUTION: Nearctic and Neotropical. Mexico (Cameron, 1884); USA (New Mexico) (Ashmead, 1896); Bolivia, Canada (Alberta, British Columbia, Northwest Territories, Quebec, Yukon Territory), Costa Rica, Dominican Republic, Guatemala, Honduras, Nicaragua and USA (Alaska, Arizona, California, Colorado) (Mata-Casanova *et al.*, in press-d).

norvegica Mata-Casanova & Pujade-Villar, 2017

Anacharis norvegica Mata-Casanova *et al.*, 2017c: XX. Holotype: CNC.

DISTRIBUTION: Palaearctic. Norway (Mata-Casanova *et al.*, 2017c).

parapsidalis Belizin, 1951

Anacharis parapsidalis Belizin, 1951: 569. Holotype: ZIN.

DISTRIBUTION: Palaearctic. Russia (Khabarovsk krai) (Belizin, 1951), China (Fujian, Shanxi) (Mata-Casanova *et al.*, 2016), Japan and Romania (Mata-Casanova *et al.*, 2017c).

punctatifrons Kieffer, 1907

Anacharis punctatifrons Kieffer, 1907: 143. Holotype: CAS.

DISTRIBUTION: Nearctic and Neotropical. California (Kieffer, 1907) (USA), Canada (British Columbia, Manitoba, Northwest Territories, Quebec, Yukon Territory), Colombia, Costa Rica, Dominican Republic, Guatemala, Honduras, Mexico (Tamaulipas), Nicaragua, Panama, USA (Alaska, Arizona, Colorado, North Carolina and Washington) and Venezuela (Mata-Casanova *et al.*, in press-d).

rwenzori Mata-Casanova & Pujade-Villar, 2015

Anacharis rwenzori Mata-Casanova & Pujade-Villar, 2015c: 317. Holotype: NHM.

DISTRIBUTION: Afrotropical. Democratic Republic of Congo (Mata-Casanova *et al.*, 2015c).

tasmaniae Mata-Casanova & Pujade-Villar, 2015

Anacharis tasmaniae Mata-Casanova *et al.*, 2015d: 3. Holotype: NHM.

DISTRIBUTION: Australasian. Australia (Tasmania, New South Wales) (Mata-Casanova *et al.*, 2015d).

tripartita Kieffer, 1907

Anacharis tripartita Kieffer, 1907: 143. Holotype: CAS.

DISTRIBUTION: Nearctic and Neotropical. USA (California) (Kieffer, 1907), Canada (Alberta, British Columbia, New Brunswick, Ontario and Quebec), Colombia, Denmark (Greenland), Mexico (Mexico DF, Nuevo León), USA (Alaska, Arizona, Colorado, Georgia, New Hampshire, Ohio, Oregon, Utah) and Venezuela (Mata-Casanova *et al.*, in press-d).

HOSTS: *Hemerobius* sp (Neuroptera: Hemerobiidae) (Mata-Casanova *et al.*, in press-d).

tucumana Díaz, 1979

Anacharis tucumana Díaz, 1979: 26. Holotype: IFML.

DISTRIBUTION: Neotropical. Argentina (Díaz, 1979).

zealandica Ashmead, 1901

Anacharis zealandica Ashmead, 1901: 329. Holotype: USNM.

Anacharis australiensis Ashmead, 1901: 329. Type: USNM. Synonymized by New, 1979: 321.

DISTRIBUTION: Australasian. Australia (Victoria) and New Zealand (Ashmead 1901; New 1979), Australia (Australian Capital Territory, New South Wales, Queensland, South Australia, Tasmania, Western Australia) (Mata-Casanova *et al.*, 2015d).

HOSTS: *Drepanacra binocula* (Newman, 1838) and *Micromus tasmaniae* (Walker 1860) (Neuroptera: Hemerobiidae) (New, 1979).

Calofigites Kieffer, 1909

Calofigites Kieffer, 1909: 93. Type species: *Calofigites nitidus* Kieffer, 1909 by monotypy.

Conaspidia Hedicke, 1914: 635. Type species: *Conaspidia neotropica non Conaspidia* Konow, 1898: 279.

Cynoconaspidia Rohwer & Fagan, 1917: 238. Unjustified emendation.

Conaspidula Strand, 1928: 53. Unjustified emendation.

Conaspidea (Hedicke) Díaz, 1979: 22 (Typographical error).

neotropica (Hedicke, 1914)

Conaspidia neotropica Hedicke, 1914: 635. Holotype: ZMB.

Calofigites neotropica (Hedicke) Weld, 1952: 172.

DISTRIBUTION: Neotropical. Argentina (Hedicke, 1914).

nitidus Kieffer, 1909

Calofigites nitidus Kieffer, 1909: 93-94. Holotype: ZMB.

Hexacharis neuropterophaga Díaz, 1979: 38. Type: MLPA. Synonymized by Restrepo-Ortiz & Pujade-Villar, 2010: 22.

Aegilips neuropterophaga (Díaz) Díaz, 1982: 112.

DISTRIBUTION: Neotropical. Peru (Kieffer, 1909), Argentina (Díaz, 1979).

HOSTS: *Sympherobius* sp (Neuroptera: Hemerobiidae) (Díaz, 1979).

Cornaegilips Mata-Casanova & Pujade-Villar gen. n.

Cornaegilips Mata-Casanova & Pujade-Villar (Mata-Casanova *et al.*, in press-e). Type species: *Aegilips chilensis* Bréthes, 1918 by monotypy and original designation.

chilensis (Bréthes, 1918)

Aegilips chilensis Bréthes, 1918: 164. Lectotype: MACN, designated by Mata-Casanova *et al.* (Mata-Casanova *et al.*, in press-e).

Cornaegilips chilensis (Bréthes) Mata-Casanova *et al.*, in press-d.

DISTRIBUTION: Neotropical. Chile (Bréthes, 1918; Díaz, 1979), Argentina and Falklands/Malvinas (Mata-Casanova *et al.*, in press-e).

HOSTS: *Sympherobius* sp (Neuroptera: Hemerobiidae) (Díaz, 1979).

Hexacharis Kieffer, 1907

Hexacharis Kieffer, 1907: 142. Type species: *Hexacharis flavipes* Kieffer, 1907 by monotypy and original designation.

flavipes Kieffer, 1907

Hexacharis flavipes Kieffer, 1907: 142. Holotype: ZMB. Status revised, Restrepo-Ortiz & Pujade-Villar, 2010: 17.

Aegilips flavipes (Kieffer) Díaz, 1986: 112.

DISTRIBUTION: Nearctic. USA (Colorado) (Kieffer, 1907; Restrepo-Ortiz & Pujade-Villar, 2010).

Proanacharis Kovalev, 1996

Proanacharis Kovalev, 1996: 410. Type species: *Proanacharis miriabilis* Kovalev, 1996 by original designation.

miriabilis Kovalev, 1996

Proanacharis miriabilis Kovalev, 1996: 410. Holotype: ZIN.

DISTRIBUTION: Palaearctic. Russia (Primorskiy krai) (Kovalev, 1996).

Solenofigites Díaz, 1979

Solenofigites Díaz, 1979: 24. Type species: *Solenofigites lautus* Díaz, 1979 by original monotypy.

lautus Díaz, 1979

Solenofigites lautus Díaz, 1979: 24. Holotype: MLPA.

DISTRIBUTION: Neotropical. Argentina, Chile (Díaz, 1979).

HOSTS: *Sympherobius* sp (Neuroptera: Hemerobiidae) (Díaz, 1979). **Note:** Argentinian specimens were collected in the Facultad de Agronomía de Mendoza insectarium, where *Oiketicus kirbyi* Berg, 1874 specimens were breed. The *Solenofigites* presence there would be accidental, as Anacharitinae don't attack Lepidoptera.

Xyalaspis Hartig, 1843

Xyalaspis Hartig, 1843: 416. Type species: *Xyalaspis laevigatus* Hartig, 1843 by subsequent designation (Rohwer & Fagan, 1917: 378.

Note: Designation of *Cynips nitidula* Dalman, 1823 as type of *Xyalaspis* by Ashmead, 1903: 12 is not correct, because this species was already the type species of *Aegilips* Haliday, 1835 since Westwood, 1840, and *Aegilips* is a valid genus.

Conaspicera Hedicke, 1914: 353. Type species: *Conaspicera norvegica* Hedicke, 1914 by original designation. Synonymization by Hedicke, 1930: 75.

aberrans Mata-Casanova & Pujade-Villar, 2014

Xyalaspis aberrans Mata-Casanova & Pujade-Villar, 2014: 559. Holotype:col. J P-V, UB .

DISTRIBUTION: Neotropical. Brazil and Panama (Mata-Casanova *et al.*, 2014b).

alveolata Mata-Casanova & Pujade-Villar, 2014

Xyalaspis alveolata Mata-Casanova & Pujade-Villar, 2014: 560. Holotype: CNC.

DISTRIBUTION: Neotropical. Ecuador (Mata-Casanova *et al.*, 2014b).

arapahoe Mata-Casanova & Pujade-Villar, 2014

Xyalaspis arapahoe Mata-Casanova & Pujade-Villar, 2014: 561. Holotype: CNC.

DISTRIBUTION: Nearctic. USA (Colorado) (Mata-Casanova *et al.*, 2014b).

armata (Giraud, 1860)

Aegilips armatus Giraud, 1860: 173. Holotype: MNHN.

Aegilips abietina Thomson, 1862: 412. Type: MZLU. Synonymized by Fergusson, 1986: 13.

Aegilips scotica Cameron, 1883: 372. Type: NHM. Synonymized by Quinlan, 1974: 17.

Xyalaspis abietina (Thomson) Kieffer, 1901: 161.

Xyalaspis armata (Giraud) Kieffer, 1901: 161.

Xyalaspis scotica (Cameron) Kieffer, 1901: 161.

Xyalaspis armata var. *fuscicornis* Kieffer, 1901: 161.

Xyalaspis armata fuscicornis (Kieffer) Dalla-Torre & Kieffer, 1910: 48. Synonymized by Fergusson, 1986: 13.

DISTRIBUTION: Palaeartic. Sweden, United Kingdom (Kieffer, 1901); Germany and Austria (Dalla Torre & Kieffer 1910); Russia (Leningradskaya obl.) (Belizin 1951); Moldova (Belizin, 1966), Ireland (Ferguson 1986); Spain (Ros-Farré & Pujade-Villar 1997).

atemiensis Ashmead, 1904

Xyalaspis atemiensis Ashmead, 1904: 76. Holotype: USNM.

DISTRIBUTION: Japan (Ashmead, 1904), China (Sichuan) (Mata-Casanova *et al.*, 2015e)

dimorphica Mata-Casanova & Pujade-Villar, 2014

Xyalaspis dimorphica Mata-Casanova & Pujade-Villar, 2014: 571. Holotype: NHM.

DISTRIBUTION: Indomalayan. India (Mata-Casanova *et al.*, 2014c).

dominicana Mata-Casanova & Pujade-Villar, 2015

Xyalaspis dominicana Mata-Casanova & Pujade-Villar, 2015: 102. Holotype: CNC.

DISTRIBUTION: Neotropical. Dominican Republic (Mata-Casanova *et al.*, 2015b).

esbelta Mata-Casanova & Pujade-Villar, 2014

Xyalaspis esbelta Mata-Casanova & Pujade-Villar, 2014: 573. Holotype: CNC.

DISTRIBUTION: Indomalayan and Palaearctic. India, Japan, Taiwan and Thailand (Mata-Casanova *et al.*, 2014c), China (Fujian, Guangxi, Guizhou, Sichuan, Xinjiang, Yunnan, Zhejiang) (Mata-Casanova *et al.*, 2015e).

flavipes Ashmead***, 1896***

Xyalaspis flavipes Ashmead, 1896: 183. Holotype: USNM.

Xyalaspis microstyla Kieffer, 1907: 151. Type: CAS. Synonymized by Mata-Casanova *et al.*, 2014b: 558.

DISTRIBUTION: Neartic and Neotropical. USA (Maryland, Virginia) (Ashmead, 1896), USA (Alabama) (Kieffer, 1907), Canada (Ontario), Colombia, Costa Rica, Guatemala, Honduras, Mexico (Chiapas), Panama, USA (Georgia, Mississippi, Missouri, New Mexico, North Carolina, Oklahoma, South Carolina) and Venezuela (Mata-Casanova *et al.*, 2014b).

hirsuta Mata-Casanova & Pujade-Villar, 2014

Xyalaspis hirsuta Mata-Casanova & Pujade-Villar, 2014: 561. Holotype: CNC.

DISTRIBUTION: Nearctic and Neotropical. Costa Rica, Colombia, Mexico (Chiapas, Durango, Morelos, Veracruz), Nicaragua, Panama, USA (Maryland, Missouri) and Venezuela (Mata-Casanova *et al.*, 2014b).

hyalina Belizin, 1951

Xyalaspis hyalinus Belizin, 1951: 574. Holotype: ZIN.

Xyalaspis lituricis Belizin, 1961: 155. Type: ZIN. Synonymized by Mata-Casanova *et al.*, 2014c: 570.

Xyalaspis hyalina (Belizin) Mata-Casanova *et al.*, 2015a: 33.

DISTRIBUTION: Palaearctic. Kazakhstan and Russia (Orenburgskaya obl.), Tajikistan (Belizin, 1951), Armenia and Kazakhstan (Belizin, 1961), Armenia, and Cyprus (Mata- Casanova *et al.*, 2015a).

laevigata Hartig, 1843

Xyalaspis laevigatus Hartig, 1843: 417. Holotype: ZSM.

Aegilips spinigera Reinhard, 1860: 221. Type: ZMHB. Synonymized by Mata-Casanova *et al.*, 2015a: 34.

Xyalaspis laevigata (Hartig) Förster 1869: 361.

Xyalaspis spinigera (Reinhard) Kieffer 1901: 161.

DISTRIBUTION: Palaearctic. Austria (Hartig 1843), Andorra, France, Iran, Norway, Romania and Spain (Mata-Casanova *et al.*, 2015a).

COMMENTS: Sex determination of *X. laevigata* by Hartig was wrong. Type material of *X. laevigata* is not a female but a male instead.

muzencaba Mata-Casanova & Pujade-Villar, 2015

Xyalaspis muzencaba Mata-Casanova & Pujade-Villar, 2015: 103. Holotype: CNC.

DISTRIBUTION: Neotropical. Mexico (Chiapas, Morelos) (Mata-Casanova *et al.*, 2015b).

orientalis Mata-Casanova & Pujade-Villar, 2014

Xyalaspis orientalis Mata-Casanova & Pujade-Villar, 2014: 574. Holotype: CNC.

DISTRIBUTION: Palaeartic. Japan and South Korea (Mata-Casanova *et al.*, 2014c), China (Gansu, Hubei, Zhejiang) (Mata-Casanova *et al.*, 2015e).

petiolata Kieffer, 1901

Xyalaspis petiolata Kieffer, 1901: 161. Lectotype: NHM, designated by Fergusson, 1986: 33.

DISTRIBUTION: Palaearctic. United Kingdom (Cameron, 1883, Kieffer 1901), Ireland (Ferguson 1986), France and Sweden (Mata-Casanova *et al.*, 2015a).

pilosa Mata-Casanova & Pujade-Villar, 2014

Xyalaspis pilosa Mata-Casanova & Pujade-Villar, 2014: 563. Holotype: CNC.

DISTRIBUTION: Neotropical. Venezuela (Mata-Casanova *et al.*, 2014b).

pseudolaevigata Mata-Casanova & Pujade-Villar, 2015

Xyalaspis pseudolaevigata Mata-Casanova & Pujade-Villar, 2015: 38. Holotype: MNHN.

