Genetic structure of the *Sphagnum magellanicum* (Sphagnaceae) complex in Europe

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ABSTRACT. *Sphagnum magellanicum* has historically been interpreted as a widespread species across both the Northern and Southern Hemispheres. Recent research, however, indicates that it comprises at least seven phylogenetic species, and that *S. magellanicum* s.str. is restricted to southern Argentina and Chile. Four species are recorded from North America and two of them, *S. divinum* and *S. medium*, are known to occur in Europe (and are typified by European collections). Here we assess European plants of this complex to test if two apparent North American endemics, *S. diabolicum* and *S. magniae*, occur in Europe, and document the genetic structure of European species of the complex, including gametophyte sex ratios and patterns of genetic diversity. We further assess evidence for gene flow between the species in Europe, and between North American and European plants of species that occur on both continents. Molecular data, especially RADseq, were used to assess genetic and phylogenetic patterns, and additional plants were identified with barcode markers to document European geographic distributions. The results indicate that *S. diabolicum* and *S. magniae* are endemic to North America. In Europe, *S. divinum* is more genetically diverse than *S. medium*. Sex ratios in both species did not depart from 50:50. Low levels of interspecific gene flow between the two species occur in Europe, as well as higher levels of gene flow between North American and European plants within *S. divinum* and *S. medium*. Overall, our results corroborate evidence that *S. divinum* and *S. medium* are phylogenetically distinct species and represent separate gene pools despite low levels of introgression.

KEYWORDS. Introgression, peatlands, peat mosses, *Sphagnum divinum*, *Sphagnum medium*

In a worldwide context the European bryophyte flora is relatively well known as it has been studied for more than 200 years. Nevertheless, taxonomic and floristic research is still finding previously unknown biodiversity. Insights come from new field discoveries, increasingly accurate resolution of relationships between plants in Europe versus other regions, and clarification of species status within complexes of closely related taxa (Hodgetts et al. 2020).

Sphagnum magellanicum was described by Bridel (1798) based on a collection made in Tierra del Fuego. *Sphagnum medium* was described from Austria by Limpricht in 1881. Gametophytes of the two species share a tendency to develop red pigmentation, a relatively uncommon trait in *Sphagnum* subg. *Sphagnum*, and they also share lenticular, completely included branch leaf chlorophyllose cells. C. Warnstorf considered *S. magellanicum* as a synonym of *S. medium* in his 1911 monograph (Warnstorf 1911, p. 487), but listed only *S. medium* from central Europe in 1914 (Warnstorf 1914). A. L. Andrews (1912) used the name *S. magellanicum* and this taxonomy has prevailed in American literature. But Warnstorf's work was very influential in Europe and it took longer for the name *S. magellanicum* to be widely used there. The general switch from *S. medium* to *S. magellanicum* took place toward the middle of the 20^{th} century; for example, in the list of British mosses (Richard & Wallace 1950). However, the Norwegian botanist Johannes Lid (Lid 1925) used *S. magellanicum* in his account of Norwegian species in the Cymbifolia group, citing Andrews (1912). Oswald (1923) also used the name *S. magellanicum* in his dissertation on the peatland vegetation of southern Sweden.

In recent decades *S. magellanicum* has been interpretated as a nearly cosmopolitan species and a major component of Northern Hemisphere peatlands. In fact, *S. magellanicum* has generally been considered one of the easiest *Sphagnum* species to identify, as the only northern member of subgenus *Sphagnum* with red pigmentation. However, the genetic structure and taxonomy of this widespread taxon is now known to be complex.

Kyrkjeeide et al. (2016b) showed using microsatellite markers that on a global scale *S. magellanicum* comprises at least five partially allopatric genetic groups. Two groups were present in both Europe and North America and another group was identified among North American plants but appeared to be absent from Europe. Additional genetic groups were found among South American plants. Yousefi et al. (2017) detected two groups of "*S. magellanicum*-like" plants at a site in Norway using RADseq markers. One group was primarily out in the open sunny parts of peatlands whereas the other was more common along the more or less shaded peatland margins. Two studies (Schwarzer & Joshi 2017, Yousefi et al. 2017) found no evidence of genetic admixture at sites where *S. divinum* and *S. medium* occur sympatrically, but a broad geographic sampling did reveal admixture in some plants. Based on the molecular work of Yousefi, Hassel et al. (2018) used the existing name, *S. medium* Limpr. for the open-peatland form and described a new species, *S. divinum* Hassel & Flatberg, for the genetic type more common along the peatland margins. Also based on the genetic results of Kyrkjeeide et al. (2016b) and Yousefi et al. (2017), Hassel et al. (2018) interpreted *S. magellanicum* Brid. as restricted to southern South America. Using morphological characters that differ between *S. medium* and *S. divinum*, European bryologists have begun to sort out herbarium specimens previously named *S. magellanicum* but the ranges of these two species in Europe is still poorly known.

Phylogenetic analyses based on RADseq have now resolved seven clades in the group, including two in South America and one in warm temperate-subtropical eastern Asia (Shaw et al. 2022). RADseq data confirm that *S. medium* and *S. divinum* occur in Europe and eastern North America. In addition, two other species *S. diabolicum* A.J. Shaw, Aguero, & Nieto-Lugilde and *S. magniae* A.J. Shaw, Aguero, & Nieto-Lugilde were resolved among eastern North American plants (Shaw et al. 2023a). Three of the species, S. *diabolicum*, *S. divinum*, and *S. medium* occupy north-temperate to boreal peatlands whereas *S. magniae* occurs throughout the southeastern coastal plain at warm temperate to subtropical sites. Of the four eastern species, only *S. divinum* has so far been recorded from western North America.

Our goal here is to clarify regional and continental genetic/phylogenetic structure in the *S. magellanicum* complex in Europe. We address the following questions/issues. (1) Do *S. diabolicum* and *S. magniae* occur in Europe? (2) Are conspecific plants from North America versus Europe genetically divergent? Are they reciprocally monophyletic? (3) Do the species differ in genetic diversity and/or structure within Europe? (4) Do species differ in gametophyte sex ratios? (5) Is there evidence of introgression between species of this complex in Europe?

MATERIALS AND METHODS

Plant Sampling. 527 *S. magellanicum* complex gametophytes from 121 European peatland sites were included in this study. Plants were considered to be at the same “site” if their collection location coordinates appeared to be within continuous habitat based on satellite imagery and less than 3 km apart, or if the collection sites were in non-continuous habitat but within approximately 1 km. In addition, we included RADseq data from 48 North American gametophytes known from previous analyses to be *S. divinum*, *S. medium*, *S. diabolicum*, or *S. magniae* (20, 8, 11, and 9 samples, respectively). Inclusion of these samples allowed us to assess the phylogenetic/biogeographic relationships between European and North American plants and determine whether any European samples group phylogenetically with *S. diabolicum* or *S. magniae.* North American samples were selected to include the geographic and phylogenetic diversity of North American plants based on previous (Shaw et al. 2022, 2023b) and unpublished work. We also included two samples of *S. affine* and *S. perichaetiale* as outgroups to root the *S. magellanicum* complex phylogenetic reconstruction.

344 of the European samples, the 48 North American samples, and the outgroup samples were subjected to RADSeq, which provided information about genetic and phylogenetic relationships (including clonality), gametophyte sex, and genetic diversity. We had rich sampling from selected sites in Estonia, southern France, and northern Spain, and although it was impractical to include all in the RADseq analyses, we obtained species identifications using barcodes for 183 gametophytes so we could assess species occurrences more thoroughly.

DNA extraction and RADseq. Genomic DNA was extracted using a modified CTAB procedure (Nieto-Lugilde et al. 2022), or a DNeasv® Plant Mini Kit (Quigen) followed by the Genomic DNA Clean & Concentrator (Zymo research). Genomic libraries were made following the double digestion restriction site-associated DNA sequencing (using EcoRI and MseI enzymes) protocol of Parchman et al. (2012), with modifications described by Duffy et al. (2020). DNA from 24 samples was processed twice and included as duplicates in the RADseq library to provide a baseline for recognizing samples with identical genotypes (clones). Samples were initially processed as diploids and heterozygous genotypes were then converted to missing data. Homozygous genotypes were treated as haplotypes as described in Shaw et al. (2023b). RADseq data are available on Dryad [submission information to be added if/when paper is accepted for publication].

Phylogenetic analyses based on RADseq data. Phylogenetic relationships among samples were inferred from the best of 10 independent runs of IQ-TREE2 v2.0.3 (Minh et al. 2020) using concatenated SNPs. The Maximum Likelihood tree was estimated using random starting trees and the ultrafast bootstrap approximation (UFBoot: Hoang et al. 2018). The best nucleotide substitution model (GTR+F+ASC+R6) was estimated using the ModelFinder algorithm with corrections for ascertainment bias (Kalyaanamoorthy et al. 2017, Lewis 2001) as implemented in IQ-TREE, and chosen according to the Bayesian Information Criterion (BIC). The rapid hill-climbing search algorithm was used to estimate the best ML tree using 1000 bootstrap replicates to estimate support for branches.

