

# Leishmania tropica in Morocco: infection in dogs

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In Morocco, human cutaneous leishmaniasis caused by *Leishmania tropica* covers a wide geographical area including the High Atlas (MARTY *et al.*, 1989) and the western part of the Anti-Atlas mountain ranges. It is hypoendemic and found in rural locations, either in isolated homesteads or in small villages. Several zymodemes from 3 separate groups of the *L. tropica* complex have been implicated: (i) MON-113; (ii) MON-102, MON-112, MON-109; and (iii) MON-122, MON-107, MON-123. Within this focus, dogs too have cutaneous lesions caused by *L. tropica*. We report here on this finding.

Canine cutaneous leishmaniasis was surveyed on the northern slope of the High Atlas in the regions of Azilal and Essaouira, located 300 km apart. Among the 313 dogs examined, 8 had cutaneous lesions: 4 in Essaouira and 4 in Azilal. Small ulcers around the muzzle were either solitary or in clusters (Figure). Samples for direct examination and culturing were collected with an Arouette scalpel under general anaesthesia. Lymph node aspirates were examined if lymphadenopathy was present. Isoenzyme electrophoresis identified 3 strains from Azilal as *L. tropica* MON-102 and 4 from Essaouira as *L. tropica* MON-113 (Table). No lymphadenopathy was observed in these 7 dogs. Anti-*Leishmania* antibodies were detected with difficulty (by latex agglutination, immunofluorescence, or counterimmunoelectrophoresis) or were absent. In one dog from Azilal (C906) an ulcer on the muzzle was caused by *L. infantum* MON-1. The animal also had lymphadenopathy, from which the same parasite (*L. infantum*) was isolated.

Canine cutaneous leishmaniasis in Morocco is thus shown to be caused by both *L. infantum* (MON-1) and

Table. Identity of *Leishmania* strains isolated from cutaneous lesions in Moroccan dogs

No.	Dog	Sex*	Locality	Code	Species	Zymodeme <sup>b</sup>
C906	F	Azilal	MCAN/MA/89/LEM1645	<i>L. infantum</i>	MON-1	
C908	M	Azilal	MCAN/MA/88/LEM1472	<i>L. tropica</i>	MON-102	
C1012	M	Essaouira	MCAN/MA/89/LEM1589	<i>L. tropica</i>	MON-102	
			MCAN/MA/89/LEM1590	<i>L. tropica</i>	MON-102	
			MCAN/MA/89/LEM1599	<i>L. tropica</i>	MON-102	
C1216	M	Azilal	MCAN/MA/90/LEM2007	<i>L. tropica</i>	MON-102	
C1224	M	Essaouira	MCAN/MA/90/LEM2008	<i>L. tropica</i>	MON-113	
C1236	M	Essaouira	MCAN/MA/90/LEM2009	<i>L. tropica</i>	MON-113	
C1246	F	Essaouira	MCAN/MA/90/LEM2147	<i>L. tropica</i>	MON-113	
C1299	M	Essaouira	MCAN/MA/90/LEM2148	<i>L. tropica</i>	MON-113	

\*F=female, M=male.

<sup>b</sup>The following enzymes were used: malate dehydrogenase, malate dehydrogenase (oxalacetate-decarboxylating (NADP)<sup>+</sup> [malic enzyme]), isocitrate dehydrogenase, phosphogluconate dehydrogenase (decarboxylating), glucose-6-phosphate dehydrogenase, glutamate dehydrogenase, NADH diaphorase, purine nucleoside phosphorylase 1 and 2, aspartate aminotransferase ( $\alpha$ -glutamate oxalacetate transaminase) 1 and 2, phosphoglucomutase, fumarate hydratase, mannose-6-phosphate isomerase, glucose-6-phosphate isomerase.



Figure. Canine cutaneous leishmaniasis in Morocco caused by *L. tropica*. Five papules are seen on the snout of dog C1012, three of which gave rise to positive cultures in NNN medium (isolates MCAN/MA/89/LEM1589, MCAN/MA/89/LEM1590, and MCAN/MA/89/LEM1599).

*L. tropica* (MON-102 and MON-113). The occurrence of *L. tropica* in rural areas in Morocco contrasts with the pattern seen in many Asian foci of this parasite and raises the possibility of the dog being a zoonotic source of human infection. It should be noted that in Azilal the prevalence of human cutaneous leishmaniasis is approximately 5/1000, while that of the canine form is 12/1000. Nevertheless, due to the small number of canine cutaneous leishmaniasis cases and the apparent short duration of the lesions, it is difficult at present to define the precise role of the dog in the epidemiological cycle. The question could be answered if the widely diffused and longer lasting cutaneous forms found in humans were also found in dogs.

The present study confirms the existence of canine cutaneous leishmaniasis caused by *L. tropica*, previously reported from western India (PETERS *et al.*, 1981). The dog is also a host for several other species of *Leishmania*: *L. arabica*, *L. braziliensis*, *L. infantum* and *L. major*. While the role of the dog as a reservoir host of *L. infantum* is well established in many countries, its role in the maintenance of other *Leishmania* species is not confirmed.

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## References

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