DISTRIBUTION: Palaearctic. France (Mata-Casanova *et al.*, 2015a).

ribesi Mata-Casanova & Pujade-Villar, 2015

Xyalaspis ribesi Mata-Casanova & Pujade-Villar, 2015: 574. Holotype:col. JP-V, UB .

DISTRIBUTION: Palaearcti. Japan and South Korea (Mata-Casanova *et al.*, 2014c), China (Henan, Zhejiang) (Mata-Casanova *et al.*, 2015e).

rugosa Hartig, 1843

Xyalaspis rugosus Hartig, 1843: 417. Holotype: ZSM.

Aegilips subulifera Thomson, 1862: 412. Type: MZLU. Synonymized by Mata-Casanova *et al*., 2015a: 40.

Xyalaspis subulifera (Thomson) Kieffer, 1901: 161.

Xyalaspis rugosa (Hartig) Mata-Casanova et al., 2015a: 40.

DISTRIBUTION: Palaeartic. Sweden (Thomson 1862), Austria (Kieffer 1898), Norway (Hedicke 1930), Netherlands (Evenhuis, 1964), France and Switzerland (Mata- Casanova *et al.*, 2015a).

siamensis Mata-Casanova & Pujade-Villar, 2014

Xyalaspis siamensis Mata-Casanova & Pujade-Villar, 2014: 574. Holotype: CNC.

DISTRIBUTION: Indomalayan. Thailand (Mata-Casanova *et al.*, 2014c).

subsaharica Mata-Casanova & Pujade-Villar, 2014

Xyalaspis subsaharica Mata-Casanova & Pujade-Villar, 2014: 546. Holotype: NHM.

DISTRIBUTION: Afrotropical. Nigeria, Uganda (Mata-Casanova *et al.*, 2014d).

victoriensis New, 1979

Xyalaspis victoriensis New, 1979: 177. Holotype: CSIRO.

DISTRIBUTION: Australasian. Australia (Victoria) (New, 1979), Australia (New South Wales, Tasmania, Queensland) (Mata-Casanova *et al.*, 2015d).

HOSTS: *Drepanacra binocula* (Newman, 1838) and *Micromus tasmaniae* (Walker, 1860) (Neuroptera: Hemerobiidae) (New, 1979).

INCERTAE SEDIS

- *Aegilips acicutalta* Provancher, 1881. *Incertae sedis* Mata-Casanova *et al.*,in press-b.
- *Aegilips notatus* Belizin, 1951. *Incertae sedis* Mata-Casanova *et al.*,in press-c.
- *Aegilips obtusilobae* Osten-Sacken, 1863. *Incertae sedis* Mata-Casanova *et al.*,in press-b.
- *Aegilips punctulata* Hedicke, 1928. *Incertae sedis* Mata-Casanova *et al.*,in press-c.
- *Anacharis osceolus* Ashmead, 1887. *Incertae sedis* Mata-Casanova *et al.*,in press-d.
- *Anacharis pediculata* Ashmead, 1887. *Incertae sedis* Mata-Casanova *et al.*,in press-d.

TRANSFERRED TO OTHER GROUPS

- *Anacharis subcompressa* Provancher, 1881: 237. Transferred by Mata-Casanova *et al.*,in press-d to *Figites* (Figitinae).

5. DISCUSSION

5.1. Taxonomical changes on Anacharitinae

As mentioned in Chapter 1.2, Anacharitinae knowledge was scarce before the present Thesis was conducted. Last detailed publication involving the whole subfamily was that of Weld's (1952). The Hymenoptera Parasitica team in the University of Barcelona studies on Anacharitinae began with Ros-Farré *et al.*, papers on the position (Ros-Farré *et al.*, 2000) and diversity (Ros-Farré *et al.*, 2003) of genus *Acanthaegilips.* Later publications added two new species to the genus (Pujade-Villar *et al.*, 2009), and revised the status of *Hexacharis* (Restrepo-Ortiz & Pujade-Villar, 2010a). In order to complete the revision of this subfamily and following with these previous studies, we arrange this Doctoral Thesis to revise and clarify the taxonomic status of the species within the most abundant and diverse Anacharitinae genera: *Aegilips, Anacharis* and *Xyalaspis*. Most of unidentified material deposited in different collections and also sent by diverse researchers to Dr. Juli Pujade-Villar at the University of Barcelona was composed of specimens belonging to those three genera, especially *Anacharis*.

The first genus revised was *Xyalaspis*, the least diverse of the three. After studying the type material, 8 species have been considered valid: *X. armata* (Giraud, 1860), *X. atemiensis* Ahsmead, 1904, *X. flavipes* Ashmead, 1896, *X. hyalina* Belizin, 1951, *X. laevigata* Hartig, 1843, *X. petiolata* Kieffer, 1901, *X. rugosa* Hartig, 1843 and *X. victoriensis* New, 1979. 5 species are not considered valid anymore: 4 have been synonymized: *X. lituricis* Belizin, 1961 with *X. hyalina*, *X. microstyla* Kieffer, 1907 with *X. flavipes*, *X. spinigera* (Reinhard, 1860) with *X. laevigata* and *X. subulifera* (Thomson, 1862) with *X. rugosa*; *X. laevis* has been transferred to genus *Aegilips* and synonymized with *A. nitidulus* (Dalman, 1823). 14 new species have been described: *X. aberrans* Mata-Casanova & Pujade-Villar, 2014, *X. alveolata* Mata-Casanova & Pujade-Villar, 2014, *X. arapahoe* Mata-Casanova & Pujade-Villar, 2014, *X. dimorphica* Mata-Casanova & Pujade-Villar, 2014, *X. dominicana* Mata-Casanova & Pujade-Villar, 2015, *X. esbelta* Mata-Casanova & Pujade-Villar, 2014, *X. hirsuta* Mata-Casanova & Pujade-Villar, 2014, *X. muzencaba* Mata-Casanova & Pujade-Villar, 2015, *X. orientalis* Mata-Casanova & Pujade-Villar, 2014, *X. pilosa* Mata-Casanova & Pujade-Villar, 2014, *X. pseudolaevigata* Mata-Casanova & Pujade-Villar, 2015, *X. siamensis* Mata-Casanova & Pujade-Villar, 2014, *X. ribesi* Mata-Casanova & Pujade-Villar, 2015 and *X. subsaharica* Mata-Casanova & Pujade-Villar, 2014.

***Xyalaspis* species**			
Previous valid species	13		
Valid species	8		
Non valid species	5	Synonyms	5
New species	14		
Current valid species	**22**		

Table 1. Summary of *Xyalaspis* species status.

The study of material labelled as *Xyalaspis* has led to the description of a new closely related genus: *Acanthaegilopsis* Pujade-Villar, 2013, which includes two species: *A. hemicoriaceus* Mata-Casanova & Pujade-Villar, 2014 and *A. malagasy* Mata-Casanova & Pujade-Villar, 2014.

Regarding *Anacharis*, 12 species have been considered valid after revising the type material: *A. antennata* Belizin, 1951, *A. eucharoides* (Dalman, 1818), *A. immunis* Walker, 1835, *A. madagascarensis* Pujade-Villar, 2012, *A. marginata* Provancher, 1887, *A. melanoneura* Ashmead, 1887, *A. mexicana* (Cameron, 1884), *A. parapsidalis* Belizin, 1951, *A. punctatifrons* Kieffer, 1907, *A. tripartita* Kieffer, 1907, *A. tucumana* Díaz, 1979 and A. *zealandica* Ashmead, 1901. 9 species are not considered valid anymore: 5 have been synonymized: *A. flavicornis* Kieffer, 1909 with *A. marginata*, *A. gracilipes* Ionescu, 1969 with *A. eucharoides*, *A. lamyi* Cockerell, 1899 with *A. mexicana*, *A. levifrons* Kieffer, 1907 with *A. marginata* and *A. mellipes* Provancher, 1888 with *A. marginata*. 2 species have been transferred to other genera: *A. flavidicornis* Kieffer, 1911 to genus *Aegilips* and *A. subcompressa* Kieffer, 1881 to *Figites* Latrielle, 1802. 2 species have been considered *incertae sedis*: *A. osceolus* Ashmead, 1887 and *A. pediculata* Provancher, 1887. 8 new species have been described: *A. afrotropica* Mata-Casanova & Pujade-Villar, 2015, *A. belizini* Mata-Casanova & Pujade-Villar, in press, *A. fergussoni* Mata-Casanova & Pujade-Villar, 2017, *A. luciae* Mata-Casanova & Pujade-Villar, in press, *A. mantocephala* Mata-Casanova & Pujade-Villar, in press, *A. norvegica* Mata-Casanova & Pujade-Villar, in press, *A. rwenzori* Mata-Casanova & Pujade-Villar, 2015 and *A. tasmaniae* Mata-Casanova & Pujade-Villar, 2015.

***Anacharis* species**			
Previous valid species	22		
Valid species	12		
Non valid species	9	Synonyms	5
		Transferred	2
		Incertae sedis	2
New species	8		
Current valid species	**20**		

Table 2. Summary of *Anacharis* species status.

The last genus revised has been *Aegilips*. The study of the type material has led to 13 valid species out of 25*: A. atricornis* Fergusson, 1985, *A. capensis* Kieffer, 1912,

A. clarimontis Kieffer, 1907, *A. kozlovi* Kovalev, 1974, *A. longicellus* Belizin, 1951, *A. nitidulus* (Dalman. 1823), *A. paucus* Belizin, 1961, *A. romseyensis* Fergusson, 1985, *A. rugata* Kieffer, 1907, *A. trisecta* Kieffer, 1907, *A. ustulatus* Belizin, 1973, *A. victoriae* Ashmead, 1896 and *A. zaitzevi* Kovalev, 1974. *Anacharis flavidicornis* has been renamed *Aegilips flavidicornis* and is considered a valid species, while *Xyalaspis laevis* has been synonymized with *A. nitidulus*. 12 species are not considered valid anymore: 6 have been synonymized: *A. curvipes* Giraud, 1860, *A. gemellus* Belizin, 1961, *A. montanus* Belizin, 1961 and *A. punctatus* Belizin, 1961 with *A. nitidulus*, *A. reticulata* Kieffer, 1908 with *A. trisecta*, and *A. vena* Fergusson, 1985 with *A. zaitzevi*. 4 species have been considered as *incertae sedis*: *A. aciculata* Provancher, 1881, *A. notatus* Belizin, 1951, *A. obtusilobae* Osten-Sacken, 1863 and *A. punctulata* Hedicke, 1928. *A. nevadensis* Kieffer, 1908 has been transferred to genus *Anacharis* and synonymized with *A. marginata*. The study of the type material of *A. chilensis* Bréthes, 1918 has led to the description of a new genus: *Cornaegilips* Mata-Casanova & Pujade-Villar, in press. 7 new species have been described: *A. aethiopicus* Mata-Casanova & Pujade-Villar, 2017, *A. cardinalae* Mata-Casanova & Pujade-Villar, in press, *A. foveata* Mata-Casanova & Pujade-Villar, 2017, *A. huberi* Mata-Casanova & Pujade-Villar, in press, *A. insularis* Mata-Casanova & Pujade-Villar, in press, *A. papuensis* Mata-Casanova & Pujade-Villar, 2015 and *A. virungae* Mata-Casanova & Pujade-Villar, 2017.

***Aegilips* species**			
Previous valid species	25		
Valid species	13		
Transferred from other genera	1		
Non valid species	12	Synonyms	6
		Transferred	2
		Incertae sedis	4
New species	7		
Current valid species	**21**		

Table 3. Summary of *Aegilips* species status.

Although knowledge on *Acanthaegilips* was deeply improved and updated in Ros-Farré *et al.* (2003) and Pujade-Villar *et al.* (2009), during the study of large series of Neotropical Anacharitinae 6 new species belonging to this genus have been described: *A. boyacensis* Mata-Casanova & Pujade-Villar, 2017, *A. curvis* Mata-Casanova & Pujade-Villar, 2017, *A. notobiellus* Mata-Casanova & Pujade-Villar, 2014,

A. palmirae Mata-Casanova & Pujade-Villar, 2013, *A. timidus* Mata-Casanova & Pujade-Villar, 2017 and *A. truncatus* Mata-Casanova & Pujade-Villar, 2017.

***Acanthaegilips* species**	
Previous valid species	14
New species	6
Current valid species	**20**

Table 4. Summary of *Acathaegilips* species status.

5.2. Updated distribution patterns of Anacharitinae

Aside from the taxonomical updates on Anacharitinae species status, another important aspect of the present Thesis has been the faunistic revisions. Records of the subfamily were scarce and mainly concentrated in the Holarctic regions; Afrotropical and Australasian regions had only two species recorded each, and Anacharitinae were absent from Indomalayan records. The results obtained after studying large series of unidentified material have increased the known distribution are and abundance of the subfamily. These results are pictured below: confirmed previous records and new records have been synthetized in tables and geographically located in maps for each continent.

The African continent is home of two bioregions: The Mediterranean coast and areas North or Sahara Desert (Morocco, Algeria, Tunis, Libya and Egypt) belong to the Palaearctic region, while Sub-Saharan Africa belong to the Afrotropical or Ethiopian bioregion, which is also extended to Southern areas of the Arabic Peninsula (Yemen). Contrary to other Figitidae subfamilies (van Noort *et al.*, 2015), Anacharitinae record in the region was very poor: just two species, *Aegilips capensis* collected from South Africa and Zimbabwe, and *Anacharis madagascarensis* from Madagascar. After our studies, 11 species are present in Africa (Fig. 16, Table 5).

African Anacharitinae record		
Species	**Previous records**	**New records**
Acanthaegilopsis hemicoriaceus		Uganda, Zimbabwe
Acanthaegilopsis malagasy		Comoros, Madagascar
Aegilips aethiopicus		DR Congo, South Africa, Zimbabwe

African Anacharitinae record		
Species	**Previous records**	**New records**
Aegilips atricornis		Morocco
Aegilips capensis	South Africa, Zimbabwe	Kenya, Malawi
Aegilips foveata		Kenya, Zimbabwe
Aegilips virungae		DR Congo
Anacharis afrotropica		DR Congo, Kenya, South Africa, Uganda
Anacharis eucharoides		Morocco
Anacharis madagascarensis	Madagascar	
Anacharis rwenzori		DR Congo
Xyalaspis subsaharica		Nigeria, Uganda

Table 5. Current Anacharitinae records in Africa.



Figure 16. Current Anacharitinae records in Africa.

Asia is divided in three bioregions. Most of its surface belongs to the Eastern portion of the Palaearctic region, while the Indian subcontinent, South Eastern Asia along with Eastern archipelagos (Indonesia, Philippines, Taiwan) form a distinct bioregion, known as Indomalayan or Oriental. As mentioned before, the southernmost areas of the Arabic Peninsula are part of the Afrotropical region. Knowledge of Asian Anacharitinae was restricted to the Palaearctic region; no specimens were known from the Indomalayan bioregion, nor from Yemen. Also, most of the knowledge was due to the extensive works of Soviet researchers (Belizin, 1951, 1961, 1973; Kovalev, 1974), focused on Soviet Central Asia and Mongolia. After our faunistic studies, the knowledge on Asian Anacharitinae has increased (Fig. 17, Table 6): the previous records mentioned 13 species present in the continent; 10 more have been added. More so, Anacharitinae specimens have been recorded for the Indomalayan region: 5 species are present there. Last but not least, species previously known just from Europe (Western Palaearctic) have also been found in Asia, suggesting a more widespread distribution area than previously thought.