Barcoding. Species identification using barcode markers was accomplished using the primers, protocols, and key provided in Nieto-Lugilde et al. (2024). Barcodes are amplicons that differ in size and the identification is a two-step process. One primer set (LG09-S1) distinguishes *S. divinum* and *S. medium* from *S. diabolicum* and *S. magniae*, and depending on the outcome of that process, a second primer distinguishes *S. divinum* from *S. medium* (LG19-S5) and the other (LG01-S6x) *S. diabolicum* from *S. magniae*. The cycling conditions were 95°C for 2 min, then 35 cycles of 95°C for 30 s, an annealing temperature of 57°C for 30 s, and 72°C for 2 min, and terminating with 72°C for 7 min. The banding patterns were visualized after electrophoresis in a 3% agarose gel with SYBR safe (Invitrogen Inc, Eugene, Oregon, USA) fluorescent DNA stain and scored by hand.

Identifying clones. Pairwise genetic distances for all RADseq samples were calculated in R v4.1.1 (R Core Team, 2021) and compared to distances between the duplicated pairs of RADseq samples to identify those with likely identical genotypes using the method described in Shaw et al. (2023b).

Population genetic structure analyses. One SNP per locus and one sample per genotype was used for clustering analyses. We used the Bayesian model-based cluster analysis implemented in STRUCTURE v2.3.4 (Pritchard *et al*. 2000) to evaluate intra- and interspecific genetic structure including individual genetic admixture. Methods, including those to evaluate the most likely number of clusters (K), were conducted as in Shaw et al. (2022). Clustering analyses were performed for *S. divinum* and *S. medium* together using just European samples, and separately for each of the two species with and without North American samples included.

Genetic diversity and differentiation statistics. One SNP per locus and one sample per genotype per site was used for population diversity and differentiation calculations. Expected heterozygosity, percent polymorphic loci, and percent private alleles were calculated using the R package 'poppr' v2.1.10 (Kamvar et al. 2014). Statistics were calculated for European samples by species and by site within species. Statistics for sites within species were calculated based on the subset of loci that were polymorphic within that species.

Sex ratios. The sexes of gametophytes subjected to RADseq were determined according to the method described and validated by Shaw et al. (2023b). Sex ratios are here expressed as the numbers of males/males+females. Because of limited sampling from individual populations (and even countries) we focused on comparing *S. divinum* and *S. medium* across Europe (Table 1), but data from each country and population are provided as Supplementary Table S3.

Isolation by distance (IBD) and climate (IBC). RADseq data (one sample per genotype per site) were used to test the relationships of genetic distance to the log of geographic distance (IBD), and genetic distance to climate distance (IBC) for *S. divinum* and *S. medium* in Europe. Because geographic distance and climate distance may be correlated, we also tested the relationship of the portion of genetic distance not explained by geographic distance to climate distance (using the residuals of regressing genetic distance on geographic distance).

For genetic distances, pairwise euclidean distances between genotypes were calculated in R. Geographic distances between sites were calculated with the “geosphere” package v.1.5-18 (Hijmans 2022). Current climate information for the sites was extracted from the 19 bioclimate variables in the CHELSA climate database (v1.2; https://chelsa-climate.org/) and summarized by the first four axes of a PCA. Climate distances between sites were calculated as the euclidean distance between the sites on the PCA. Statistical significance of the distance relationships was tested using Mantel tests (with 100,000 replicates) in the R package “adegenet” v2.1.10 (Jombart & Ahmed 2011). We also explored using distances between individual climate variables including Mean annual temperature, Temperature seasonality, Mean annual precipitation, and Precipitation seasonality, but results did not differ from the PCA-based climate analysis

Demographic analyses. Two sets of demographic analyses were conducted. The first set included North American and European plants of *S. divinum* and *S. medium* (the “four-deme” model analyses) and the second included just European plants of the two species (“two-deme” model analyses). The models did not include *S. diabolicum* nor *S. magniae* as these species were not detected in Europe (see below).

The primary goals of the four-deme demographic model analyses were to assess intercontinental gene flow within each of the species that occurs in both North America and Europe, and interspecific gene flow within the two continents. The four-deme models (Fig. 5) included the common ancestral population for all four demes (two species, two continents), the ancestral *S. divinum* deme that gave rise to the *S. divinum* demes on both continents, and the ancestral deme of *S. medium* that gave rise to the *S. medium* demes on both continents. This allowed us to compare the likelihoods of models representing different gene flow scenarios including estimates of gene flow not only between the extant demes, but also their ancestors. We also compared likelihoods of models that differed in the timing of the species’ continental divergences (*i.e.*, whether North American and European *S. divinum* demes separated before or after North American and European *S. medium* demes).

The two-deme models (Fig. 6) included European plants of *S. divinum* and *S. medium*, and their common ancestral population. The primary goal of these analyses was to estimate interspecific gene flow within Europe. We compared the likelihoods of models with no gene flow between species (“No gene flow”), gene flow early after speciation followed by a period of no gene flow (“Early gene flow”), recent gene flow after a period of no gene flow (“Recent gene flow”), and gene flow over the entire time since divergence (“Full gene flow”).

Both the four-deme and two-deme models included estimates of divergence times and effective population sizes for all current and ancestral demes. The default value of $2.8*10^{8}$ substitutions per generation was used in all models since the mutation rate of *Sphagnum* is unknown. To avoid the problem of parameter “non-identifiability”, which occurs when different parameter values give similar approximate likelihoods (*e.g.*, a model with short divergence time, small populations sizes, and high gene flow can have similar likelihood to a model with long divergence time, large population sizes, and low gene flow) we fixed the value of the divergence time of *S. divinum* and *S. medium* at 15,000 generations. As a result, other parameter estimates should be interpreted as relative and not absolute values.

The models were compared using the approximate likelihood method of fastsimcoal version 2.8 (Excoffier et al. 2021, Gutenkunst et al. 2009) with site frequency spectra (SFSs) as input. Unfolded SFSs were calculated using the easySFS pipeline (https://github.com/isaacovercast/easySFS) with subsampling of groups as required to eliminate missing data. For the four-deme analysis, groups were subsampled to: 92 European *S. divinum*, 113 European *S. medium*, 14 North American *S. divinum*, and 7 North American *S. medium*. For the two-deme analysis, groups were subsampled to 92 European *S. divinum* and 114 European *S. medium*.

At least 100 independent fastsimcoal runs were performed for each demographic model, the expected SFSs were generated from 100,000 simulations, and parameters were optimized over 40 ECM cycles. Approximate likelihoods were used to calculate the Akaike information criterion (AIC) with lower AIC values indicating better demographic models.

Variance in demographic parameter estimates were obtained from parametric bootstrapping. The estimated demographic parameters of the best model were used to simulate 100 independent SFSs and each simulated SFS was used as input for 10 independent fastsimcoal runs of 10,000 simulations and 40 ECM cycles. The distributions of the parameter estimates from the best run of each simulated SFS were used to represent the variance in parameter estimates.

RESULTS

Phylogenetics. Phylogenetic relationships among samples indicate that all European plants belong to *S. divinum* or *S. medium*; none group with *S. diabolicum* or *S. magniae*, which appear to be North American endemics (Supplemental Fig. S1). *Sphagnum divinum* and *S. medium*, in contrast, are represented by samples from both continents. Terminal branch lengths leading to individual samples of *S. diabolicum* and *S. magniae* are notably long compared to terminals within *S. divinum* and *S. medium*, consistent with this pattern as observed in previous analyses of both whole genome sequences and RADseq data.

Genealogical relationships among samples within both *S. divinum* and *S. medium* remain ambiguous. Multiple data sets differing in amount of allowed missed data, and therefore with differing sample inclusion, yielded somewhat different results (not shown) and we therefore cannot determine with any high level of confidence whether North American and European samples within *S. medium*, are reciprocally monophyletic. In the reconstruction presented here, two samples (probably a single clone) from Iceland are sister to the rest of the species (Fig. S1). Then a paraphyletic grade of all North American samples is basal to all other European samples. Within *S. divinum*, a single Russian sample is resolved as sister to all other samples of the species, but that Russian sample had a high level of missing data. Then, as in *S. medium*, North American samples of *S. divinum* form a grade with all other European samples nested within it. Despite ambiguity, reconstructions for both species suggest that most if not all European samples are derived from North American plants, although reciprocal monophyllly cannot be rejected.

Species distributions in Europe. *S. divinum* was identified from 65 of the 121 sites included in this study, *S. medium* was identified from 63, and both species were identified from seven sites (Fig. 1, Supplemental Table S2). Both species occurred in the most southern area we had samples from, in southern France/northern Spain.

Population genetic structure. STRUCTURE analyses were conducted for *S. divinum* and *S. medium* together using just European samples. Each of the two species were also analyzed separately using samples from both North America and Europe. The optimal K (number of genotype groups) for European plants is K=2, corresponding to *S. divinum* and *S. medium* (Fig. 2). There is little evidence of genetic admixture within individual plants, but two samples from Austria (asterisks in Fig. 2) were predominantly

S. medium but were admixed with the *S. divinum* genotype group, and one of them is nearly a 50:50 mixture.

STRUCTURE analyses with both European and North American samples of the two species separately corroborate the interpretation from phylogenetic reconstructions that there is some, but subtle, differentiation between continents within both species (Fig. 3A, B). The optimal K for both is two, and both genetic groups occur in both North America and Europe for both species. Nevertheless, the less represented genetic group (gray in Fig. 3A, B) is at consistently higher levels in North American than most European samples within both species, reflecting some divergence between continental metapopulation systems. The Icelandic *S. medium* that falls sister to all other *S. medium* in the maximum likelihood tree has STRUCTURE genetic group memberships more similar to North American than European samples (asterisk in Fig. 3B). The same is true for the Russian *S. divinum* sample that was sister to all other *S. divinum* samples (asterisk in Fig. 3A).