Asian Anacharitinae record		
Species	**Previous records**	**New records**
Aegilips aethiopicus		Yemen
Aegilips atricornis		India, Pakistan
Aegilips flavidicornis	China (Xinjiang)	
Aegilips kozlovi	Mongolia	
Aegilips longicellus	Tajikistan, Russia (Chelyabinsk)	
Aegilips nitidulus	Russia (Chelyabinsk, Sakha)	
Aegilips paucus	Kazakhstan	
Aegilips romseyensis		China (Zhejiang)
Aegilips ustulatus	Kyrgyzstan	
Aegilips zaitzevi	Mongolia	Russia (Primorskiy)
Anacharis antennata	Tajikistan	China (Guangxi, Neimenggu, Ningxia, Yunnan), Japan
Anacharis belizini		Thailand
Anacharis immunis	Russia (Irkutskaya)	Japan
Anacharis parapsidalis	Russia (Khabarovsk)	China (Fujian, Shanxi), Japan
Proanacharis miriabilis	Russia (Primorskiy)	
Xyalaspis atemiensis	Japan	China (Sichuan)

Asian Anacharitinae record		
Species	**Previous records**	**New records**
Xyalaspis dimorphica		India
Xyalaspis esbelta		China (Fujian, Guangxi, Guizhou, Sichuan, Xinjiang, Yunnan, Zhejiang), India, Japan, Taiwan, Thailand
Xyalaspis hyalina	Kazakhstan, Tajikistan	
Xyalaspis laevigata		Iran
Xyalaspis orientalis		China (Gansu, Hubei, Zhejiang), Japan, South Korea
Xyalaspis ribesi		China (Henan, Zhejiang)
Xyalaspis siamensis		Thailand

Table 6. Current Anacharitinae records in Asia.

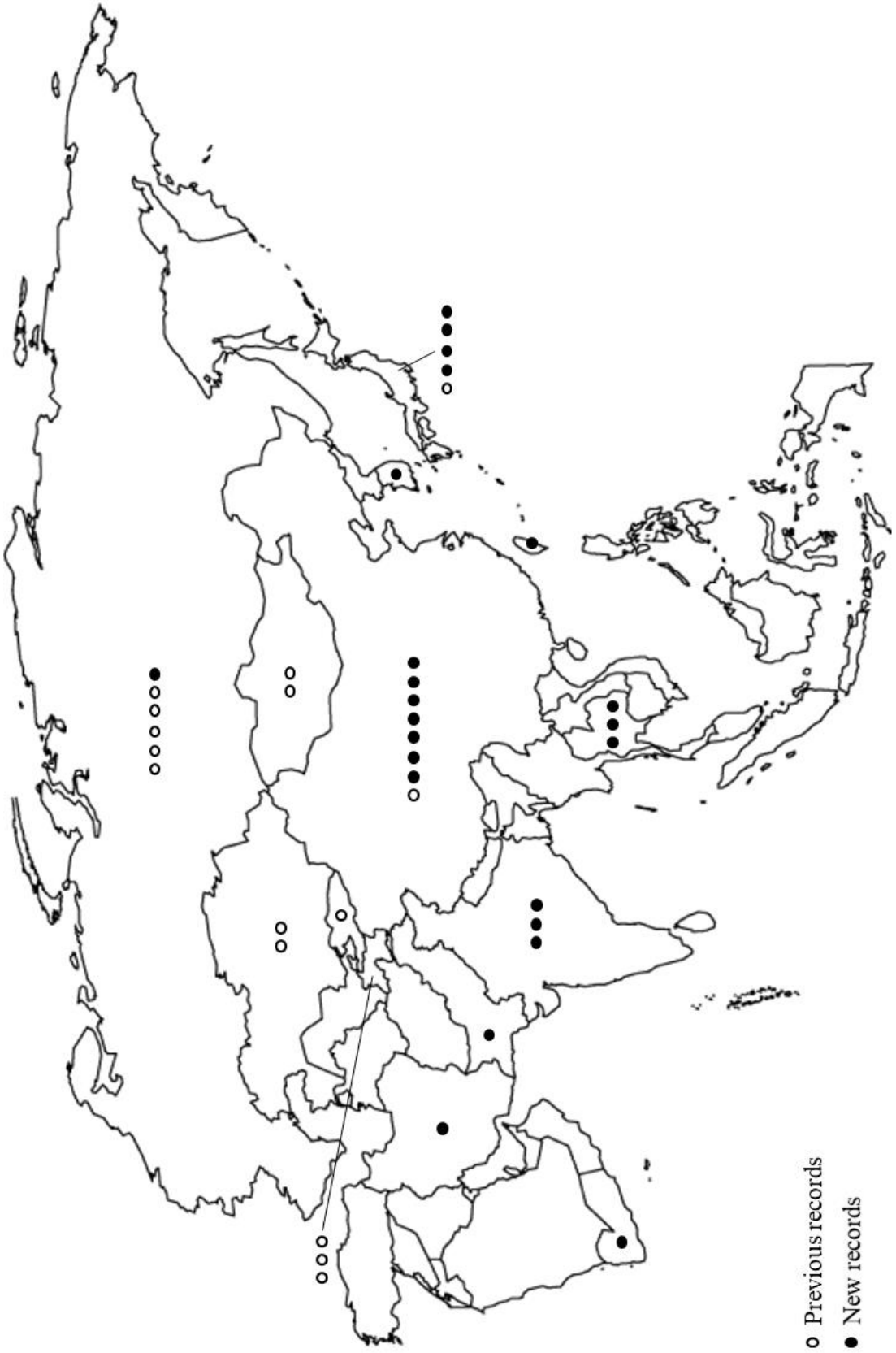


Figure 18. Current Anacharitinae records in Asia.

Australia, New Guinea, New Zealand along with smaller Melanesian islands form the Australasian bioregion. Cynipoidea and Figitidae have extensive records in the region (Paretas-Martínez *et al.*, 2013); however, Anacharitinae diversity was reduced to just two species: *Anacharis zealandica* and *Xyalaspis victoriensis*. Two new species have been described from the region, one of them from New Guinea (Fig. 19, Table 7).

Asian Anacharitinae record		
Species	**Previous records**	**New records**
Aegilips papuensis		Papua New Guinea
Anacharis tasmaniae		Australia (NSW, TAS)
Anacharis zealandica	New Zealand, Australia (VIC)	Australia (ACT, NSW, QLD, SA, TAS, WA)
Xyalaspis victoriensis	Australia (VIC)	Australia (NSW, QLD, TAS)

Table 7. Current Anacharitinae records in the Australasian region.



Figure 19. Current Anacharitinae records in the Australasian region.

Europe forms the Western portion of the Palaearctic region. Before studies were carried on, European Anacharitinae record was among the highest, with 17 known species. After faunistic revisions, the number of known species is reduced to 16, 3 of them new species (Fig. 20, Table 8).

European Anacharitinae record		
Species	**Previous records**	**New records**
Aegilips atricornis	United Kingdom	Andorra, Austria, Cyprus, France, Hungary, Ireland, Portugal (Madeira), Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland
Aegilips insularis		Portugal (Madeira)
Aegilips kozlovi		Hungary, Romania
Aegilips nitidulus	Armenia, Austria, France, Georgia, Germany, Moldova, Sweden, Romania, Ukraine, United Kingdom	Andorra, Bosnia and Herzegovina, Czech Republic, Hungary, Ireland, Italy, Norway, Slovenia, Spain
Aegilips romseyensis	United Kingdom	Austria, Czech Republic, France, Hungary, Italy, Romania, Slovakia
Aegilips zaitzevi	United Kingdom	
Anacharis eucharoides	Austria, France, Georgia, Germany, Moldova, Netherlands, Romania, Russia, Sweden, United Kingdom	Andorra, Belgium, Czech Republic, Hungary, Italy, Norway, Switzerland
Anacharis fergussoni		Andorra, France, Germany, Hungary, Romania, Slovakia, Spain
Anacharis immunis	Armenia, Austria, Finland, Germany, Latvia, Norway, Poland, Russia, Sweden, Ukraine, United Kingdom	Andorra, Belgium, Denmark
Anacharis norvegica		Norway

European Anacharitinae record		
Species	**Previous records**	**New records**
Xyalaspis armata	Austria, Germany, Ireland, Russia, Spain, Sweden, United Kingdom	
Xyalaspis hyalina	Armenia, Russia	Cyprus
Xyalaspis laevigata	Austria	Andorra, France, Norway, Romania, Spain
Xyalaspis petiolata	United Kingdom, Ireland	France, Sweden
Xyalaspis pseudolaevigata		France
Xyalaspis rugosa	Austria, Netherlands, Norway, Sweden	France, Switzerland

Table 7. Current Anacharitinae records in Europe.



Figure 20. Current Anacharitinae records in Europe.

North America is divided into two bioregions: most of the continent belongs to the Nearctic region, while Southern Florida and Mexico are part of the Neotropical region. Anacharitinae record in North America included 16 species and one endemic genus, *Hexacharis.* After revisions of North American material have been done, 17 species are known there; more so, the known distribution areas of previously described species have vastly increased (Fig. 21, Table 8).

North American Anacharitinae record		
Species	**Previous records**	**New records**
Aegilips cardinalae		Canada (BC, ON, QC), USA (AL, NH, NC, MO, WA)
Aegilips clarimontis	USA (CA)	Canada (ON), Mexico (CP), USA (NM)
Aegilips huberi		Canada (BC, NB, ON, YT), USA (AL, AZ, WA)
Aegilips rugatus	USA (CO)	Canada (AB, BC, NT, ON), USA (AL, AZ, CA, VA, WA)
Aegilips trisectus	USA (WI)	Canada (AB, BC, ON, YT), USA (AL, CA, CO, NH, NC, VA, WA)
Aegilips victoriae	Canada (BC)	Canada (AB, NT), USA (AL, CO, NM)
Aegilips zaitzevi		Canada (ON), USA (AL)
Anacharis mantocephala		USA (SC)
Anacharis marginata	Canada (QC), USA (NV, PA, WI)	Canada (AB, BC, NB, NL, NT, NS, ON), Mexico (CH), USA (AL, FL, MI, NH, NY, NC, OH, VA)
Anacharis melanoneura	USA (AL, FL)	Canada (AB, BC, MA, NB, NL, NT, ON, QC,YT), Mexico (CH, NL), USA (AL, AZ, CA, CO, GA, MI, MO, NE, NH, NM, NY, NC, OH, SC, TX, VA, WA)

North American Anacharitinae record		
Species	**Previous records**	**New records**
Anacharis mexicana	Mexico, USA (NM)	Canada (AB, BC, NT, QC, YT), USA (AL, AZ, CA, CO)
Anacharis punctatifrons	USA (CA)	Canada (BC, MA, NT, QC, YT), Mexico (TM), USA (AL, AZ, CO, NC, WA)
Anacharis tripartita	USA (CA)	Canada (AB, BC, NB, ON, QC), Denmark (Greenland), Mexico (DF, NL), USA (AL, AZ, CO, GA, NH, OH, OR, UT)
Hexacharis flavipes	USA (CO)	
Xyalaspis arapahoe		USA (CO)
Xyalaspis flavipes	USA (AL, MD, VA)	Canada (ON), Mexico (CP), USA (GA, MS, MO, NM, NC, OK, SC)
Xyalaspis hirsuta		Mexico (CP, DU, MR, VE), USA (MD, MO)
Xyalaspis muzencaba		Mexico (CP, MR)

Table 7. Current Anacharitinae records in North America.

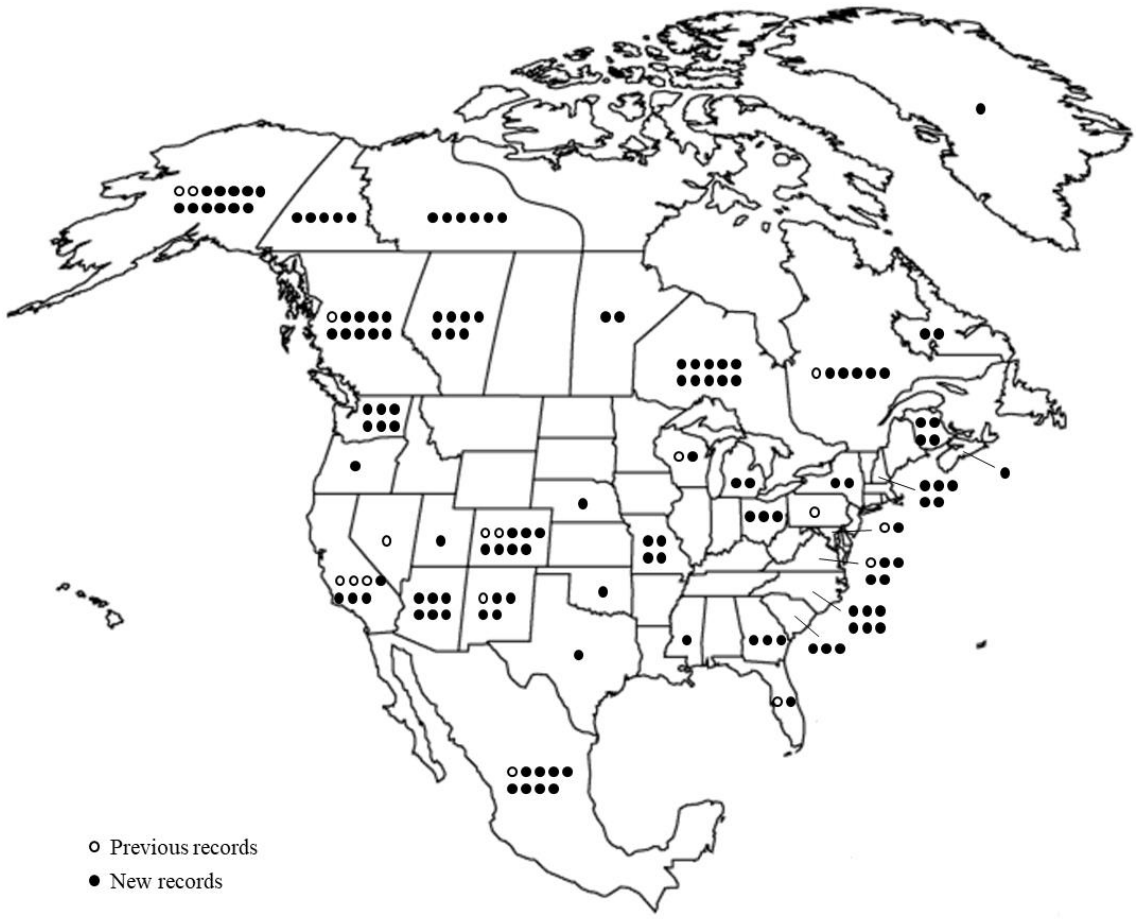


Figure 21. Current Anacharitinae records in North America.

South America and the Caribbean area are included within the Neotropical bioregion. This region holds the highest known Anacharitinae diversity: 5 genera were known to occur, 3 of them being endemic – *Acanthaegilips*, *Calofigites* and *Solenofigites*. Anacharitinae fauna for the region was quite known (Díaz, 1979, 1982; Ros-Farré *et al.*, 2003; Pujade-Villar *et al.*, 2009; Restrepo-Ortiz *et al.*, 2010c): 19 species had been recorded. The studies on the Neotropical region have shown interesting results: one new genus has been described, *Cornaegilips*, endemic of the Sub-Antarctican subregion; *Xyalaspis*, never cited for the region, is also present. Thus, the Neotropical region hosts the highest known Anacharitinae biodiversity at the generic level: 7 out of 10 genera have been found. This score is also found at the specific level: 39 species have been recorded (Figure 22, Table 9).

Central and South American Anacharitinae record		
Species	**Previous records**	**New records**
Acanthaegilips alienus	Dominican Republic	
Acanthaegilips ashmeadi	Peru, Venezuela	Colombia

Central and South American Anacharitinae record		
Species	**Species**	**Species**
Acanthaegilips boyacensis		Colombia
Acanthaegilips braziliensis	Argentina, Brazil, Ecuador, Venezuela	Nicaragua, Panama
Acanthaegilips carinatus	Brazil	
Acanthaegilips colombiensis	Colombia	
Acanthaegilips curvis		Colombia
Acanthaegilips dentis	Costa Rica, Venezuela	
Acanthaegilips exiguus	Jamaica	
Acanthaegilips huggerti	Ecuador, Nicaragua, Venezuela	Colombia
Acanthaegilips levis	Ecuador, Nicaragua, Venezuela	Colombia
Acanthaegilips macropennis	Bolivia, Colombia, Ecuador, Venezuela	
Acanthaegilips masneri	Ecuador, Venezuela	
Acanthaegilips notiobiellus		Venezuela
Acanthaegilips occultus	Venezuela	
Acanthaegilips palmirae		Colombia
Acanthaegilips timidus		Colombia
Acanthaegilips truncatus		Colombia
Acanthaegilips venezuelensis	Venezuela	Colombia

Central and South American Anacharitinae record		
Species	**Species**	**Species**
Aegilips cardinalae		Costa Rica, Guatemala
Aegilips rugatus		Guatemala
Anacharis luciae		Brazil, Colombia, Dominican Republic, Venezuela
Anacharis mantocephala		Bolivia, Colombia, Costa Rica
Anacharis melanoneura		Colombia, Dominican Republic, Jamaica, Panama
Anacharis mexicana		Bolivia, Costa Rica, Dominican Republic, Guatemala, Honduras, Nicaragua
Anacharis punctatifrons		Colombia, Costa Rica, Dominican Republic, Guatemala, Honduras, Venezuela
Anacharis trisecta		Colombia, Venezuela
Anacharis tucumana	Argentina	
Calofigites neotropica	Argentina	
Calofigites nitidus	Argentina, Peru	
Cornaegilis chilensis	Chile	Argentina, Falklands/Malvinas
Solenofigites lautus	Argentina, Chile	
Xyalaspis aberrans		Brazil, Panama
Xyalaspis alveolata		Ecuador
Xyalaspis dominicana		Dominican Republic

Central and South American Anacharitinae record		
Species	**Species**	**Species**
Xyalaspis flavipes		Colombia, Costa Rica, Guatemala, Honduras, Panama, Venezuela
Xyalaspis hirsuta		Costa Rica, Colombia, Nicaragua, Panama, Venezuela
Xyalaspis pilosa		Venezuela

Table 7. Current Anacharitinae records in South America.



Figure 22. Current Anacharitinae records in South America.

After more than four years of research, the results of the present Doctoral Thesis have significantly improved the knowledge of Anacharitinae, laying the taxonomical foundations for further studies in other fields such as phylogeny, biological cycles and pest control. The results of this project will be very useful and very beneficial for entomologists, agronomists and pest controllers.

From this starting point, it would be interesting and necessary to continue this line of research focusing on ecological and molecular approaches. Little is known about life history, evolution and internal relationships of the subfamily members, and their interaction and impact in arthropod fauna of their ecosystems. These new research lines will be helpful to fill the huge gaps in Anacharitinae knowledge and give us the tools for a full comprehension of the subfamily.

6. GENERAL CONCLUSIONS

The results obtained are summarized in the following conclusions, arranged according to the set up objectives in chapter 2.

1. Studying worldwide Anacharitinae biodiversity.

    a. Type material of all described species have located and been studied except for those cases in which it has been lost.

    b. 14 *Acanthaegilips*, 13 *Aegilips*¸ 12 *Anacharis,* 2 *Calofigites* and 7 *Xyalaspis* species previously described have been considered valid species. Monotypic taxa *Hexacharis flavipes, Proanacharis mirabilis* and *Solenofigites lautus* have been also considered as valid.

    c. 8 *Aegilips,* 6 *Anacharis* and 4 *Xyalaspis* species have been synonymized. 1 *Aegilips,* 2 *Anacharis* and 1 *Xyalaspis* have been transferred to other genera (from *Aegilips* to *Cornaegilips*; from *Anacharis* to *Aegilips* and *Figites*; from *Xyalaspis* to *Aegilips*). 3 *Aegilips* and 2 *Anacharis* species have been considered *incertae sedis*.

    d. A total of 5861 specimens have been identified: 2722 females and 3089 males.

    e. 2 new genera – *Acanthaegilopsis* and *Cornaegilips* – have been described. 37 new species have been described: 6 belonging to *Acanthaegilips*, 7 belonging to *Aegilips*, 8 belonging to *Anacharis*, and 14 belonging to *Xyalaspis*.

    f. Updated and complete keys for genera and species of Anacharitinae have been made.

    g. New records have been stablished. *Aegilips* has been recorded for the first time in the Australasian and Indomalayan regions; *Anacharis*, for the Afrotropical and Indomalayan; *Xyalaspis* for the Afrotropical, Indomalayan and Neotropical.

2. Studying the subfamily internal phylogeny and biology.

    a. Host of genus *Acanthaegilips* has been described for the first time. New host species for *Aegilips* and *Anacharis* have been recorded.

    b. Internal phylogeny studies have been started regarding *Acanthaegilopsis – Aegilips – Xyalaspis* group.

3. Make the results known for the scientific community.

    a. As mentioned before in the Results section, 18 papers have been produced during those years.

b. Results have also been presented in congresses: 4 presentations – at the VIII Congreso Latinoamericano de Entomología, the Xth European Congress of Entomology, the XVI Congreso Ibérico de Entomología, and the XVII Congreso Ibérico de Entomología – and 1 poster – at the LI Congreso Nacional de la Sociedad Mexicana de Entomología.

7. RESUM

7.1. Introducció

Els Anacharitinae. Posició taxonòmica

Els himenòpters parasitoids són el grup d'insectes més importants pel que fa al control de plagues (Pickens & Miller, 1980; Rozova, 1991; Baranowski *et al.*, 1993; Johnson, 1993; Ovruski and Fidalgo, 1994; Díaz & Gallardo, 1996; Matrangolo *et al.*, 1997; Menezes *et al.*, 1997; Villeneuve & Trottin, 1997; Wharton *et al.*, 1998), doncs suposen un element clau per a las xarxes tròfiques tant de sistemes natural com agrícoles. Tot i la seva cabdal importància, poques espècies són usades per a aquesta tasca degut al gran desconeixement pel que fa a la diversitat i cicles vitals (Madrigal-Cardeño, 2001). Les estimes més recents calculen que només un 5% del total de la diversitat d'Hymenoptera es troba descrita (Buffington & Noort, 2007). Estudis de d'índole filogenètica, biològica i biogeogràfica resulten essencial per a ampliar el nostre coneixement del grup i augmentar les possibilitats d'emprar-los com a eina biològica de control de plagues.

Cynipoidea és una superfamilia d'himenòpters parasitoids pertanyents a la secció Parasitica del subordre Apocrita. Es caracteritzen per presentar una venació alar molt reduïda (on només resta la cel·la radial del parell d'ales anterior), mida petita, i un metasoma curt, arrodonit i lateralment comprimit. El consens actual divideix els Cynipoidea en cinc famílies existents: (Ronquist, 1999): Austrocynipidae, Cynipidae, Figitidae, Ibaliidae i Liopteridae. Aquestes s'agrupen en dos blocs: els macrocinipoids, i els microcinipoids. Els macrocinipoids inclou les famílies Austrocynipidae, Ibaliidae i Liopteridae; es caracteritzen per una major mida i un seguit d'adaptacions per a parasitar larves d'insectes xilòfags, i no formen un grup monofilètic. Els microcinipoids inclouen les altres dues famílies, Cynipidae i Figitidae, que formen un grup monofilètic que suposa el 90% de la diversitat coneguda de Cynipoidea. Malgrat tractar-se de grups germans, les dues famílies presenten biologies significativament diferents: Figitidae són parasitoids o hiperparasitoids de diversos grups d'insectes, mentre que Cynipidae són organismes cecidògens, o inquilins d'altres cecidògens. Morfològicament poden distingir-se fàcilment per l'aspecte de la vena Rs+M. mentre que a Cynipidae aquesta s'insereix a la regió mitja de la vena basal, en el cas dels Figitidae ho fa a l'extrem distal.

Figitidae compren gairebé exclusivament endoparasitoids d'insectes endopterigots. Ronquist (1999) suggereix l'origen de la família en un grup de parasitoids d'insectes cecidògens endopterigots (biologia que encara es troba a la subfamília Thrasorinae), seguida d'una radiació cap a larves d'insectes predadors d'àfids dels ordres Diptera (Aspicerinae, Eucoilinae, Figitinae) i Neuroptera (Anacharitinae).

Figitidae és possiblement la més diversa de les famílies de Cynipoidea (Norlander, 1984; Ronquist, 1999; Fontal-Cazalla *et al.*, 2002). Actualment hi ha al voltant de 1.400 espècies descrites repartides en 132 gèneres (Buffington *et al.*, 2005), però la diversitat total estimada és del voltant de 24.000 espècies (Norlander, 1984).

Malgrat l'extrema riquesa d'espècies de les regions tropical (Fergusson & Hanson, 1995; Nieves-Aldrey & Fontal-Cazalla, 1997; Fontal-Cazalla & Nieves-Aldrey, 1999 el registre presenta un biaix cap a la regió Holàrtica (Dalla-Torre & Kieffer, 1910; Weld, 1952), on la fauna de microhimenòpters es troba molt més estudiada. La classificació de la família ha resultat caòtica durant molt de temps (Ronquist, 1999), i no va ser fins a finals del segle XX que varen iniciar-se esforços per a resoldre-ho. Actualment, dotze subfamílies es troben reconegudes dins de Figitidae: Parnipinae, Thrasorinae, Anacharitinae, Aspicerinae, Charipinae, Emarginae, Euceroptrinae, Eucolinae, Figitinae, Mikeiinae, Plectocynipinae i Pycnostigmatinae (Ronquist, 1999; Ronquist & Nieves-Aldrey, 2001; Ros-Farré & Pujade-Villar, 2007; Buffington & Liljeblad, 2008 and Paretas-Martínez *et al*., 2011). L'objecte d'estudi de la present tesi és Anacharitinae.

Antecedents històrics

L'estudi d'Anacharitinae s'inicia al segle XIX amb la descripció de *Cynips euchariοides* Dalman, 1818. El mateix autor, el 1823, designa un nou gènere per a incloure aquesta espècie: *Anacharis* Dalman, 1823. En aquest mateix treball (Dalman, 1823), descriu una nova espècie de *Cynips* Linnaeus, 1758: *C. nitidula* Dalman, 1823. L'estudi d'aquest per Haliday (a Walker, 1835) du a la designació d'un altre nou gènere: *Aegilips* Haliday, 1835. Hartig (1843) va descriure un nou gènere amb una prominent espina escutelar: *Xyalaspis* Hartig, 1843. No fou fins Thomson (1862) que tingué lloc el primer intent de dur a terme una classificació dels tàxons superiors de Cynipodea; aquest autor establí, entre d'altres, la tribu Anacharina, que, d'acord amb l'article 11.7 del ICZN, és una designació vàlida. Thomson hi inclogué *Aegilips* i *Anacharis* però ignorà *Xyalaspis*, el qual no es troba mencionat al seu treball. Aproximacions posteriors foren les de Förster (1869) i Cameron (1890) (aquesta última centrada en els cinipoids britànics) les quals però contenen moltes identificacions errònies així com caràcters poc fiables com ara la coloració.

El primer treball cabdal per a l'estudi de Cynipodea és la monografia de Dalla-Torre & Kieffer (1910). En aquets, els autors tractaven Anacharitinae com a part de Figitidae, i hi incloïen 7 gèneres: *Acanthaegilips* Ashmead, 1897; *Acothyreus* Ashmead, 1887; *Aegilips*; *Anacharis*; *Anacharoides* Cameron, 1904; *Prosynapsis* Dalla-Torre & Kieffer, 1910; and *Xyalaspis*. Dos gèneres foren afegits posteriorment: *Paraegilips* Kieffer, 1910 i *Seitneria* Tavares, 1928. Canvis posteriors en la composició d'Anacharitinae fou la posada en sinonímia de *Paraegilips* amb *Paramblynotus* Cameron, 1908 (Liopteridae: Mayrellinae) duta a terme per Hedicke i Kerrich (1940.

Weld (1952) va presentar una llista actualització d'Anacharitinae, entre d'altres Cynipoidea. Va traslladar *Anacharoides* a Aspicerinae i va incloure 10 gèneres dins Anacharitinae: *Acanthaegilips*; *Acothyreus*; *Aegilips*; *Anacharis*; *Calofigites* Kieffer, 1909; *Hexacharis* Kieffer, 1907; *Paraegilips* Kieffer, 1910; *Prosynapsis* Dalla-Torre & Kieffer, 1910; *Seitneria* Tavares, 1928; i *Xyalaspis*. Aquest treball suposà una peça clau en l'estudi d'Anacharitinae degut a la inclusió d'una clau genèrica amb els caràcters d'importància taxonòmica degudament il·lustrats. El treball de Weld però no resolia la posició de dos gèneres d'afinitat incerta: *Paraegilips* i *Seitneria.* Al contrari

de Hedicke i Kerrich (1940), va mantenir la validesa del primer, però mencionà els seus dubtes sobre la seva pertinença a Anacharitinae o a Liopterida. Pel que fa a *Seitneria*, Weld mencionava similituds morfològiques i biològiques amb Figitinae, però mantenia el gènere dins Anacharitinae.

Posteriorment quatre gèneres foren descrits i inclosos dins Anacharitinae: *Stylobrachys* Belizin, 1951; *Petricynips* Belizin, 1961; *Solenofigites* Díaz, 1979; i *Proanacharis* Kovalev, 1996. El nombre de gèneres d'Anacharitinae es reduí els anys següents degut a sinonímies: Kierych (1984) i Díaz (1986) varen posar en sinonímia respectivament *Prosynapsis* i *Hexacharis* amb *Aegilips.* La revisió dels Cynipoidea britànics duta a terme per Fergusson (1986) no va suposar cap canvi a nivell genèric, però fou de gran importància per aclarir la caòtica situació dels Anacharitinae paleàrtics a nivell específic. L'últim canvi d'importància durant aquells anys fou el trasllat de *Stylobrachis* a Liopteridae (Kovalev, 1994).

La posició taxonòmic d'Anacharitinae ha estat també problemàtica. Norlander (1982) va ascendir Anacharitinae a nivell de família sense cap més comentari; aquesta decisió no fou seguida per la majoria d'autors: Fergusson (1986 va mantenir el seu estatus com a subfamília. Kovalev (1996) va separar el gènere *Acanthaegilips* de la resta d'Anacharitinae i el col·loca dins la seva pròpia subfamília, Acanthaegilipinae.