Sexuality and genetic diversity within species. No evidence of sex bias was observed among European plants of either *S. divinum* or *S. medium* (Table 1). The degree of clonality also does not differ between the two species. However, *S. divinum* harbors higher genetic diversity, as indicated by a higher percentage of polymorphic loci (PPL in Table 1) and a slightly greater number of private alleles. Genetic diversity estimates for each European population are provided in Supplemental Table S3.

Isolation by distance and climate. There are weak but significant relationships between genetic distance and physical separation between populations (IBD) within both *S. divinum* and *S. medium* (Supplemental Table S4; Fig. 4A, B). There were also significant relationships to climatic (dis)similarity (Fig. S4A, B.), but climatic dissimilarities are correlated with physical separation for sites of both species (*S. divinum* adjusted $r^2 = 0.406$; *S. medium* adjusted $r^2 = 0.707$; Fig. S4E, F) and when that relationship was taken into account there was no correlation between that portion of genetic distance not already explained by geographic distance (the residuals) and climatic dissimilarity in either species (Supplemental Table S4, Fig. S4C, D).

Demographic analyses. In the four-deme analyses, we first compared two models that differed only in whether North American and European *S. divinum* diverged first or North American and European *S. medium* diverged first. Likelihood and AIC scores suggest that the "medium first" scenario is more likely (Supplemental Table S5), so more complex models to compare the different gene flow scenarios were analyzed using the "medium first" divergence order.

The models for the different gene flow scenarios differ based on whether they include estimates of gene flow during different time periods: the earliest time period before North American and European *S. medium* or North American and European *S. divinum* had diverged (Gene flow matrix 2), a middle time period after *S. medium* had diverged between continents but *S. divinum* had not (Gene flow matrix 1), and a recent period after *S. divinum* had also diverged between continents (Gene flow matrix 0). All of the models that include gene flow estimates for Matrix 0 (Partial gene flow models 1, 3, 5, and the Full gene flow model) are more likely than models that do not, but the AIC scores for these models are essentially indistinguishable. Bootstrapping runs suggest that we are not getting good estimates of gene flow in Matrix 1 or 2 (Supplemental Fig. S2), which could explain why models that differ only in whether they include those two matrices have essentially the same likelihood. We also do not get good estimates of effective population sizes for those time periods. Interestingly however, the estimates from all four of these models and the results of the bootstrapping give a similar picture of gene flow among the extant demes (Matrix 0): low (but non-zero) gene flow between species within a continent and between species between continents, but orders of magnitude higher gene flow within species between continents. Levels of gene flow as indicated by parameter estimates (Supplementary Table S5) and bootstrap results (Supplemental Fig. S2) are low in all cases, but are higher within species between continents, than between the species (Supplemental Table S5).

In the two-deme analyses focused on just European plants, where we compared models with no interspecific gene flow (Fig. 6A), gene flow early after speciation but that subsequently ceased (Fig. 6B), reproductive isolation after speciation but with more recent interspecific gene flow (Fig. 6C), and continuous gene flow since speciation (Fig. 6D), the most likely model was that with recent gene flow following a period of reproductive isolation (Fig. 6C). In the best model, the estimated level of interspecific gene flow is very low, but non-zero (Supplemental Table S6).

Both the four- and two-deme analyses agree in several results: the effective population size in European *S. divinum* is greater than in *S. medium*, and there is some low degree of introgression between the two species in Europe. The four-deme results suggest that divergence between European and North American populations of *S. medium* occurred before divergence of *S. divinum* plants on the two continents.

Discussion

Our results indicate that *S. diabolicum* and *S. magniae* are restricted to North America; no European plants grouped with samples of these two species as represented by North American collections in phylogenetic or Structure analyses. While it is of course possible that one or both species might eventually be detected in Europe, our sampling includes more than 300 plants and all belong to *S. divinum* or *S. medium*. If *S. magniae* occurs in Europe it would be expected in the most southerly areas since it is restricted to the southeastern U.S. in North America. Our current European sampling extends southward to around the France-Spain border where both *S. divinum* or *S. medium* are documented. Additional sampling to the east in southern Europe would be the most likely areas to find *S. magniae*. However, the very close genetic and phylogenetic relationship between *S. diabolicum* and *S. magniae*, and their relatively recent divergence within this complex of species is consistent with them being endemic to eastern North America. At present there is no way to accurately date their origin and divergence in absolute time.

Our RADseg data indicate that European *S. divinum* contains more genetic diversity than *S. medium*. This is indicated by percentages of polymorphic loci in the two species, and estimates for effective population sizes (Ne) in the demographic analyses. The demographic analyses further estimated that Ne was substantially larger in the common ancestor of *S. divinum* and *S. medium* than in either extant species as represented by European plants, suggesting population bottlenecks associated with the origins of European demes of both species. Details of phylogenetic relationships between North

American and European plants within *S. divinum* and *S. medium* are still dubious, but it appears more likely that most or all European plants within both species are derived from North American plants, so any population bottleneck evidenced for European plants more likely reflects colonization than speciation history.

Previous research (Shaw et al. 2022) showed that the eastern North American endemics, *S. diabolicum* and *S. magniae*, are more genetically diverse than *S. divinum* or *S. medium*. Sampling for this study was not designed to compare genetic diversity in the endemics relative to *S. divinum* and *S. medium* but terminal branch lengths leading to *S. diabolicum* and *S. magniae* accessions in the phylogenetic tree (Fig. S1) are consistent with greater diversity among samples of these two species. This difference in tree shape was evident in analyses of whole genome sequences (Shaw et al. 2022) but population-level processes underlying that difference are currently unclear. There is no obvious difference in frequency of sporophyte production between *S. diabolicum*/*S. magniae* versus *S. divinum*/*S. medium*.

Sex ratios did not deviate from 50:50 for European plants of either *S. divinum* or *S. medium*. In contrast, Shaw et al. (2023b), detected a female bias in North American plants of *S. divinum* and *S. medium*, significantly so in the former. Female biased sex ratios are common in bryophytes (Longton and Greene 1969; Bisang et al. 2014)). It is unclear if the difference between European and North American sex ratios for *S. divinum* reflect sampling artifacts (more samples from Europe) or real geographic differences.

Sphagnum divinum and *S. medium* were confirmed from the same peatlands at seven sites, which agrees with earlier studies (Schwarzer & Joshi 2017, Yousefi et al.

2017) that documented sympatric plants. Nieto-Lugilde et al. (2024) showed that *S. diabolicum*, *S. divinum*, and *S. medium* co-occur at many sites in eastern North America, often in proximity sufficient to allow for interbreeding. Our results indicate that genetic admixture between the species is very limited in European plants of *S. divinum* and *S. medium*, but admixed plants do occur, and demographic analyses indicate that introgression between the two species is more likely than complete reproductive isolation. That introgression appears to reflect secondary contact following their initial divergence. Conspecific gene flow between continents was estimated by our demographic analyses to be greater than interspecific gene flow within Europe. Previous work on other *Sphagnum* species has similarly documented conspecific migration across the Atlantic Ocean. In fact, in agreement with the current study, Imwattana (2022) found that gene flow between eastern North American and European *S. flexuosum* was higher than between this species and its close relative, *S. recurvum*, within Eastern North America. Other studies have consistently documented amphi-Atlantic gene flow within Sphagnum species, often associated with limited genetic divergence between population systems on the two continents (e.g., Szövényi et al. 2008, Kyrkjeeide et al. 2016a).

Given that Russian samples are the most genetically similar to North American samples of *S. divinum*, and Icelandic samples are most similar to North American samples of *S. medium*, it is plausible that gene flow is maintained via Asia for *S. divinum* and across the Atlantic for *S. medium*. However, a true circum-boreal distribution of *S. divinum* is yet to be confirmed. The possibly amphi-Atlantic (*S. medium*) and circum-boreal (*S. divinum*) enables further testing of migration patterns, climatic niche separation, and post-glacial recolonization.

Individual parameter estimates from our demographic analyses have high levels of uncertainty. Furthermore, our phylogenetic reconstruction(s) are uncertain with regard to whether North American and European groups within *S. divinum* and *S. medium* are reciprocally monophyletic. This would seem to invalidate the demographic models, but although the demographic model diagram looks like a phylogenetic tree, it is not. Unlike phylogenetic trees, a demographic model diagram has no nodes but just blocks representing groups of interbreeding individuals that may or may not also sometimes interbreed with other groups (as represented by the horizontal migration arrows). Demographic analyses test alterative population genetic models, not phylogenetic hypotheses.

Our results corroborate analyses by Yousefi et al. (2017), and the taxonomic conclusions of Hassel et al. (2018) that *S. divinum* and *S. medium* represent separate species, even if they occasionally hybridize. Ongoing work on the four species in North American includes much more intensive sampling within sympatric and allopatric populations to assess interspecific introgression. This group continues to develop as a model for evolutionary processes including climate adaptation (Piatkowski et al. 2023), clonal structure (Shaw et al. 2023b) and hybridization (Shaw et al. 2024).

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Table 1. Genetic diversity and sex ratios in European plants of *S. divinum* and *S. medium*.

Species	**Ramets**	**Genets**	**R/G**	**Hexp**	**PPL**	**PPr**	**(G-1)/(R-1)**	**Sex Ratio (genets)**	**Sex Ratio (ramets)**
S. divinum	161	123	1.31	0.130	48.6	32.8	0.76	0.528	0.529
S. medium	183	150	1.22	0.158	34.4	25.7	0.82	0.514	0.507
Total	344	273	1.26	0.247	100.0	NA	0.79		

Figure Legends

Fig. 1. Distribution map of genetically confirmed samples of *S. divinum* and *S. medium* in Europe.

Fig. 2. STRUCTURE analysis results for European samples of *S. divinum* and *S. medium*.

Fig. 3. STRUCTURE analysis results for European and North American samples of *S. divinum* (A) and *S. medium* (B).

Fig. 4. Isolation by distance (IBD) plots: genetic differentiation among European populations of *S. divinum* (A) and *S. m*edium (B) relative to physical distances between sites.

Fig. 5. Demographic models compared for European and North American samples of *S. divinum* and *S. medium* – "four-deme models". Models differ by which gene flow matrices are included in the model, corresponding to gene flow during different time periods. In addition, to the "*S. medium*-first" models shown, we tested a model where *S. divinum* in Europe and North America diverged before *S. medium* in North America and Europe.

Fig. 6. Demographic models compared for European samples of *S. divinum* and *S. medium* – "two-deme models". A. No gene flow (genetic similarity due to ancestral polymorphism only). B. Early gene flow (introgression occurred subsequent to speciation but

then ceased). C. Recent gene flow (secondary contact; introgression followed a period of reproductive isolation). D. Full gene flow (continuous introgression subsequent to speciation).

Supplementary documents online:

Supplementary Fig. S1. Phylogenetic relationships among European and North American representatives of the *S. magellanicum* complex. Tip labels joined by black bars on the right have indistinguishable RADseq genotypes. Tip labels in violet, blue, green, and brown are North American *S. diabolicum*, *S. divinum*, *S. magniae*, and *S. medium* samples, respectively. European samples are labeled in black text. Nodel labels indicate maximum likelihood bootstrap support.

Supplementary Fig. S2. Four-deme Full migration model bootstraps of parameter estimates.

Supplementary Fig. S3. Two-deme Secondary contact model bootstraps of parameter estimates.

Supplementary Fig. S4. Plots of genetic distance versus climatic distance for European samples of *S. divinum* (A) and *S. medium* (B), plots of the portion of genetic distance not explained by geographic distance (the residuals) versus climatic distance for European samples of *S. divinum* (C) and *S. medium* (D), and plots of the relationship between geographic distances and climatic distances for European samples of *S. divinum* (E) and *S. medium* (F).

Supplementary Table S1. Voucher list of collections included in RADseq and barcoding analyses

Supplementary Table S2. Sample counts by country and site for *S. divinum* and *S. medium* gametophytes identified to species using either RADseq data or barcoding PCR.

Supplementary Table S3. *Sex ratio and genetic diversity statistics for European populations of S. divinum and S. medium.*

Supplementary Table S4. Tests of Isolation by geographic distance, Isolation by climate distance, and Isolation by climate distance when accounting for the effect of geographic distance, for European plants of *S. divinum* and *S. medium*.

Supplementary Table S5. Parameter estimates, model likelihoods, and Akaike Information Criterion (AIC) scores from the four-deme demographic models for North American and European plants of *S. divinum* and *S. medium.*

Supplementary Table S6. Parameter estimates, model likelihoods, and Akaike Information Criterion (AIC) scores from two-deme demographic models for European plants of *S. divinum* and *S. medium.*

Figure

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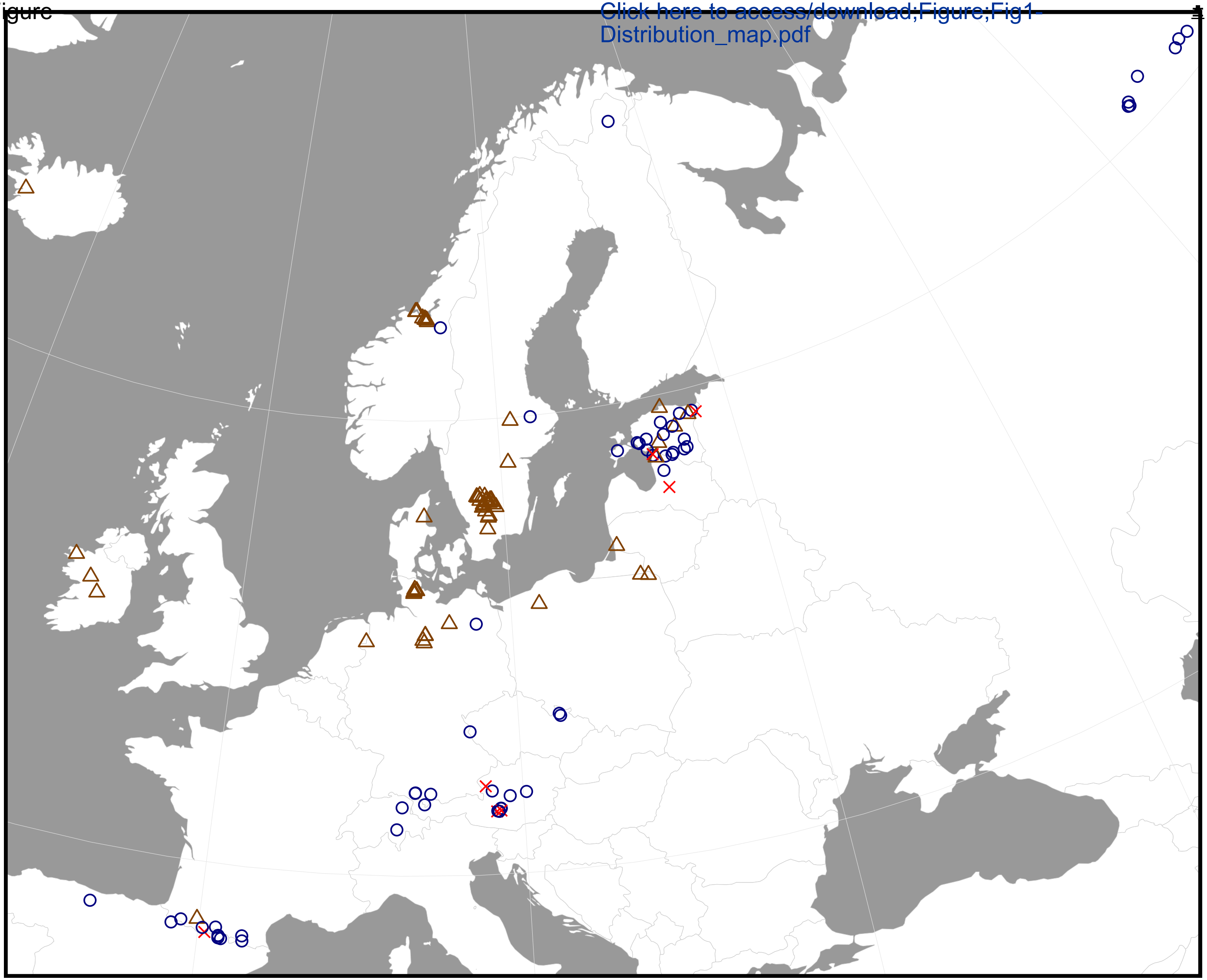
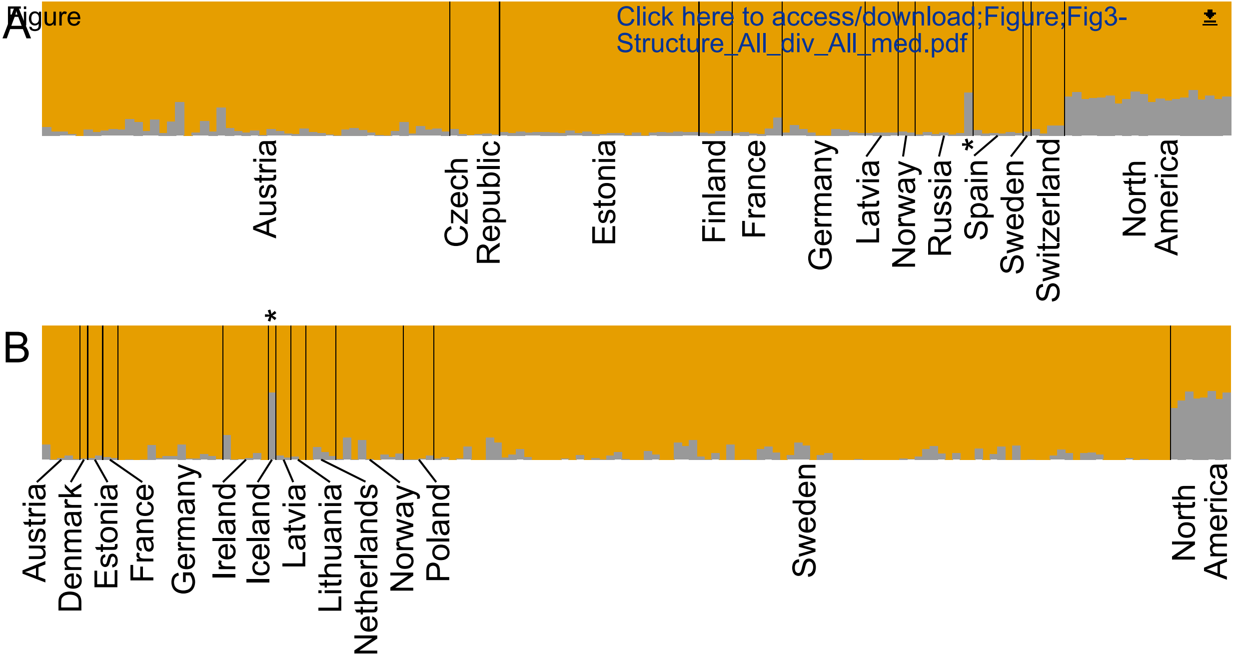