Els inicis del segle XXI foren crucials per a l'estudi de la taxonomia dels Figitidae. Ronquist (1999) va establir-ne la monofília, així com demostrà la monofília de totes les subfamílies llevat de Figitinae, un calaix de sastre taxonòmic pendent de. Ros-Farré *et al.* (2000) resolgué la posició d'*Acanthaegilips*, situant-lo dins del nucli d'Anacharitinae, proper a dos gèneres també neotropicals, *Calofigites* i *Solenofigites*. Així, la subfamília comprenia 7 gèneres: *Acanthaegilips, Aegilips, Anacharis, Calofigites, Proanacharis, Solenofigites* i *Xyalaspis*. A més a més, els autors definiren les sinapomorfies de la sibfamília. Pel que fa a gèneres anteriorment inclosos dins Anacharitinae, *Paraegilips* fou considerat un lioptèrid típic malgrat la seva mida reduïda, validant la sinonímia duta a terme per Hedicke (Hedicke & Kerrich, 1940). *Seitneria* es traslladà a Figitinae degut a les semblances amb *Amphitectus, Melanips* i *Sarothrus*. La posició de *Petricynips* restà incerta; el material es trobava greument danyat i diversos caràcters essencials eren impossibles d'examinar; fou exclòs d'Anacharitinae *sensu stricto* i es manté en una posició incerta.

Ros-Farré *et al.* (2000) fou el primer treball del grup de Parasitica de la Universitat de Barcelona centrat en Anacharitinae. La diversitat del gènere *Acanthaegilips* fou estudiada en els anys següents (Ros-Farré *et al.,* 2003; Pujade-Villar, *et al.,* 2009; Restrepo-Ortiz *et al.,* 2010). Treballs de gran importància taxonòmica foren Restrepo-Ortiz & Pujade-Villar (2010a, 2010b) en els quals *Acothyreus* fou posat en sinonímia amb *Anacharis* i *Hexacharis* fou considerat un gènere vàlid. Aquest últim treball (Restrepo-Ortiz & Pujade-Villar, 2010b) incloïa una clau per als gèneres d'Anacharitinae degut a que nous descobriments havien invalidat la clau de Weld (1952).

Morfologia i caràcters diagnòstics

Anacharitinae inclou cinipoids de mida mitjana, entre els 2 i 3 mm de longitud, de coloració negra. Solen presentar un aspecte més esvelt que la majoria de cinipoids, i un grau variable de microescultura al mesosoma, restant tant el cap com el metasoma llisos. El dimorfisme sexual es troba reduït a les antenes: 14 segments en el cas de mascles i 13 en el de femelles, com en la majoria de Figitidae. La subfamília es caracteritza per tres sinapomorfies: una placa pronotal arrodonida i continua, el cap triangular en visió frontal (tot i que de vegades por presentar una expansió secundària de l'àrea malar que li dóna un aspecte quadrat) i mandíbules superposades.

El **cap** dels Anacharitinae presenta uns pocs caràcters d'importància taxonòmica. La carina occipital es troba absent en la majoria de gèneres, però és un caràcter que serveix per a identificar *Solenofigites*. Un altre caràcter d'importància a nivell genèric és la presència d'espines dirigides cap enrere a la regió occipital, un caràcter exclusiu de *Cornaegilips.* L'àrea malar presenta també variabilitat: al gènere *Acanthaegilips* hi podem trobar un solc, l'aspecte del qual té importància a l'hora de distingir espècies. L'àrea malar també pot presentar una banda coriàcia als gèneres *Aegilips, Anacharis* i *Xyalaspis*; en el cas d'*Anacharis,* aquesta pot trobar-se absent o present, i revesteix d'importància per a la distinció d'espècies; en el cas de *Xyalaspis* només una espècie presenta variabilitat en aquest caràcter, mentre que totes les espècies d'*Aegilips* el presenten sense distinció.

Les **antenes** dels mascles d'Anacharitinae poden presentar algunes modificacions importants. En el cas del gènere *Hexacharis*, els mascles presenten el tercer flagel·lòmer excavat, un caràcter exclusiu. En el cas del gènere *Acanthaegilips* poden presentar expansions dorsoventrals als flagel·lòmers segon a cinquè; la presència o absència d'aquests és un caràcter important a l'hora de distingir espècies.

El mesosoma presenta importants caràcters tant a nivell genèric com específic. A nivell genèric, trobem caràcter importants al mesoscutel i la mesopleura. El **mesoscutel** és la regió posterior en que es troba dividit l'esclerit mig dorsal; la presència d'una espina en aquest segment defineix els gèneres *Acanthaegilips, Acanthaegilopsis* i *Xyalaspis*. Per altra banda, la **mesopleura** és l'esclerit mig lateral toràcic; el seu aspecte serveix per a distingir entre diferents gèneres: *Acanthaegilips* i *Solenofigites* hi presenten un solc oblic; *Anacharis, Calofigites, Hexacharis* i *Proanacharis* presenten un solc transversal que en el cas d'*Anacharis* i *Proanacharis* és profund i dividit en cel·les, mentre que en els altres dos gèneres es troba molt reduït, fins a desaparèixer en alguns casos. Pel que fa a *Acanthaegilopsis, Aegilips, Cornaegilips* i *Xyalaspis*, no hi trobem cap solc; en el cas d'*Acanthaegilosis* la major part de la superfície mesopleural es troba coberta per escultura coriàcia, mentre que els altres tres gèneres presenten un conjunt de carenes a la regió anteroventral més o menys desenvolupades.

A nivell específic, els caràcter més importants es troben a la regió mitja dorsal del mesosoma. El segment anterior d'aquesta regió, el **mesoscut**, presenta molta variabilitat pel que fa a l'escultura: areolada, coriàcia, amb carenes transversals o llisa. L'extensió i aspecte dels notaules també revesteix d'importància per a distingir espècies; aquests poden ser complerts o incomplerts, absents, i poden presentar carenes transverses internes. El **mesoscutel** també presenta variabilitat en l'escultura

d'importància taxonòmica: pot presentar una superfície llisa o areolada. A la regió anterior del mesoscutel es pot trobar unes depressions conegudes com a fòvees escutelars. Aquestes poden trobar-se delimitades per una carena circumcidant o no, poden ser distingides de la resta de la superfície escutelar.

Les **ales** solen ser hialines i estar cobertes d'una pubescència fina, més llarga al marge distal, i presentar una venació molt reduïda. No obstant, convé mencionar tres caràcters d'importància taxonòmica. El primer d'ells és la presència d'un pterostigma fosc al marge distal de la cel·la radial al gènere *Proanacharis*. El segon és l'aspecte de la cel·la radial: aquesta pot trobar-se oberta al marge costal (vena costal incomplerta) en algunes espècies d'*Acanthaegilips* i *Calofigites*. L'últim caràcter important present a les ales dels Anacharitinae és la vena 2rm, absent a la majoria d'espècies però característica del gènere *Hexacharis* i d'algunes espècies d'*Aegilips.*

Pel que fa a l'últim tagma corporal, el **metasoma**¸ l'aspecte d'aquest és important a l'hora de distingir gèneres. La longitud relativa dels tergits metasomals ens permet separar gèneres: en el cas d' *Acanthaegilips* i *Solenofigites,* el T4 cobreix la majoria del metasoma. A *Acanthaegilopsis, Aegilips, Cornaegilips* i *Xyalaspis* T3 i T4 comprenen vora 2/3 de la superfície total del metasoma, mentre que a *Anacharis, Calofigites, Hexacharis* i *Proanacharis* T3 I T4 són similars en longitud a T5, T6 i T7. Dins dels segments metasomals en destaca el **pecíol** (el segon segment abdominal i primer metasomal en himenòpters Apocrita). Als Anacharitinae, aquest presenta certa variabilitat, especialment al gènere *Anacharis*. La longitud relativa del pecíol respecte a la metacoxa permet distingir entre espècies d'aquests gènere. L'escultura del pecíol també presenta variabilitat entre espècies.

Biologia

Els Figitidae són endoparasitoids d'insectes endopterigots. Tot i parasitar altres organismes, els parasitoids presenten diferències substancials amb els paràsits: (i) el seu cicle es limita sempre a un sol hoste; (ii) l'estadi de paràstic és només una part del seu cicle, i tenen un fase de vida lliure; (iii) impedeixen la reproducció de l'histe, ja sigui matant-lo o esterilitzant-lo; (iv) tenen una mida similar a l'hoste; i (v) parasiten tàxons propers.

Com els altres cinipoids parasitoids (Austrocynipidae, Ibaliidae i Liopteridae), els Figitidae, són endoparasitoids cenobionts. La femella oposita els ous dins l'hoste i la larva es desenvolupa sense alterar-ne el desenvolupament (Askew & Shaw, 1986; Quicke, 1997).

Pel que fa a Anacharitinae, aquests ataquen els membres de la família Hemerobiidae (Neuroptera). Els gèneres *Hemerobius, Micromus, Notobiella, Sympherobius* i *Wesmaelius* han estat citats com a hostes (Díaz, 1979; New, 1979; Kierych, 1984; Miller & Lambdin, 1985; Ferguson, 1986; Cave & Miller, 1987; Mata-Casanova *et al.*, 2014a).

El cicle dels Anacharitinae es força desconegut; només hi ha registres per al gènere *Anacharis.* La femella d'*Anacharis* oposita els segons i tercers estats de larves d'Hemerobiidae (Cave & Miller, 1985; Miller & Lambdin, 1987), molt rarament el primer estat (Selhime & Kanavel, 1968). Palpa l'hoste i doblega els seu metasoma,

col·locant-lo entre les cames i insertant l'ovopositor al centre el dorsum de l'hoste (Miller & Lambdin, 1987).

La incubació i posterior desenvolupament de la larva dura entre 7 i 9 dies dins l'hoste; aquest forma un capoll però no pupa. Un cop finalitzada la consumició interna de l'hoste, la larva *d'Anacharis* emergeix per l'intertegument ventral o lateral, i resta entre 2 i 5 dies fora l'hoste consumint-ne les restes incloent les àrees esclerificades (Handlirsch, 1886; Cave & Miller, 1985; Miller & Lambdin, 1987). Un cop finalitzada la consumpció de les restes de l'hoste, la larva forma un pupa i resta en aquest estat entre 5 i 8 dies. (Cave & Miller, 1985), tot i que hi ha registres de l'estadi pupa durant fins a 14 dies en una espècie no identificada d'*Anacharis* (Wegenek, 1950). L'adult resta 24h dins el capoll de l'hoste fins que l'exosquelet s'endureix, i surt fora obrint-se camí amb les mandíbules (Cave & Millar, 1985). Els adults tenen un vida curta d'entre 1 i 9 dies (Miller & Lambdin, 1987), cosa que podria explicar la dificultat de recol·lectar Anacharitinae i la seva distribució espacial, amb pics de presència molt abundants però curts

Els membres de la subfamília no presenten requisits estrictes pel que fa a l'hàbitat. S'han col·lectat espècimens des de prats de tundra d'Alaska, Grenlàndia, i Lapònia fins a mates semi desèrtiques del sud-oest del EUA i als estrats arboris superiors de les selves centro i sud-americanes. L'alçada tampoc és un factor limitant; l'àrea de distribució oscil·la entre localitats a nivell del mar fins a alçades de més de 3.500 m a la serralada andina.

Distribució geogràfica

Anacharitinae és una subfamília de distribució cosmopolita, present a tots els continents llevat de l'Antàrtida (tot i que un gènere, *Cornaegilips*, és endèmic de la regió sub-antàrtica). Tot i no ser tant abundants com d'altres subfamílies de Figitidae (Charipinae i Eucoilinae, principalment), els Anacharitinae es troben ben representats al llarg de la seva àrea de distribució: s'han trobat individus des de Grenlàndia i Lapònia fins a Patagònia i Nova Zelanda.

Abans de que es dugués a terme la present revisió taxonòmica, la diversitat coneguda dels Anacharitinae presentava un patró interessant: mentre que per un costat la major diversitat genèrica es concentrava a la regió neotropical (cinc gèneres presents, tres d'ells endèmics: *Acanthaegilips, Calofigites* i *Solenofigites*), la major part de les espècies descrites eren holàrtiques (59 espècies de 81). Alguns dels punts calents ("hot-spots") de biodiversitat tenien un registre escàs d'Anacharitinae (2 espècies australàsiques i afrotropicals, respectivament), o aquests hi eren fins i tot absents, com ara la regió Indomalaia.

L'estudi de material sense identificar ha permès expandir el nostre coneixement sobre la distribució de la subfamília. A nivell genèric, la regió neotropical es manté com l'epicentre de biodiversitat de la família, amb tots els gèneres presents llevat *d'Acanthaegilopsis* i *Proanacharis* i amb el major índex d'endemisme: quatre gèneres (*Acanthaegilips, Calofigites, Cornaegilips* i *Solenofigites*). El coneixement respecte a la fauna de regions prèviament estudiades ha millorat: el nombre d'espècies holàrtiques ha disminuït (Mata-Casanova *et al.*, 2014b, 2014c, 2015a, 2015c), mentre que la

biodiversitat tropical d'Anacharitinae s'ha incrementat amb la descripció de noves espècies neotropicals (Mata-Casanova 2013b, 2014b, 2015a, 2017a), afrotropicals (Mata-Casanova *et al.,* 2013a, 2015b, 2017b), australàsiques (Mata-Casanova *et al.*, 2015c) i indomalaies.

Filogènia i història evolutiva

Figitidae és un grup monofilètic definit per dues sinapomorfies (Ronquist, 1995; 1999): la presència d'un punt feble al novè tergum en el lloc de la tercera vàlvula de les femelles, cosa que permet el moviment de les parts distals de l'ovopositor respecte la part basal i serveix de base per a futures modificacions, i per presentar la vena Rs+M projectada cap a l'extrem posterior de la vena basal.

Ronquist (1999) fou el primer en elaborar una filogènia interna de Figitidae, basada en caràcters del metasoma de la femella complementats amb altres caràcters morfològics i biològics. Els resultats donaven suport a la monofília dels Anacharitinae (excloent *Petricynips*); *Proanacharis* apareixia com a grup germà de la resta d'Anacharitinae. En aquest anàlisi Charipinae eren el grup germà d'Anacharitinae.

Ros-Farré *et al.* (2000) dugué a terme un anàlisi cladística de diverses espècies dels taxa més elevats de Figitidae basat en 24 caràcters. Els resultats suportaven la monofília de la subfamília i la pertinença a aquesta d'*Acanthaegilips*. *Proanacharis* tornava a aparèixer com a grup germà de la resta d'Anacharitinae. Anacharitinae però no apareixia com a grup germà de Charipinae sinó dels clúster format per Aspicerinae + Figitinae *sensu lato* (que incloïa *Melanips* Haliday, 1835). El treball de Vårdal *et al.* (2003) basat en la morfologia dels ous arribà a les mateixes conclusions pel que fa a relacions que Ronquist (1999).

Posteriors estudis de la filogènia dels cinipoids es basaren en la morfologia larval (Nieves-Aldrey *et al.*, 2005) però no inclogueren els Anacharitinae. Buffington *et al.* (2007) suposà una filogènia basada en 165 caràcters morfològics, 4 regions gèniques i dades sobre cicles vitals, analitzades mitjançant mètodes de màxima parsimònia i d'inferència bayesiana. Els resultats mostraven Anacharitinae com a grup germà de la resta dels Figitidae "centrals" (Aspicerinae, Charipinae, Emarginae, Eucoilinae i Figitinae *sensu lato*), suggerint una divergència precoç del llinatge parasitoid de neuròpters del tronc principal dels Figitidae. Pel que fa a la filogènia interna de la subfamília, els anàlisis de màxima parsimònia distingien dos grans clústers: per un costat els gèneres amb espina escutelar (*Acanthaegilips* i *Xyalaspis*) i per l'altra aquells gèneres sense espina (*Aegilips, Anacharis* i *Hexacharis*).