Figure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Poland
Sweden
North America

Figure

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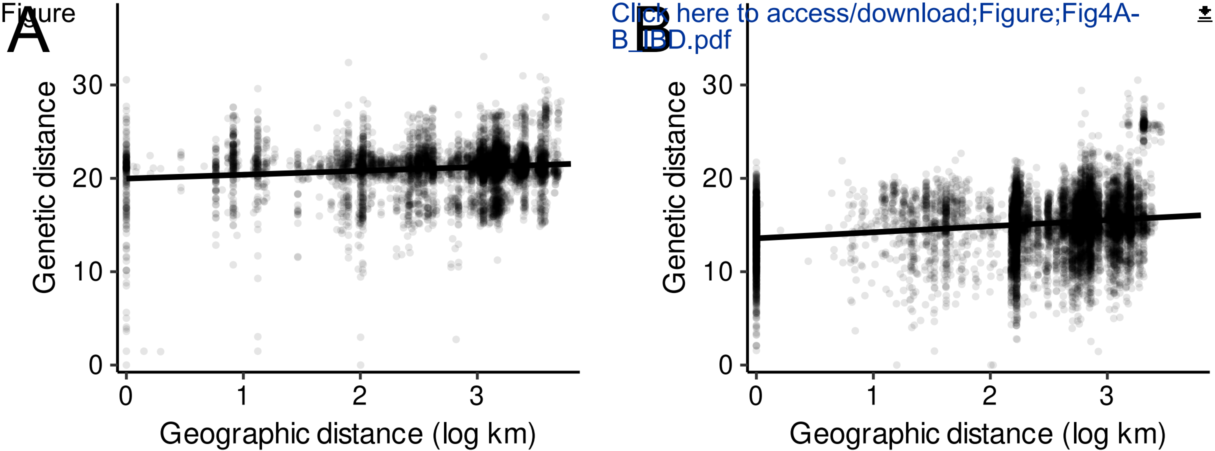

Figure

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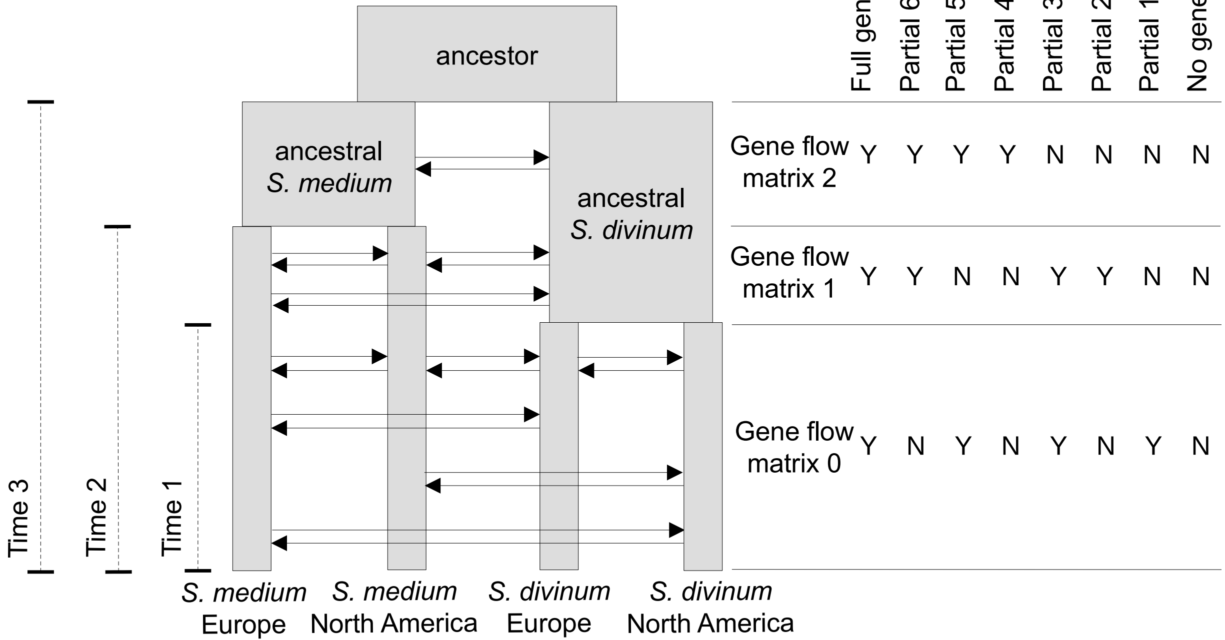
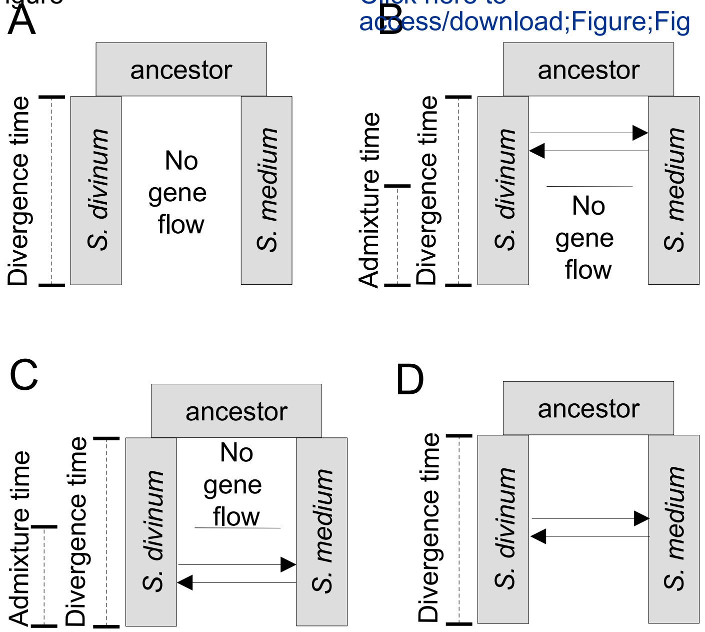


Figure


A
ancestor
Divergence time
S. divinum
No gene flow
S. medium
B
ancestor
Admixture time
Divergence time
S. divinum
No gene flow
S. medium
C
ancestor
Admixture time
Divergence time
S. divinum
No gene flow
S. medium
D
ancestor
Divergence time
S. divinum
S. medium

Supplemental Table S1. Voucher table with collection information, species, sex, and genotype for samples included in RADseq and PCR barcode analyses in the *Sphagnum magellanicum* complex.

DNA ID	Species	Collector or Institution ID	Collectors	Continent	Country-State	Site code	Latitude	Longitude	Elevation	RADseq sex	RADseq genotype	Data type
1-5-3	*S. magniae*	1-5-3	Aguero, B. & Nieto-Lugilde, M.	North America	USA-North Carolina	NC-Green Swamp	34.0812470	-78.2998570	17	Male	mag-2	RADseq
2-5-2	*S. magniae*	2-5-2	Aguero, B. & Nieto-Lugilde, M.	North America	USA-North Carolina	NC-Lake Waccamaw	34.2607800	-78.4788900	14	Female	mag-3	RADseq
3-6-2	*S. diabolicum*	3-6-2	Aguero, B. & Nieto-Lugilde, M.	North America	USA-Maine	ME-Indian River Rd Fen	44.6181600	-67.6968400	44	Male	diab-1	RADseq
3-6-2dup	*S. diabolicum*	3-6-2	Aguero, B. & Nieto-Lugilde, M.	North America	USA-Maine	ME-Indian River Rd Fen	44.6181600	-67.6968400	44	Male	diab-1	RADseq
5-3-1	*S. medium*	5-3-1	Aguero, B. & Nieto-Lugilde, M.	North America	USA-Maine	ME-Birch Harbor	44.3942500	-68.0644300	38	Female	med-26	RADseq
ISQX	*S. divinum*	2017-146	Shaw, A.J.	North America	Canada-Quebec	QC-Sept Iles	50.2026000	-66.6748600	77	Female	div-35	RADseq
ISQZ	*S. magniae*	2018-66	Shaw, A.J.	North America	USA-Georgia	GA-Okefenokee CSF	30.7402100	-82.0817500	23	Male	mag-4	RADseq
ISRH	*S. perichaetiale*	2017-318	Shaw, A.J.	North America	USA-North Carolina	NC-Green Swamp	34.0812470	-78.2998570	17	NA	NA	RADseq
ISRW	*S. affine*	BP2017-292	Piatkowski, B.	North America	USA-Vermont	VT-FranklinBog	44.9496700	-72.8766000	133	NA	NA	RADseq
IUSP	*S. magniae*	BP2018-131	Piatkowski, B.	North America	USA-Arkansas	AR-Collier Springs	34.4838600	-93.5928600	351	Female	mag-5	RADseq
IUSZ	*S. magniae*	BP2018-44	Piatkowski, B.	North America	USA-Florida	FL-Apalachicola	30.0017200	-85.0000500	3	Male	mag-6	RADseq
IUTQ	*S. divinum*	GOL-13	Stark, K.	North America	Canada-Alberta	AB-Kirby South	55.3375518	-111.0061800	727	Female	div-36	RADseq
IUUJ	*S. divinum*	GOL-2 9036	Golinski, K.	North America	Canada-British Columbia	BC-Campbell River	49.9688400	-125.3909800	226	Female	div-37	RADseq
IUWC	*S. medium*	2018-340	Shaw, A.J.	North America	USA-Maine	ME-Shark Cove Bog	44.3922500	-67.9862500	8	Female	med-27	RADseq
IUWF	*S. divinum*	WENDLING3	Wendling, D.J.	North America	USA-Michigan	MI-West Lake Bog	42.1889000	-85.5823000	262	Female	div-38	RADseq
IUWR	*S. medium*	2018-255	Shaw, A.J.	North America	USA-New Hampshire	NH-Philbrick Cricenti Bog	43.4228900	-72.0090700	385	Female	med-28	RADseq
IUWX	*S. divinum*	2018-263	Shaw, A.J.	North America	USA-New Hampshire	NH-Coos Co Wooded Peatlands	44.4160800	-71.5961000	335	Male	div-39	RADseq
IUXA	*S. divinum*	AVERY11	Avery, D.	North America	USA-Vermont	VT-Joe Pond	44.5037800	-72.6224800	224	Female	div-40	RADseq
IUXC	*S. diabolicum*	2018-270	Shaw, A.J.	North America	USA-Vermont	VT-Moose Bog	44.2642000	-71.7394360	345	Female	diab-8	RADseq
IYRK	*S. divinum*	BA-CZ	Aguero, B.	Europe	Czech Republic	CZE-Farské Bažiny	49.7422700	12.4939800	744	Female	div-41	RADseq
SB5372	*S. divinum*	2018-235	Shaw, A.J.	North America	USA-New Hampshire	NH-Cooper Cedar Woods	43.4231900	-71.1537780	160	Female	div-27	RADseq
SB5372dup	*S. divinum*	2018-235	Shaw, A.J.	North America	USA-New Hampshire	NH-Cooper Cedar Woods	43.4231900	-71.1537780	160	Female	div-27	RADseq
SB5407	*S. divinum*	2018-291	Shaw, A.J.	North America	USA-Maine	ME-Jemtland Bog	47.0028840	-68.0532130	217	Female	div-28	RADseq
SB5407dup	*S. divinum*	2018-291	Shaw, A.J.	North America	USA-Maine	ME-Jemtland Bog	47.0028840	-68.0532130	217	Female	div-28	RADseq
SB5419	*S. divinum*	2018-304	Shaw, A.J.	North America	USA-Maine	ME-Millinocket Sawdust Bog	45.7267720	-68.8371620	151	Female	div-42	RADseq
SB5466	*S. divinum*	BP2018-137	Piatkowski, B.	North America	USA-Wisconsin	WI-Beulah Bog	42.8333333	-88.4166667	255	Female	div-43	RADseq
SB5505	*S. divinum*	JP-17	Shaw, A.J.	North America	USA-New York	NY-Jam Pond Bog	42.4959647	-75.8259934	461	Male	div-29	RADseq
SB5505dup	*S. divinum*	JP-17	Shaw, A.J.	North America	USA-New York	NY-Jam Pond Bog	42.4959647	-75.8259934	461	Male	div-29	RADseq
SB5521	*S. magniae*	2018-81	Shaw, A.J.	North America	USA-Georgia	GA-Okefenokee CI	30.7086612	-82.1621954	39	Female	mag-7	RADseq
SB5533	*S. divinum*	2017-296-4	Shaw, A.J.	North America	USA-West Virginia	WV-Dolly Sods	39.0260000	-79.3165000	1184	Female	div-44	RADseq
SB5539	*S. medium*	Buck65094-2	Buck, W.	North America	USA-Pennsylvania	PA-Black Moshannon	40.9160600	-78.0607490	568	Male	med-29	RADseq
SB5542	*S. divinum*	SCH-11-1	Shaw, A.J.	North America	Canada-Labrador	LB-Schefferville11	54.7291830	-66.7766500	563	Male	div-45	RADseq
SB5546	*S. divinum*	SCH-13-1	Shaw, A.J.	North America	Canada-Quebec	QC-Schefferville13	54.8415676	-66.8878675	505	Male	div-46	RADseq
SB5587	*S. divinum*	CZ-JESF	Aguero, B.	Europe	Czech Republic	CZE-Jeseníky	50.0885921	17.1640722	900	Female	div-1	RADseq
SB5588	*S. divinum*	CZ-JESB	Aguero, B.	Europe	Czech Republic	CZE-Jeseníky	50.0885921	17.1640722	900	Female	div-1	RADseq
SB5601	*S. magniae*	BP_GS14	Piatkowski, B.	North America	USA-North Carolina	NC-Green Swamp	34.0812470	-78.2998570	17	Female	mag-1	RADseq
SB5601dup	*S. magniae*	BP_GS14	Piatkowski, B.	North America	USA-North Carolina	NC-Green Swamp	34.0812470	-78.2998570	17	Female	mag-1	RADseq
SB5635	*S. magniae*	DUKE68338	Shaw, A.J.	North America	USA-Alabama	AL-Solon Dixon	31.1666000	-86.6986000	68	Male	mag-8	RADseq
SB5665	*S. diabolicum*	RV-4	Vilgalys, R.	North America	Canada-Newfoundland	NL-La Manche	47.1794863	-52.8891706	72	Female	diab-9	RADseq
SB5702	*S. diabolicum*	WBNJ-4	Bien, W.	North America	USA-New Jersey	NJ-Colliers Mill	40.2355834	-74.3952181	49	Male	diab-10	RADseq
SB5770	*S. divinum*	15064	Shaw, A.J.	Europe	Russia	RUS-Priobskoe Mestorozhdenie	60.9857300	70.1893400	35	Female	div-47	RADseq
SB5788	*S. medium*	2017-156	Shaw, A.J.	North America	Canada-Quebec	QC-Sept Iles	50.2029000	-66.5954000	67	Female	med-30	RADseq
SB5817	*S. divinum*	2019-318	Shaw, A.J.	Europe	Sweden	SWE-Ramsmossen	59.9703480	17.1624040	100	Female	div-48	RADseq
SB5818	*S. medium*	2019-245	Shaw, A.J.	Europe	Iceland	ISL-Borgarfijaroarhraur	64.6859100	-21.4050200	46	Female	med-1	RADseq
SB5828	*S. magniae*	2017-135	Shaw, A.J.	North America	USA-North Carolina	NC-Broadacres Lake	35.0163889	-79.5447222	103	Female	mag-9	RADseq
SB5865	*S. divinum*	WA-DNR	Berkey, M.	North America	USA-Washington	WA-Sunday Lake Trailhead Bog	47.6292355	-121.5804059	568	Female	div-49	RADseq
SB5880	*S. divinum*	15168	Shaw, A.J.	Europe	Russia	RUS-Polosatoye KO	60.9416600	63.7389500	75	Male	div-50	RADseq
SB5912	*S. diabolicum*	20004	Duffy, A.	North America	USA-North Carolina	NC-Pineola Bog	36.0313107	-81.8982100	1069	Female	diab-11	RADseq
SB5924	*S. medium*	2019-243	Shaw, A.J.	Europe	Iceland	ISL-Borgarfijaroarhraur	64.6859100	-21.4050200	46	Female	med-1	RADseq
SB6879	*S. divinum*	MCN-2021-2	Navarro, M.	North America	USA-New York	NY-Jam Pond Bog	42.4959647	-75.8259934	461	Female	div-30	RADseq
SB6879dup	*S. divinum*	MCN-2021-2	Navarro, M.	North America	USA-New York	NY-Jam Pond Bog	42.4959647	-75.8259934	461	Female	div-30	RADseq
SB6880	*S. diabolicum*	MCN-2021-3	Navarro, M.	North America	USA-New York	NY-Jam Pond Bog	42.4959647	-75.8259934	461	Male	diab-2	RADseq
SB6880dup	*S. diabolicum*	MCN-2021-3	Navarro, M.	North America	USA-New York	NY-Jam Pond Bog	42.4959647	-75.8259934	461	Male	diab-2	RADseq
SB6881	*S. divinum*	MCN-2021-6	Navarro, M.	North America	USA-New York	NY-McLean Bog	42.4909100	-76.2971500	333	Male	div-31	RADseq
SB6881dup	*S. divinum*	MCN-2021-6	Navarro, M.	North America	USA-New York	NY-McLean Bog	42.4909100	-76.2971500	333	Male	div-31	RADseq
SB6894	*S. medium*	MG1	Galka, M.	Europe	Poland	POL-Bagno Kusowo	53.8150000	16.5886110	145	Female	med-31	RADseq
SB6895	*S. medium*	MG2	Galka, M.	Europe	Poland	POL-Mechacz Wielki Bog	54.3311110	22.4413890	186	Male	med-32	RADseq
SB6896	*S. medium*	MG3	Galka, M.	Europe	Poland	POL-Smolniki	54.2766670	22.8761110	178	Female	med-33	RADseq
SB6897	*S. medium*	MG4	Galka, M.	Europe	Poland	POL-Bagno Kusowo	53.8127780	16.5863890	145	Male	med-34	RADseq
SB6898	*S. divinum*	MG5	Galka, M.	Europe	Austria	AUT-Rotmoss	47.6836110	15.1541670	690	Male	div-51	RADseq
SB6899	*S. divinum*	MG6	Galka, M.	Europe	Austria	AUT-Pürgschachen Moor	47.5810280	14.3468610	690	Male	div-52	RADseq
SB6900	*S. divinum*	MG7	Galka, M.	Europe	Austria	AUT-Pürgschachen Moor	47.5794720	14.3474170	690	Male	div-53	RADseq
SB6901	*S. divinum*	MG8	Galka, M.	Europe	Austria	AUT-LudlalmMoor	47.1813890	13.8797220	1676	Male	div-54	RADseq
SB6902	*S. divinum*	MG9	Galka, M.	Europe	Austria	AUT-Rotmoss	47.6830560	15.1544440	690	Female	div-55	RADseq
SB6903	*S. divinum*	MG10	Galka, M.	Europe	Austria	AUT-Dürrenecksee	47.1738890	13.8750000	1693	Female	div-56	RADseq
SB6904	*S. divinum*	MG11	Galka, M.	Europe	Austria	AUT-Prebersee	47.1830560	13.8680560	1625	Female	div-57	RADseq
SB6905	*S. divinum*	2.0221E+11	Hepenstrick, D.	Europe	Switzerland	CHE-Unterer Hüttenbüel	47.2609400	9.0873300	1090	Male	div-58	RADseq
SB6906	*S. divinum*	2.0221E+11	Hepenstrick, D.	Europe	Switzerland	CHE-Unterer Hüttenbüel	47.2587700	9.0852000	1122	Female	div-59	RADseq
SB6907	*S. divinum*	2.02207E+11	Hepenstrick, D.	Europe	Switzerland	CHE-Pian Segno	46.5320000	8.8460000	1655	Male	div-60	RADseq
SB6908	*S. divinum*	2.0221E+11	Hepenstrick, D.	Europe	Switzerland	CHE-Unterer Hüttenbüel	47.2588700	9.0865000	1122	Female	div-61	RADseq
SB7169	*S. divinum*	sn2	Shaw, A.J.	North America	USA-New York	NY-McLean Bog	42.4909100	-76.2971500	333	Male	div-32	RADseq
SB7169dup	*S. divinum*	sn2	Shaw, A.J.	North America	USA-New York	NY-McLean Bog	42.4909100	-76.2971500	333	Male	div-32	RADseq
SB7476	*S. diabolicum*	19796	Aguero, B.	North America	USA-Maine	ME-Indian River Rd Fen	44.6181600	-67.6968400	44	Female	diab-3	RADseq
SB7476dup	*S. diabolicum*	19796	Aguero, B.	North America	USA-Maine	ME-Indian River Rd Fen	44.6181600	-67.6968400	44	Female	diab-3	RADseq
SB7485	*S. diabolicum*	19838	Aguero, B.	North America	USA-Maine	ME-Birch Harbor	44.3942500	-68.0644300	38	Male	diab-4	RADseq
SB7485dup	*S. diabolicum*	19838	Aguero, B.	North America	USA-Maine	ME-Birch Harbor	44.3942500	-68.0644300	38	Male	diab-4	RADseq
SB7493	*S. medium*	19847	Aguero, B.	North America	USA-Maine	ME-Whalesback Ridge	44.8590700	-68.2859800	74	Female	med-20	RADseq