L'aproximació filogenètica més recent (Buffington *et al.,* 2012) acaba amb la monofília dels Figitidae: els paràsits d'organismes (Euceroptrinae, Mikeiinae, Plectocynipinae, Pycnostigminae, i Thrasorinae) apareixen com a més propers a Cynipidae que a la resta de Figitidae. Els resultats respecte a la posició dels Anacharitinae concorden amb els de Buffington *et al.* (2007): Anacharitinae apareix com a grup germà dels Figitidae més derivats. Les estimes de divergència per a la subfamília donades per Buffington *et al.* (2012) són de 113 Ma, substancialment més recent que l'edat de divergència d'Hemerobiidae i Chrysopidae (uns 178 Ma d'acord

amb Winterton *et al.*, (2010)). Pel que fa a la filogènia interna, *Aegilips* es troba més proper a *Xyalaspis* que al clade *Anacharis-Hexacharis*.

7.2. Objectius

L'objectiu principal de la present tesi doctoral ha estat una actualització del coneixement de la subfamília Anacharitinae, realitzant un estudi taxonòmic que doti a la comunitat científica d'eines útils per a l'estudi del grup. Això ha significat estudiar totes les espècies actualment descrites així com examinar material no identificat per tal d'establir els caràcters diagnòstics i delimitar cada gènere i espècie de forma clara. Aquest tipus de feina taxonòmica és d'importància cabdal per a tàxons poc coneguts com els Anacharitinae: una taxonomia actualitzada i correcta suposa un punt d'inici per a posteriors estudis en altres camps.

Els objectius específics de la tesi han estat els següents:

1. Estudiar la diversitat global dels Anacharitinae.

    a. Revisió de les espècies prèviament descrites per a comprovar-ne la validesa, i realització de descripcions complertes d'aquestes amb els caràcters degudament il·lustrats en cas necessari.

    b. Identificació de material d'Anacharitinae indeterminat deposited en institucions científics d'arreu del món.

    c. Descripció de nous gèneres i espècies d'Anacharitinae, realització de descripcions complertes així com facilitant informació sobre distribució i biologia sempre que sigui possible.

    d. Realitzar figures amb els caràcters diagnòstics de les noves espècies realitzats amb SEM.

    e. Dur a terme claus actualitzades i complertes per a la identificació de les espècies d' Anacharitinae per al seu ús en estudis taxonòmics, de control de plagues o d'altres.

2. Estudiar la biologia i filogènia interna de la subfamília.

    a. Analitzar les relacions entre diferents gèneres i espècies d'Anacharitinae.

    b. Establir la història, origen i patrons de distribució dels Anacharitinae.

    c. Establir, sempre que sigui possible, la relació entre espècies d'Anacharitinae i els seus hostes.

3. Donar a conèixer els resultats a la comunitat científica mitjançant publicacions en revistes científiques i ponències a congressos d'àmbit nacional i internacional.

7.3. Material i mètodes

S'ha estudiat el material tipus de les espècies d'Anacharitinae així com llargues sèries de material sense identificar, pertanyent a les següents institucions:

- ANIC (Australian National Insect Collection (CSIRO), Canberra, Australia; Nicole Fisher).
- CAS (California Academy of Sciences, San Francisco, EE.UU; Robert Zuparko).
- CNC (Canadian National Collection of Insects, Arachnids and Nematodes, Ottawa, Canada; Andrew Bennett and Sophie Cardinal).
- IAVH (Instituto Alexander von Humboldt, Villa de Leiva, Colombia; Claudia Medina).
- IFML (Instituto de Entomología – Fundación Miguel Lillo; Tucumán, Argentina; Emilia Constanza Pérez).
- MGAB (Muzeul de Istoria Naturala "Grigore Antipa", Bucharest, Romania; Melanya Stan).
- MJMO-UCOB (Museo Jose Manuel Osorio – Universidad Centroccidental "Lisandro Alvarado, Barquisimento, Venezuela; Evelín Arcaya).
- MLPA (Universidad Nacional de La Plata, Museo de la Plata, La Plata, Argentina; Fabiana Gallardo).
- MNHN (Muséum National d'Histoire Naturelle, Paris, France; Magdalena Czyrnek and Claire Villemant).
- MZLU (Lund Museum of Zoology, Lund, Sweden; Christer Hansson).
- NHM (Natural History Museum, London, United Kingdom; David Notton).
- UAT (Universidad Autónoma de Tamaulipas, Ciudad Victoria, Mexico; Juana Maria Coronado and Enrique Ruiz).
- ULg (Université de Liège, Liège, Belgium; Pierre-Nicolas Libert)
- ULQC (University of Laval, Quebec, Canada; Jean-Marie Perron).
- USNM (United States National Museum of Natural History (Smithsonian Institution), Washington DC, USA; M. Buffington)
- ZAFU (Zhejiang Agricultural and Forest University, Linan, China; Yiping Wang).

- ZIN (Zoologicheskij Institut, Rossinskaya Akademiya Nauk, Saint Petersburg, Russia; Sergey Belokobilskij and Oleg Kovalev).
- ZMHB (Museum für Naturkunde der Humboldt-Universität, Berlin, Germany; Frank Koch).
- ZSM (Zoologische Staatssammlung Museum, München, Germany; Olga Schmidt).

En el cas del material depositat al CNC, MLPA, UAT, USNM i ZIN aquest va poder ser examinat in situ durant l'estada de l'autor de la tesi a aquestes institucions. El material fou examinat amb una lupa Olympus SZ30; en el cas que es necessites més detall el material s'examinà amb una lupa Zeiss Discovery V8 amb una càmera InfinityX-21C acoblada, o més sovint amb un microscopi electrònic de rastreig FEI Quanta 200 ESEM. Les imatges preses amb aquests han estat usades per a il·lustrar els treballs.

7.4. Resultats

Revisions faunístiques

L'estudi del material tipus de les espècies d'Anacharitinae així com de material no identificat pertanyent a la subfamília ha permès establir els caràcters diagnòstics de les espècies d'Anacharitinae i actualitzar l'estat d'aquestes, establint sinonímies sempre que ha estat necessari. L'estudi també ha permès ampliar les àrees de distribució d'aquestes espècies. Les revisions faunístiques han donat lloc a les següents publicacions:

19. *Acanthaegilopsis malagasy* gen. n. and sp. n. of Anacharitinae from Madagascar and the Comoros. 2013. *African Entomology*, 21: 161-164.
20. Nuevas contribuciones al conocimiento de *Acanthaegilips* en Colombia (Hymenoptera: Figitidae: Anacharitinae). 2013. *Revista Colombiana de Entomologia*, 31: 71-75.
21. Revision of the American Species of Genus *Xyalaspis* (Hymenoptera: Figitidae: Anacharitinae). 2014. *Annals of the American Entomological Society*, 107: 557-566.
22. First host record for *Acanthaegilips* (Hymenoptera: Figitidae: Anacharitinae) and description of a new species from Venezuela. 2014. *Florida Entomologist*, 97: 461-464.
23. Revision of the Asian species of genus *Xyalaspis* Hartig, 1843 (Hymenoptera: Figitidae: Anacharitinae). 2014. *Journal of Asia-Pacific Entomology*, 17: 569-576.
24. Description of two new species of Anacharitinae (Hymenoptera: Figitidae) from the Afrotropical region. 2014. *African Entomology*, 22: 545-551.
25. Revision of the genus *Xyalaspis* Hartig, 1843 (Hymenoptera: Figitidae: Anacharitinae) in the Western Palearctic. 2015. *Zoosystema*, 37(1): 31-43.
26. Current knowledge of subfamily Anacharitinae (Hymenoptera: Figitidae) in the Australasian region. 2015. *Austral Entomology*, 54: 438-444.
27. Description of two new species of *Anacharis* Dalman, 1823 (Hymenoptera: Figitidae, Anacharitinae) from the Afrotropical region. 2015. *African Entomology*, 23(2): 314-320.
28. Description of two new species of genus *Xyalaspis* Hartig, 1843 (Hymenoptera: Figitidae: Anacharitinae) in the Neotropical region. 2015. *Dugesiana*, 22(2): 97-102.
29. Diversity of subfamily Anacharitinae (Hymenoptera: Cynipoidea: Figitidae) in China with description of a new species of *Xyalaspis* Hartig, 1843. 2015. *Journal of Asia-Pacific Entomology*, 19: 9-14.

30. Revision of the current knowledge of genus *Aegilips* Haliday, 1835 (Hymenoptera: Figitidae: Anacharitinae) in the Afrotropical region, with description of three new species. 2017. *African Entomology*, 25(1): 62-71.

31. Description of four new species of genus *Acanthaegilips* Ashmead, 1897 (Hymenoptera: Figitidae: Anacharitinae) from Colombia. 2017. *Neotropical Entomology*, 46(6): 649-657.

32. Three new species of *Anacharis* Dalman, 1823(Hymenoptera: Figitidae) with revised taxonomy and distribution records of Palaearctic and Indomalayan species. *European Journal of Taxonomy* (Acceptat).

33. Revision of the Eurasian species of genus *Aegilips* Haliday, 1835 (Hymenoptera: Figitidae, Anacharitinae). *European Journal of Entomology* (En revisió).

34. Revision of the current knowledge of genus *Aegilips* Haliday, 1835 (Hymenoptera: Figitidae: Anacharitinae) in North America. *Canadian Entomologist* (En revisió).

35. Current status of the knowledge of genus *Anacharis* (Dalman, 1818) (Hymenoptera: Figitidae, Anacharitinae) in America. *Journal of Insect Science* (En revisió).

36. *Cornaegilips* Mata-Casanova & Pujade-Villar gen. nov. (Hymenoptera: Cynipoidea: Figitidae: Anacharitinae) from Andean region, with an identification key to the genera of Anacharitinae worldwide. *Neotropical Entomology* (En revisió).

Catàleg actualitzat d'Anacharitinae

Un cop finalitzades les revisions, l'estatus taxonòmic de moltes espècies de la subfamília han patit canvis significatius. Respecte al material tipus no trobat s'han examinat les descripcions per a comprovar si aquestes eren prou per a identificar adequadament l'espècie o si, al ser aquestes insuficients, el seu estatus era impossible de determinar (*incertae sedis*). El material tipus que ha pogut ser examinat ha servit per a validar l'estat de les espècies o per a decidir que aquestes corresponien a sinonímies. Juntament amb aquests canvis, s'han descrit un gran nombre de noves espècies. Així doncs, la realització d'un catàleg amb l'estatus actualitzat per a les espècies d'Anacharitinae era necessària.

El catàleg s'estructura de forma següent per a cada espècie: (i) nom, autor, any i pàgina de publicació, juntament amb informació sobre la institució on es troba depositat el material tipus; (ii) sinonímies, amb la informació prèviament mencionada per a cada espècie sinonimitzada; (iii) distribució per a cada espècie, amb tots els països on l'espècie ha estat recol·lectada inclosos, amb les referències per a cada registre indicades; (iv) hostes coneguts, amb les referències per a cada registre indicades; (v) comentaris taxonòmics per a l'espècie, si s'escau.

Clau actualitzada per a la subfamília

Per a complementar la nova informació sobre les espècies d'Anacharitinae donada al catàleg, s'ha elaborat una clau actualitzada per de tota la subfamília. Des de

Restrepo-Ortiz & Pujade-Villar (2010) s'han descrit dos nou gèneres (*Acanthaegilopsis* i *Cornaegilips*) i diversos caràcters prèviament usats per a distingir gèneres ja no són vàlids o resulten confusos. Pel que fa a les claus d'espècies, l'adició de noves espècies d'*Acanthaegilips* ha fet necessària una actualització de la clau del gènere realitzada Ros-Farré *et al.* (2003. Respecte a *Aegilips, Anacharis* i *Xyalaspis*, la realització de claus complertes era una necessitat urgent donat que l'última clau mundial d'aquests era la publicada a Dalla-Torre & Kieffer (1910), avui en dia totalment desfasada i fortament basada en la coloració, un caràcter sense validesa per als Anacharitinae.

Aquesta clau representa el primer intent actualitzat de sintetitzar tota la informació taxonòmica relativa als Anacharitinae d'una forma fàcilment accessible per a entomòlegs i investigadors en el camp del control de plagues d'àfids.

7.5. Discussió

La subfamília Anacharitinae inclou actualment 10 gèneres. D'aquests, 4 són monoespecífic (*Cornaegilips, Hexacharis, Proanacharis* i *Solenofigites*) i dos d'ells només inclouen dues espècies (*Acanthaegilopsis* i *Calofigites*). El major esforç es va centrar en l'estudi dels gèneres més diversos i en especial en *Aegilips, Anacharis* i *Xyalaspis* doncs les dades respecte aquest tres gèneres es trobaven totalment desfasades.

Canvis en l'estatus taxònomic de les espècies d'Anacharitinae

El primer gènere revisat fou *Xyalaspis*, el menys divers dels tres. Després d'estudiar el material tipus, 8 espècies es consideren vàlides: *X. armata* (Giraud, 1860), *X. atemiensis* Ahsmead, 1904, *X. flavipes* Ashmead, 1896, *X. hyalina* Belizin, 1951, *X. laevigata* Hartig, 1843, *X. petiolata* Kieffer, 1901, *X. rugosa* Hartig, 1843 i *X. victoriensis* New, 1979. 5 espècies han quedat invalidades: 4 d'elles han estat sinonimitzades: *X. lituricis* Belizin, 1961 amb *X. hyalina*, *X. microstyla* Kieffer, 1907 amb *X. flavipes*, *X. spinigera* (Reinhard, 1860) amb *X. laevigata* i *X. subulifera* (Thomson, 1862) amb *X. rugosa*; *X. laevis* s'ha transferit a *Aegilips* i sinonimitzat amb *A. nitidulus* (Dalman, 1823). S'han descrit 14 noves espècies: *X. aberrans* Mata-Casanova & Pujade-Villar, 2014, *X. alveolata* Mata-Casanova & Pujade-Villar, 2014, *X. arapahoe* Mata-Casanova & Pujade-Villar, 2014, *X. dimorphica* Mata-Casanova & Pujade-Villar, 2014, *X. dominicana* Mata-Casanova & Pujade-Villar, 2015, *X. esbelta* Mata-Casanova & Pujade-Villar, 2014, *X. hirsuta* Mata-Casanova & Pujade-Villar, 2014, *X. muzencaba* Mata-Casanova & Pujade-Villar, 2015, *X. orientalis* Mata-Casanova & Pujade-Villar, 2014, *X. pilosa* Mata-Casanova & Pujade-Villar, 2014, *X. pseudolaevigata* Mata-Casanova & Pujade-Villar, 2015, *X. siamensis* Mata-Casanova & Pujade-Villar, 2014, *X. ribesi* Mata-Casanova & Pujade-Villar, 2015 i *X. subsaharica* Mata-Casanova & Pujade-Villar, 2014. L'estudi de material no identificat etiquetat com *Xyalaspis* ha donat lloc a la descripció d'un gènere proper a aquest: *Acanthaegilopsis* Pujade-Villar, 2013, que inclou dues espècies: *A. hemicoriaceus* Mata-Casanova & Pujade-Villar, 2014 i *A. malagasy* Mata-Casanova & Pujade-Villar, 2014.

Pel que fa a *Anacharis*, 12 espècies es consideren vàlides un cop revisat el material tipus: *A. antennata* Belizin, 1951, *A. eucharoides* (Dalman, 1818), *A. immunis* Walker, 1835, *A. madagascarensis* Pujade-Villar, 2012, *A. marginata* Provancher, 1887, *A. melanoneura* Ashmead, 1887, *A. mexicana* (Cameron, 1884), *A. parapsidalis* Belizin, 1951, *A. punctatifrons* Kieffer, 1907, *A. tripartita* Kieffer, 1907, *A. tucumana* Díaz, 1979 i A. *zealandica* Ashmead, 1901. 10 espècies han quedat invalidades: 5 d'elles han estat sinonimitzades: *A. flavicornis* Kieffer, 1909 amb *A. marginata*, *A. gracilipes* Ionescu, 1969 amb *A. eucharoides*, *A. lamyi* Cockerell, 1899 amb *A. mexicana*, *A. levifrons* Kieffer, 1907 amb *A. marginata* i *A. mellipes* Provancher, 1888 amb *A. marginata*. 2 han estat transferides a alters gèneres: *A. flavidicornis* Kieffer, 1911 a *Aegilips* i *A. subcompressa* Kieffer, 1881 a *Figites* Latrielle, 1802. 2 espècies es consideren *incertae sedis*: *A. osceolus* Ashmead, 1887 i *A. pediculata* Provancher, 1887 i 1 espècie es considera *nomen nudum*: *A. ashmeadi* Dalla-Torre & Kieffer, 1910. 8 noves espècies han estat descrites: *A. afrotropica* Mata-Casanova & Pujade-Villar, 2015, *A. belizini* Mata-Casanova & Pujade-Villar, in press, *A. fergussoni* Mata-

Casanova & Pujade-Villar, 2017, *A. luciae* Mata-Casanova & Pujade-Villar, in press, *A. mantocephala* Mata-Casanova & Pujade-Villar, in press, *A. norvegica* Mata-Casanova & Pujade-Villar, in press, *A. rwenzori* Mata-Casanova & Pujade-Villar, 2015 i *A. tasmaniae* Mata-Casanova & Pujade-Villar, 2015.

Aegilips ha estat l'últim gènere revisat. L'estudi del material tipus ha portat a mantenir 13 espècies vàlides de les 25 anteriorment descrites*: A. atricornis* Fergusson, 1985, *A. capensis* Kieffer, 1912, *A. clarimontis* Kieffer, 1907, *A. kozlovi* Kovalev, 1974, *A. longicellus* Belizin, 1951, *A. nitidulus* (Dalman. 1823), *A. paucus* Belizin, 1961, *A. romseyensis* Fergusson, 1985, *A. rugata* Kieffer, 1907, *A. trisecta* Kieffer, 1907, *A. ustulatus* Belizin, 1973, *A. victoriae* Ashmead, 1896 i *A. zaitzevi* Kovalev, 1974. *Anacharis flavidicornis* ha estat reanomenat *Aegilips flavidicornis* i es considera una espècie vàlida, mentre que *Xyalaspis laevis* s'ha sinonimitzat amb *A. nitidulus*. 12 espècies no es consideren vàlides actualment: 6 han estat sinonimitzades: *A. curvipes* Giraud, 1860, *A. gemellus* Belizin, 1961, *A. montanus* Belizin, 1961 i *A. punctatus* Belizin, 1961 amb *A. nitidulus*, *A. reticulata* Kieffer, 1908 amb *A. trisecta*, i *A. vena* Fergusson, 1985 amb *A. zaitzevi*. 4 espècies es consideren *incertae sedis*: *A. aciculata* Provancher, 1881, *A. notatus* Belizin, 1951, *A. obtusilobae* Osten-Sacken, 1863 i *A. punctulata* Hedicke, 1928. *A. nevadensis* Kieffer, 1908 ha estat trasnferit a *Anacharis* I sinonimitzat amb *A. marginata*. L'estudi del material tipus d'*A. chilensis* Bréthes, 1918 ha donat lloc a la descripció d'un nou gènere: *Cornaegilips* Mata-Casanova & Pujade-Villar, in press. 7 noves espècies han estat descrites: *A. aethiopicus* Mata-Casanova & Pujade-Villar, 2017, *A. cardinalae* Mata-Casanova & Pujade-Villar, in press, *A. foveata* Mata-Casanova & Pujade-Villar, 2017, *A. huberi* Mata-Casanova & Pujade-Villar, in press, *A. insularis* Mata-Casanova & Pujade-Villar, in press, *A. papuensis* Mata-Casanova & Pujade-Villar, 2015 i *A. virungae* Mata-Casanova & Pujade-Villar, 2017.

Tot i que l'estat del gènere *Acanthaegilips* va ser actualitzat als treballs de Ros-Farré *et al.* (2003) i Pujade-Villar *et al.* (2009), al llarg de l'estudi de llargues sèries d'Anacharitinae neotropicals s'han descrit 6 noves espècies pertanyents a aquest gènere: *A. boyacensis* Mata-Casanova & Pujade-Villar, 2017, *A. curvis* Mata-Casanova & Pujade-Villar, 2017, *A. notobiellus* Mata-Casanova & Pujade-Villar, 2014, *A. palmirae* Mata-Casanova & Pujade-Villar, 2013, *A. timidus* Mata-Casanova & Pujade-Villar, 2017 i *A. truncatus* Mata-Casanova & Pujade-Villar, 2017.

Canvis en les àrees de distribució de les espècies d'Anacharitinae

Un altre aspecte important de la tesi doctoral han estat les revisions faunístiques d'Anacharitinae. Els registres de la subfamília eren escassos i es trobaven concentrats principalment a la regió holàrtica; només dues espècies havien estat citades per a les regions afrotropical i australàsica, mentre que els Anacharitinae es trobaven absents dels registres faunístics indomalais. Els resultats obtinguts han permès augmentar les àrees de distribució conegudes per a les espècies de la subfamília.

Àfrica es troba dividida en dues bioregions: la costa mediterrània i la resta d'àrees al nord del desert del Sàhara (Marroc, Algèria, Tunísia, Líbia i Egipte)pertanyen a la regió paleàrtica, mentre que l'Àfrica subsahariana forma la regió afrotropical o etiòpica, que s'estén fins a l'extrem més meridional de la Península Aràbiga (Iemen). Al contrari que en d'altres subfamílies de Figitidae (van Noort *et al.*, 2015), el register

d'Anacharitinae Africans era pobre, amb només dues espècies: *Aegilips capensis* citat per a Sudàfrica i Zimbabwe, i *Anacharis madagascarensis* de Madagascar. Després del present estudi, 11 espècies es troben presents a Àfrica (entre ells dues pertanyents a un nou gènere endèmic per a la regió: *Acanthaegilopsis*), i els registres de la subfamília arriben fins a Àfrica Central.

Àsia es troba dividida en tres bioregions. La major part de la seva superfície correspon a la porció oriental de la regió paleàrtica, mentre que el subcontinent indi, el sud-est asiàtic i els arxipèlags més orientals (Indonèsia, Filipines i Taiwan) formen una bioregió pròpia, la indomalaia o oriental. Com s'ha mencionat a l'apartat anterior, la porció més meridional de la Península Aràbiga corresponen a la regió afrotropical. El coneixement dels Anacharitinae asiàtics es concentrava a la porció paleàrtica, la major part gràcies a la gran tasca duta a terme per entomòlegs soviètics (Belizin, 1951, 1961, 1973; Kovalev, 1974), centrada a l'Àsia central soviètica i Mongòlia. Després dels nostres estudis faunístics, el coneixement dels Anacharitinae asiàtics s'ha incrementat notablement: a les 13 espècies prèviament citades, se n'hi ha afegit 10 nous registres. Els resgistres d'Anacharitinae s'han estes a la regió indomalaia, amb 5 espècies citades allà. Finalment, diverses espècies prèviament només conegudes a Europa (Paleàrtic occidental) s'han trobat també a Àsia, suggerint unes àrees de distribució més amples del que es creia prèviament.

Austràlia, Nova Guinea, Nova Zelanda i les illes de la Melanèsia formen la bioregió australàsica. Tant Cynipoidea com Figitidae tenen un registre extens a la regió (Paretas-Martínez *et al.*, 2013);la diversitat d'Anacharitinae, però, es trobava reduïda a només dues espècies: *Anacharis zealandica* i *Xyalaspis victoriensis*. Dues noves espècies han estat descrites per a aquesta bioregió, una d'elles suposant el primer registre per a Nova Guinea.

Europa forma la porció occidental de la bioregió paleàrtica. Abans que es duguessin a terme els estudis faunístics, el registre dels Anacharitinae europeus era un dels més extensos I rics, amb 17 espècies conegudes per a la regió. Un cop finalitzats els estudis, la seva riquesa cau a 16 espècies, 3 d'elles noves.

Amèrica del Nord es troba dividida en dues bioregions: la major part del continent forma la regió neàrtica, mentre que les àrees més meridionals de Florida I Mèxic es troben dins la regió neotropical. El registre d'Anacharitinae a Amèrica del Nord incloïa 16 espècies i un gènere endèmic, Hexacharis. Un cop concloses les revisions de la fauna nord-americana, 17 espècies es troben presents al continent; no només això, sinó que les àrees de distribució de la majoria d'espècies s'han incrementat significativament I la fauna d'Anacharitinae per al continent es troba amplament documentada.

Amèrica Central i del Sud, juntament amb el Carib, s'inclouen dins la regió neotropical. Aquesta regió tenia la màxima diversitat coneguda per a la subfamílai: 5 gèneres hi eren present, 3 d'ells endèmics (*Acanthaegilips, Calofigites* i *Solenofigites*). La fauna d'Anacharitinae a la regió es trobava força ben documentada (Díaz, 1979, 1982; Ros-Farré *et al.*, 2003; Pujade-Villar *et al.*, 2009; Restrepo-Ortiz *et al.*, 2010c): 19 espècies hi havien estat citades. Els estudis a la regió neotropical han donat resultats interessants: un nou gènere hi ha estat escrit, *Cornaegilips*, endèmic de l'àrea sub-

antàrtica; *Xyalaspis*, absent de la regió neotropical, hi ha estat citat també amb 6 espècies presents. Així doncs, l'àrea neotropical conté el major registre conegut de gèneres d'Anacharitinae: 7 sobre 10. Aquesta marca també es manté quan parlem a nivell específic: un total de 39 espècies han estat citades a la regió.

7.6. Conclusions generals

Els resultats es presenten organitzats d'acord amb els objectius prèviament plantejats:

1. Estudi de la biodiversitat global d'Anacharitinae.

    a. El material tipus de les espècies d'Anacharitinae ha estat examinat, llevat d'aquells casos en que aquest s'havia perdut.

    b. De les espècies prèviament descrites es consideren vàlides: 14 per a *Acanthaegilips*, 13 per a *Aegilips*¸ 12 per a *Anacharis*, 2 per a *Calofigites* i 7 per a *Xyalaspis*. Els tàxons monotípics Monotypic taxa *Hexacharis flavipes, Proanacharis mirabilis* i *Solenofigites lautus* també es consideren vàlids.

    c. S'han dut a terme les següents sinonímies: 8 per a *Aegilips,* 6 per a *Anacharis* i 4 a per *Xyalaspis*. Han estat transferides a altres gèneres: 1 espècie d'*Aegilips,* 2 d'*Anacharis* i 1 de *Xyalaspis* (d' *Aegilips* a *Cornaegilips*; d'*Anacharis* a *Aegilips* i *Figites*; de *Xyalaspis* a *Aegilips*, respectivament). S'han considerat *incertae* sedis les següents espècies: 3 per a *Aegilips* i 2 per a *Anacharis*.

    d. Un total de 5861 han estat identificats: 2722 femelles i 3089 mascles.

    e. 2 nous gèneres han estat descrits: *Acanthaegilopsis* i *Cornaegilips.* 37 noves espècies han estat descrites: 6 per a *Acanthaegilips*, 7 per a *Aegilips*, 8 per a *Anacharis*, i 14 per a *Xyalaspis*.

    f. S'han realitzat claus actualitzades per a gèneres i espècies d'Anacharitinae.

    g. S'han establert nous registres. *Aegilips* ha estat citat per primer cop a les regions australàsica i indomalaia; *Anacharis*, a les regions afrotropical i indomalaia; *Xyalaspis* a les regions afrotropical, indomalaia i neotropical.

2. Estudiar la biologia I filogènia interna.

    a. S'ha descrit per primer cop l'hoste d'*Acanthaegilips*. S'han descrit nous hostes per a *Aegilips* i *Anacharis*.

    b. S'han iniciat estudis per aclarir la filogènia del complex *Acanthaegilopsis – Aegilips – Xyalaspis*.

3. Donar a conèixer els resultats a la comunitat científica.

    a. Els resultats han donat lloc a 18 publicacions.

b. Els resultats s'han presentat a diversos congressos: 4 presentacions (VIII Congreso Latinoamericano de Entomología, Xth European Congress of Entomology, XVI Congreso Ibérico de Entomología, XVII Congreso Ibérico de Entomología) i un pòster (LI Congreso Nacional de la Sociedad Mexicana de Entomología).

8. SUPERVISOR'S REPORT

8.1. Supervisor's report about the impact factor of the published and submitted papers

Juli Pujade Villar and Jesús Selfa, supervisors of the Noel Mata Casanova's Doctoral Thesis, give the following inform about the impact factor of the papers which form this Doctoral Thesis.

The memory of this Doctoral Thesis is composed by 18 papers. All of these papers have been already published. For each chapter below is detailed the impact factor of the journal where the paper has been published.

Chapter 4.2.1. Mata-Casanova, N. & Pujade-Villar, J. *Acanthaegilopsis malagasy* gen. n. and sp. n. of Anacharitinae from Madagascar and the Comoros. *African Entomology*, 21: 161-164.

IF: 0.690; **Quartile Rank:** 3; **Area:** Insect Science.

Chapter 4.2.2. Mata-Casanova, N. & Pujade-Villar, J. Nuevos aportes al conocimiento de *Acanthaegilips* en Colombia (Hymenoptera: Figitidae: Anacharitinae). *Revista Colombiana de Entomologia*, 31: 71-75.

IF: 0.253; **Quartile Rank:** 4; **Area:** Insect Science.

Chapter 4.2.3. Mata-Casanova, N., Selfa, J. & Pujade-Villar, J. Revision of the American Species of Genus *Xyalaspis* (Hymenoptera: Figitidae: Anacharitinae). *Annals of the American Entomological Society*, 107: 557-566.

IF: 1.222; **Quartile Rank:** 2; **Area:** Insect Science.

Chapter 4.2.4. Mata-Casanova, N., Selfa, J., Arcaya, E., Sosa, F., Tormos, J. & Pujade-Villar, J. First host record for *Acanthaegilips* (Hymenoptera: Figitidae: Anacharitinae) and description of a new species from Venezuela. *Florida Entomologist*, 97: 461-464.

IF: 0.975; **Quartile Rank:** 2; **Area:** Insect Science.

Chapter 4.2.5. Mata-Casanova, N., Selfa, J. & Pujade-Villar, J. Revision of the Asian species of genus *Xyalaspis* Hartig, 1843 (Hymenoptera: Figitidae: Anacharitinae). *Journal of Asia-Pacific Entomology*, 17: 569-576.

IF: 1.080; **Quartile Rank:** 2; **Area:** Insect Science.

Chapter 4.2.6. Mata-Casanova, N., Selfa, J. & Pujade-Villar, J. Description of two new species of Anacharitinae (Hymenoptera: Figitidae) from the Afrotropical region. *African Entomology*, 22: 545-551.

IF: 0.690; **Quartile Rank:** 3; **Area:** Insect Science.

Chapter 4.2.7. Mata-Casanova, N., Selfa, J. & Pujade-Villar, J. Revision of the genus *Xyalaspis* Hartig, 1843 (Hymenoptera: Figitidae: Anacharitinae) in the Western Palearctic. *Zoosystema*, 37(1): 31-43.

IF: 0.632; **Quartile Rank:** 2; **Area:** Insect Science.