SB7493dup	*S. medium*	19847	Aguero, B.	North America	USA-Maine	ME-Whalesback Ridge	44.8590700	-68.2859800	74	Female	med-20	RADseq
SB7494	*S. medium*	19848	Aguero, B.	North America	USA-Maine	ME-Whalesback Ridge	44.8590700	-68.2859800	74	Male	med-21	RADseq
SB7494dup	*S. medium*	19848	Aguero, B.	North America	USA-Maine	ME-Whalesback Ridge	44.8590700	-68.2859800	74	Male	med-21	RADseq
SB7514	*S. medium*	2021-36	Shaw, A.J.	North America	USA-Maine	ME-Birch Harbor	44.3940200	-68.0647000	38	Male	med-22	RADseq
SB7514dup	*S. medium*	2021-36	Shaw, A.J.	North America	USA-Maine	ME-Birch Harbor	44.3940200	-68.0647000	38	Male	med-22	RADseq
SB7516	*S. diabolicum*	2021-33	Shaw, A.J.	North America	USA-Maine	ME-Birch Harbor	44.3940200	-68.0647000	38	Female	diab-5	RADseq
SB7516dup	*S. diabolicum*	2021-33	Shaw, A.J.	North America	USA-Maine	ME-Birch Harbor	44.3940200	-68.0647000	38	Female	diab-5	RADseq
SB7536	*S. divinum*	BP2021-6	Piatkowski, B.	North America	USA-Minnesota	MN-Spruce	47.5066390	-93.4558970	416	Female	div-33	RADseq
SB7536dup	*S. divinum*	BP2021-6	Piatkowski, B.	North America	USA-Minnesota	MN-Spruce	47.5066390	-93.4558970	416	Female	div-33	RADseq
SB7547	*S. diabolicum*	2021-40	Nieto-Lugilde, M	North America	USA-Maine	ME-Shark Cove Bog	44.3922330	-67.9862460	8	Female	diab-6	RADseq
SB7547dup	*S. diabolicum*	2021-40	Nieto-Lugilde, M	North America	USA-Maine	ME-Shark Cove Bog	44.3922330	-67.9862460	8	Female	diab-6	RADseq
SB7549	*S. diabolicum*	19806	Aguero, B.	North America	USA-Maine	ME-Hadley Lake Rd	44.7419300	-67.4399900	17	Male	diab-7	RADseq
SB7549dup	*S. diabolicum*	19806	Aguero, B.	North America	USA-Maine	ME-Hadley Lake Rd	44.7419300	-67.4399900	17	Male	diab-7	RADseq
SB8243	*S. divinum*	Ai_SMAG1	Escolà-Lamora, N. & Domènech, G.	Europe	Spain	ESP-Aiguadassi	42.5690530	0.9320430	1901	Male	div-2	RADseq
SB8244	*S. divinum*	AiSmag0201	Escolà-Lamora, N. & Domènech, G.	Europe	Spain	ESP-Aiguadassi	42.5690530	0.9320430	1901	Male	div-2	RADseq
SB8245	*S. divinum*	Ai_SMAG3	Escolà-Lamora, N. & Domènech, G.	Europe	Spain	ESP-Aiguadassi	42.5690530	0.9320430	1903	NA	NA	Barcode PCR
SB8246	*S. divinum*	Ai_SMAG4	Escolà-Lamora, N. & Domènech, G.	Europe	Spain	ESP-Aiguadassi	42.5690530	0.9320430	1903	NA	NA	Barcode PCR
SB8247	*S. divinum*	Ai_SMAG5	Escolà-Lamora, N. & Domènech, G.	Europe	Spain	ESP-Aiguadassi	42.5690530	0.9320430	1903	NA	NA	Barcode PCR
SB8248	*S. divinum*	Ai_SMAG6	Escolà-Lamora, N. & Domènech, G.	Europe	Spain	ESP-Aiguadassi	42.5690530	0.9320430	1903	NA	NA	Barcode PCR
SB8249	*S. divinum*	Ai_SMAG7	Escolà-Lamora, N. & Domènech, G.	Europe	Spain	ESP-Aiguadassi	42.5690530	0.9320430	1903	NA	NA	Barcode PCR
SB8250	*S. divinum*	Ai_SMAG8	Escolà-Lamora, N. & Domènech, G.	Europe	Spain	ESP-Aiguadassi	42.5690530	0.9320430	1903	NA	NA	Barcode PCR
SB8252	*S. divinum*	Ai_SMAG1001	Escolà-Lamora, N. & Domènech, G.	Europe	Spain	ESP-Aiguadassi	42.5690530	0.9320430	1903	NA	NA	Barcode PCR
SB8253	*S. divinum*	Ai_SMAG11	Escolà-Lamora, N. & Domènech, G.	Europe	Spain	ESP-Aiguadassi	42.5690530	0.9320430	1903	NA	NA	Barcode PCR
SB8255	*S. divinum*	ARTSMAG3	Pérez-Haase, A. & Escolà-Lamora, N.	Europe	France	FRA-Artiga	42.9092200	0.7751830	1416	Male	div-62	RADseq
SB8256	*S. divinum*	ARTSMAG05	Pérez-Haase, A. & Escolà-Lamora, N.	Europe	France	FRA-Artiga	42.9092200	0.7751830	1424	NA	NA	Barcode PCR
SB8257	*S. divinum*	ARTSMAG08	Pérez-Haase, A. & Escolà-Lamora, N.	Europe	France	FRA-Artiga	42.9092200	0.7751830	1424	NA	NA	Barcode PCR
SB8258	*S. divinum*	ARTSMAG12	Pérez-Haase, A. & Escolà-Lamora, N.	Europe	France	FRA-Artiga	42.9092200	0.7751830	1424	NA	NA	Barcode PCR
SB8259	*S. divinum*	ARTSMAG14	Pérez-Haase, A. & Escolà-Lamora, N.	Europe	France	FRA-Artiga	42.9092200	0.7751830	1424	NA	NA	Barcode PCR
SB8260	*S. divinum*	ARTSMAG16	Pérez-Haase, A. & Escolà-Lamora, N.	Europe	France	FRA-Artiga	42.9092200	0.7751830	1424	NA	NA	Barcode PCR
SB8261	*S. divinum*	ARTSMAG19	Pérez-Haase, A. & Escolà-Lamora, N.	Europe	France	FRA-Artiga	42.9092200	0.7751830	1424	NA	NA	Barcode PCR
SB8262	*S. divinum*	BAISMAG2	Pérez-Haase, A.	Europe	Spain	ESP-Baigura	42.8781800	-1.2320220	1258	Female	div-3	RADseq
SB8263	*S. divinum*	BAISMAG4	Pérez-Haase, A.	Europe	Spain	ESP-Baigura	42.8781800	-1.2320220	1258	Female	div-3	RADseq
SB8264	*S. divinum*	BAISMAG10	Pérez-Haase, A.	Europe	Spain	ESP-Baigura	42.8781800	-1.2320220	1259	NA	NA	Barcode PCR
SB8266	*S. divinum*	BAISMAG17	Pérez-Haase, A.	Europe	Spain	ESP-Baigura	42.8781800	-1.2320220	1259	NA	NA	Barcode PCR
SB8267	*S. divinum*	BAISMAG21	Pérez-Haase, A.	Europe	Spain	ESP-Baigura	42.8781800	-1.2320220	1259	NA	NA	Barcode PCR
SB8268	*S. divinum*	BAISMAG32	Pérez-Haase, A.	Europe	Spain	ESP-Baigura	42.8781800	-1.2320220	1259	NA	NA	Barcode PCR
SB8269	*S. divinum*	BAISMAG34	Pérez-Haase, A.	Europe	Spain	ESP-Baigura	42.8781800	-1.2320220	1259	NA	NA	Barcode PCR