Chapter 4.2.8. Mata-Casanova, N., Selfa, J. & Pujade-Villar, J. Current knowledge of subfamily Anacharitinae (Hymenoptera: Figitidae) in the Australasian region. *Austral Entomology*, 54: 438-444.

IF: 1.341; **Quartile Rank:** 2; **Area:** Insect Science.

Chapter 4.2.9. Mata-Casanova, N., Selfa, J. & Pujade-Villar, J. Description of two new species of *Anacharis* Dalman, 1823 (Hymenoptera: Figitidae, Anacharitinae) from the Afrotropical region. *African Entomology*, 23(2): 314-320.

IF: 0.690; **Quartile Rank:** 3; **Area:** Insect Science.

Chapter 4.2.10. Mata-Casanova, N., Selfa, J. & Pujade-Villar, J. Description of two new species of genus *Xyalaspis* Hartig, 1843 (Hymenoptera: Figitidae: Anacharitinae) in the Neotropical region. *Dugesiana*, 22(2): 97-102.

IF: This journal has no IF.

Chapter 4.2.11. Mata-Casanova, N., Selfa, J., Wang, Y., Chen, X. & Pujade-Villar, J. Diversity of subfamily Anacharitinae (Hymenoptera: Cynipoidea: Figitidae) in China with description of a new species of *Xyalaspis* Hartig, 1843. *Journal of Asia-Pacific Entomology*, 19: 9-14.

IF: 1.080; **Quartile Rank:** 2; **Area:** Insect Science.

Chapter 4.2.12. Mata-Casanova, N., Selfa, J. & Pujade-Villar, J. Revision of the current knowledge of genus *Aegilips* Haliday, 1835 (Hymenoptera: Figitidae: Anacharitinae) in the Afrotropical region, with description of three new species. *African Entomology*, 25(1): 62-71.

IF: 0.690; **Quartile Rank:** 3; **Area:** Insect Science.

Chapter 4.2.13. Mata-Casanova, N., Selfa, J. & Pujade-Villar, J. Description of four new species of genus *Acanthaegilips* Ashmead, 1897 (Hymenoptera: Figitidae: Anacharitinae) from Colombia. *Neotropical Entomology*, 46(6): 649-657.

IF: 1.200; **Quartile Rank:** 2; **Area:** Insect Science.

Chapter 4.2.14. Mata-Casanova, N., Selfa, J. & Pujade-Villar, J. Three new species of *Anacharis* Dalman, 1823(Hymenoptera: Figitidae) with revised taxonomy and distribution records of Palaearctic and Indomalayan species. *European Journal of Taxonomy.*

IF: 0.320; **Quartile Rank:** 3; **Area:** Insect Science.

Chapter 4.2.15. Mata-Casanova, N., Selfa, J. & Pujade-Villar, J. Revision of the Eurasian species of genus *Aegilips* Haliday, 1835 (Hymenoptera: Figitidae, Anacharitinae). *European Journal of Entomology.*

IF: 1.061; **Quartile Rank:** 2; **Area:** Insect Science.

Chapter 4.2.16. Mata-Casanova, N., Selfa, J. & Pujade-Villar, J. Revision of the current knowledge of genus *Aegilips* Haliday, 1835 (Hymenoptera: Figitidae: Anacharitinae) in North America. *Canadian Entomologist.*

IF: 0.837; **Quartile Rank:** 2; **Area:** Insect Science.

Chapter 4.2.17. Mata-Casanova, N., Selfa, J. & Pujade-Villar, J. Current status of the knowledge of genus *Anacharis* (Dalman, 1818) (Hymenoptera: Figitidae, Anacharitinae) in America. *Journal of Insect Science.*

IF: 0.921; **Quartile Rank:** 3; **Area:** Insect Science.

Chapter 4.2.18. Mata-Casanova, N., Selfa, J. & Pujade-Villar, J. *Cornaegilips* Mata-Casanova & Pujade-Villar gen. nov. (Hymenoptera: Cynipoidea: Figitidae: Anacharitinae) from Andean region, with an identification key to the genera of Anacharitinae worldwide. *Neotropical Entomology.*

IF: 0.756; **Quartile Rank:** 2; **Area:** Insect Science.

8.2. Supervisor's report about the participation of the PhD student in each paper

Juli Pujade Villar and Jesús Selfa, supervisors of the Noel Mata Casanova's Doctoral Thesis, give the following inform about the contribution of the PhD student in the papers which take part of her Doctoral Thesis.

Chapter 4.2.1. Mata-Casanova, N. & Pujade-Villar, J. *Acanthaegilopsis malagasy* gen. n. and sp. n. of Anacharitinae from Madagascar and the Comoros. *African Entomology*, 21: 161-164.

PhD student contribution: study of the specimens, description of the new genus and species and pictures of their diagnostic features. Writing and discussion of the manuscript.

Other author's contribution: JPV: loan of the material to be studied in the University of Barcelona, study of the type material, supervision of the necessary taxonomic changes. Participation in the writing and discussion of the manuscript.

Chapter 4.2.2. Mata-Casanova, N. & Pujade-Villar, J. Nuevos aportes al conocimiento de *Acanthaegilips* en Colombia (Hymenoptera: Figitidae: Anacharitinae). *Revista Colombiana de Entomologia*, 31: 71-75.

PhD student contribution: study of the specimens, description of the new species and pictures of their diagnostic features. Writing and discussion of the manuscript.

Other author's contribution: JPV: loan of the material to be studied in the University of Barcelona, supervision of the necessary taxonomic changes. Participation in the writing and discussion of the manuscript.

Chapter 4.2.3. Mata-Casanova, N., Selfa, J. & Pujade-Villar, J. Revision of the American Species of Genus *Xyalaspis* (Hymenoptera: Figitidae: Anacharitinae). *Annals of the American Entomological Society*, 107: 557-566.

PhD student contribution: study and identification of the types and undetermined Anacharitinae material, revision of the bibliography, elaboration of the photographs and plates, description of the new species. Writing and discussion of the manuscript.

Other author's contribution: JS: participation in the writing and discussion of the manuscript. JPV: loan of the type material to be studied in the University of Barcelona, supervision of the necessary taxonomic changes. Participation in the writing and discussion of the manuscript.

Chapter 4.2.4. Mata-Casanova, N., Selfa, J., Arcaya, E., Sosa, F., Tormos, J. & Pujade-Villar, J. First host record for *Acanthaegilips* (Hymenoptera: Figitidae: Anacharitinae) and description of a new species from Venezuela. *Florida Entomologist*, 97: 461-464.

PhD student contribution: study of the specimens, description of the new species and pictures of their diagnostic features. Writing and discussion of the manuscript.

Other author's contribution: JS, EA and JT: participation in the writing and discussion of the manuscript. FS: Identification of Hemerobiidae species, participation in the writing and discussion of the manuscript. JPV: loan of the material to be studied in the University of Barcelona, supervision of the necessary taxonomic changes. Participation in the writing and discussion of the manuscript.

Chapter 4.2.5. Mata-Casanova, N., Selfa, J. & Pujade-Villar, J. Revision of the Asian species of genus *Xyalaspis* Hartig, 1843 (Hymenoptera: Figitidae: Anacharitinae). *Journal of Asia-Pacific Entomology*, 17: 569-576.

PhD student contribution: study and identification of the types and undetermined Anacharitinae material, revision of the bibliography, elaboration of the photographs and plates, description of the new species. Writing and discussion of the manuscript.

Other author's contribution: JS: participation in the writing and discussion of the manuscript. JPV: loan of the type material to be studied in the University of Barcelona, supervision of the necessary taxonomic changes. Participation in the writing and discussion of the manuscript.

Chapter 4.2.6. Mata-Casanova, N., Selfa, J. & Pujade-Villar, J. Description of two new species of Anacharitinae (Hymenoptera: Figitidae) from the Afrotropical region. *African Entomology*, 22: 545-551.

PhD student contribution: study of the specimens, description of the new species and pictures of their diagnostic features. Writing and discussion of the manuscript.

Other author's contribution: JS: participation in the writing and discussion of the manuscript. JPV: loan of the material to be studied in the University of Barcelona, supervision of the necessary taxonomic changes. Participation in the writing and discussion of the manuscript.

Chapter 4.2.7. Mata-Casanova, N., Selfa, J. & Pujade-Villar, J. Revision of the genus *Xyalaspis* Hartig, 1843 (Hymenoptera: Figitidae: Anacharitinae) in the Western Palearctic. *Zoosystema*, 37(1): 31-43.

PhD student contribution: study and identification of the types and undetermined Anacharitinae material, revision of the bibliography, elaboration of the photographs and plates, description of the new species.Writing and discussion of the manuscript.

Other author's contribution: JS: participation in the writing and discussion of the manuscript. JPV: loan of the type material to be studied in the University of Barcelona, supervision of the necessary taxonomic changes. Participation in the writing and discussion of the manuscript.

Chapter 4.2.8. Mata-Casanova, N., Selfa, J. & Pujade-Villar, J. Current knowledge of subfamily Anacharitinae (Hymenoptera: Figitidae) in the Australasian region. *Austral Entomology*, 54: 438-444.

PhD student contribution: study and identification of the types and undetermined Anacharitinae material, revision of the bibliography, elaboration of the photographs and plates, description of the new species. Writing and discussion of the manuscript.

Other author's contribution: JS: participation in the writing and discussion of the manuscript. JPV: loan of the material to be studied in the University of Barcelona, supervision of the necessary taxonomic changes. Participation in the writing and discussion of the manuscript.

Chapter 4.2.9. Mata-Casanova, N., Selfa, J. & Pujade-Villar, J. Description of two new species of *Anacharis* Dalman, 1823 (Hymenoptera: Figitidae, Anacharitinae) from the Afrotropical region. *African Entomology*, 23(2): 314-320.

PhD student contribution: study of the specimens, description of the new species and pictures of their diagnostic features. Writing and discussion of the manuscript.

Other author's contribution: JS: participation in the writing and discussion of the manuscript. JPV: loan of the material to be studied in the University of Barcelona, supervision of the necessary taxonomic changes. Participation in the writing and discussion of the manuscript.

Chapter 4.2.10. Mata-Casanova, N., Selfa, J. & Pujade-Villar, J. Description of two new species of genus *Xyalaspis* Hartig, 1843 (Hymenoptera: Figitidae: Anacharitinae) in the Neotropical region. *Dugesiana*, 22(2): 97-102.

PhD student contribution: study of the specimens, description of the new species and pictures of their diagnostic features. Writing and discussion of the manuscript.

Other author's contribution: JS: participation in the writing and discussion of the manuscript. JPV: loan of the material to be studied in the University of Barcelona, supervision of the necessary taxonomic changes. Participation in the writing and discussion of the manuscript.

Chapter 4.2.11. Mata-Casanova, N., Selfa, J., Wang, Y., Chen, X. & Pujade-Villar, J. Diversity of subfamily Anacharitinae (Hymenoptera: Cynipoidea: Figitidae) in China with description of a new species of *Xyalaspis* Hartig, 1843. *Journal of Asia-Pacific Entomology*, 19: 9-14.

PhD student contribution: study of the specimens, description of the new species and pictures of their diagnostic features. Writing and discussion of the manuscript.

Other author's contribution: JS: participation in the writing and discussion of the manuscript. YW and XC: collection of the studied material, participation in the writing and discussion of the manuscript. JPV: loan of the material to be studied in the University of Barcelona, supervision of the necessary taxonomic changes. Participation in the writing and discussion of the manuscript.

Chapter 4.2.12. Mata-Casanova, N., Selfa, J. & Pujade-Villar, J. Revision of the current knowledge of genus *Aegilips* Haliday, 1835 (Hymenoptera: Figitidae: Anacharitinae) in the Afrotropical region, with description of three new species. *African Entomology*, 25(1): 62-71.

PhD student contribution: study of the specimens, description of the new species and pictures of their diagnostic features. Writing and discussion of the manuscript.

Other author's contribution: JS: Participation in the writing and discussion of the manuscript. JPV: loan of the type material to be studied in the University of Barcelona, participation in the writing and discussion of the manuscript.

Chapter 4.2.13. Mata-Casanova, N., Selfa, J. & Pujade-Villar, J. Description of four new species of genus *Acanthaegilips* Ashmead, 1897 (Hymenoptera: Figitidae: Anacharitinae) from Colombia. *Neotropical Entomology*, 46(6): 649-657.

PhD student contribution: study of the specimens, description of the new species and pictures of their diagnostic features. Writing and discussion of the manuscript.

Other author's contribution: JS: Participation in the writing and discussion of the manuscript. JPV: loan of the type material to be studied in the University of Barcelona, participation in the writing and discussion of the manuscript.

Chapter 4.2.14. Mata-Casanova, N., Selfa, J. & Pujade-Villar, J. Three new species of *Anacharis* Dalman, 1823(Hymenoptera: Figitidae) with revised taxonomy and distribution records of Palaearctic and Indomalayan species. *European Journal of Taxonomy.*

PhD student contribution: study of the specimens, description of the new species and pictures of their diagnostic features. Writing and discussion of the manuscript.

Other author's contribution: JS: Participation in the writing and discussion of the manuscript. JPV: loan of the type material to be studied in the University of Barcelona, participation in the writing and discussion of the manuscript.

Chapter 4.2.15. Mata-Casanova, N., Selfa, J. & Pujade-Villar, J. Revision of the Eurasian species of genus *Aegilips* Haliday, 1835 (Hymenoptera: Figitidae, Anacharitinae). *European Journal of Entomology.*

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Other author's contribution: JS: Participation in the writing and discussion of the manuscript. JPV: loan of the type material to be studied in the University of Barcelona, participation in the writing and discussion of the manuscript.

Chapter 4.2.16. Mata-Casanova, N., Selfa, J. & Pujade-Villar, J. Revision of the current knowledge of genus *Aegilips* Haliday, 1835 (Hymenoptera: Figitidae: Anacharitinae) in North America. *Canadian Entomologist.*

PhD student contribution: study of the specimens, description of the new species and pictures of their diagnostic features. Writing and discussion of the manuscript.

Other author's contribution: JS: Participation in the writing and discussion of the manuscript. JPV: loan of the type material to be studied in the University of Barcelona, participation in the writing and discussion of the manuscript.

Chapter 4.2.17. Mata-Casanova, N., Selfa, J. & Pujade-Villar, J. Current status of the knowledge of genus *Anacharis* (Dalman, 1818) (Hymenoptera: Figitidae, Anacharitinae) in America. *Journal of Insect Science.*

PhD student contribution: study of the specimens, description of the new species and pictures of their diagnostic features. Writing and discussion of the manuscript.

Other author's contribution: JS: Participation in the writing and discussion of the manuscript. JPV: loan of the type material to be studied in the University of Barcelona, participation in the writing and discussion of the manuscript.

Chapter 4.2.18. Mata-Casanova, N., Selfa, Gallardo, F. J. & Pujade-Villar, J. *Cornaegilips* Mata-Casanova & Pujade-Villar gen. nov. (Hymenoptera: Cynipoidea: Figitidae: Anacharitinae) from Andean region, with an identification key to the genera of Anacharitinae worldwide. *Neotropical Entomology.*

PhD student contribution: stay at the MLPA (La Plata, Argentina), study of the type material, description of the new species and pictures of their diagnostic features. Writing and discussion of the manuscript.

Other author's contribution: JS and JPV: Participation in the writing and discussion of the manuscript. FG: designation of lectotype, supervision of the necessary taxonomic changes, comments on biogeographical features. Participation in the writing and discussion of the manuscript.

Finally, we certify that any of the co-authors of these papers which are part of the Noel Mata Casanova's Doctoral Thesis, have not been used and nor they will be used either implicitly or explicitly for the preparation of another Doctoral Thesis.

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