SB8270	*S. divinum*	BN_SMAG2	Pérez-Haase, A., Escolà-Lamora, N., Pladevall-Izard, E. & Rosique-Esplugas, C.	Europe	Spain	ESP-Bassa Nera	42.6379970	0.9247840	1889	Male	div-4	RADseq
SB8271	*S. divinum*	BN_SMAG3	Pérez-Haase, A., Escolà-Lamora, N., Pladevall-Izard, E. & Rosique-Esplugas, C.	Europe	Spain	ESP-Bassa Nera	42.6379970	0.9247840	1889	Male	div-4	RADseq
SB8272	*S. divinum*	BNSMAG10	Pérez-Haase, A., Escolà-Lamora, N., Pladevall-Izard, E. & Rosique-Esplugas, C.	Europe	Spain	ESP-Bassa Nera	42.6379970	0.9247840	1892	NA	NA	Barcode PCR
SB8273	*S. divinum*	BN_SMAG12	Pérez-Haase, A., Escolà-Lamora, N., Pladevall-Izard, E. & Rosique-Esplugas, C.	Europe	Spain	ESP-Bassa Nera	42.6379970	0.9247840	1892	NA	NA	Barcode PCR
SB8274	*S. divinum*	SBNSMAG1	Pérez-Haase, A., Escolà-Lamora, N., Pladevall-Izard, E. & Rosique-Esplugas, C.	Europe	Spain	ESP-Bassa Nera	42.6379970	0.9247840	1892	NA	NA	Barcode PCR
SB8275	*S. divinum*	SBNSMAG4	Pérez-Haase, A., Escolà-Lamora, N., Pladevall-Izard, E. & Rosique-Esplugas, C.	Europe	Spain	ESP-Bassa Nera	42.6379970	0.9247840	1892	NA	NA	Barcode PCR
SB8276	*S. divinum*	SBNSMAG15	Pérez-Haase, A., Escolà-Lamora, N., Pladevall-Izard, E. & Rosique-Esplugas, C.	Europe	Spain	ESP-Bassa Nera	42.6379970	0.9247840	1892	NA	NA	Barcode PCR
SB8277	*S. divinum*	SBNSMAG17	Pérez-Haase, A., Escolà-Lamora, N., Pladevall-Izard, E. & Rosique-Esplugas, C.	Europe	Spain	ESP-Bassa Nera	42.6379970	0.9247840	1892	NA	NA	Barcode PCR
SB8278	*S. divinum*	COLSMAG2	Pérez-Haase, A. & Escolà-Lamora, N. & Guardiola-Bufí, M.	Europe	Spain	ESP-Colomèrs	42.6279500	0.9353460	2166	Male	div-4	RADseq
SB8279	*S. divinum*	COLSMAG4	Pérez-Haase, A. & Escolà-Lamora, N. & Guardiola-Bufí, M.	Europe	Spain	ESP-Colomèrs	42.6279500	0.9353460	2169	NA	NA	Barcode PCR
SB8280	*S. divinum*	COLSMAG06	Pérez-Haase, A. & Escolà-Lamora, N. & Guardiola-Bufí, M.	Europe	Spain	ESP-Colomèrs	42.6279500	0.9353460	2169	NA	NA	Barcode PCR
SB8281	*S. divinum*	COLSMAG8	Pérez-Haase, A. & Escolà-Lamora, N. & Guardiola-Bufí, M.	Europe	Spain	ESP-Colomèrs	42.6279500	0.9353460	2169	NA	NA	Barcode PCR
SB8283	*S. divinum*	COLSMAG14	Pérez-Haase, A. & Escolà-Lamora, N. & Guardiola-Bufí, M.	Europe	Spain	ESP-Colomèrs	42.6279500	0.9353460	2169	NA	NA	Barcode PCR
SB8284	*S. divinum*	COLSMAG16	Pérez-Haase, A. & Escolà-Lamora, N. & Guardiola-Bufí, M.	Europe	Spain	ESP-Colomèrs	42.6279500	0.9353460	2169	NA	NA	Barcode PCR
SB8285	*S. divinum*	COLSMAG19	Pérez-Haase, A. & Escolà-Lamora, N. & Guardiola-Bufí, M.	Europe	Spain	ESP-Colomèrs	42.6279500	0.9353460	2169	NA	NA	Barcode PCR
SB8286	*S. divinum*	EPSMAG01APH	Pérez-Haase, A., Escolà-Lamora, N., Pladevall-Izard, E. & Rosique-Esplugas, C.	Europe	Spain	ESP-Era Planhòla	42.6453510	0.9312730	1829	Female	div-63	RADseq
SB8287	*S. divinum*	EP_SMAG6	Pérez-Haase, A., Escolà-Lamora, N., Pladevall-Izard, E. & Rosique-Esplugas, C.	Europe	Spain	ESP-Era Planhòla	42.6453510	0.9312730	1831	NA	NA	Barcode PCR
SB8288	*S. divinum*	EPSMAG08APH	Pérez-Haase, A., Escolà-Lamora, N., Pladevall-Izard, E. & Rosique-Esplugas, C.	Europe	Spain	ESP-Era Planhòla	42.6453510	0.9312730	1831	NA	NA	Barcode PCR
SB8289	*S. divinum*	EPSMAG13APH	Pérez-Haase, A., Escolà-Lamora, N., Pladevall-Izard, E. & Rosique-Esplugas, C.	Europe	Spain	ESP-Era Planhòla	42.6453510	0.9312730	1831	NA	NA	Barcode PCR
SB8290	*S. divinum*	SEPSMAG1	Pérez-Haase, A., Escolà-Lamora, N., Pladevall-Izard, E. & Rosique-Esplugas, C.	Europe	Spain	ESP-Era Planhòla	42.6453510	0.9312730	1831	NA	NA	Barcode PCR
SB8291	*S. divinum*	SEPSMAG5	Pérez-Haase, A., Escolà-Lamora, N., Pladevall-Izard, E. & Rosique-Esplugas, C.	Europe	Spain	ESP-Era Planhòla	42.6453510	0.9312730	1831	NA	NA	Barcode PCR
SB8292	*S. divinum*	SEPSMAG07	Pérez-Haase, A., Escolà-Lamora, N., Pladevall-Izard, E. & Rosique-Esplugas, C.	Europe	Spain	ESP-Era Planhòla	42.6453510	0.9312730	1831	NA	NA	Barcode PCR
SB8293	*S. divinum*	SEPSMAG16	Pérez-Haase, A., Escolà-Lamora, N., Pladevall-Izard, E. & Rosique-Esplugas, C.	Europe	Spain	ESP-Era Planhòla	42.6453510	0.9312730	1831	NA	NA	Barcode PCR
SB8294	*S. divinum*	ERASMAG1	Pérez-Haase, A. & Rochés-Ribalta, R.	Europe	France	FRA-Estany del Racó	42.5536160	2.0089610	2009	Male	div-64	RADseq
SB8295	*S. divinum*	ERASMAG2	Pérez-Haase, A. & Rochés-Ribalta, R.	Europe	France	FRA-Estany del Racó	42.5536160	2.0089610	2009	Male	div-65	RADseq
SB8296	*S. divinum*	ERASMAG5	Pérez-Haase, A. & Rochés-Ribalta, R.	Europe	France	FRA-Estany del Racó	42.5536160	2.0089610	2011	NA	NA	Barcode PCR
SB8297	*S. divinum*	ERASMAG8	Pérez-Haase, A. & Rochés-Ribalta, R.	Europe	France	FRA-Estany del Racó	42.5536160	2.0089610	2011	NA	NA	Barcode PCR
SB8298	*S. divinum*	ERASMAG18	Pérez-Haase, A. & Rochés-Ribalta, R.	Europe	France	FRA-Estany del Racó	42.5536160	2.0089610	2011	NA	NA	Barcode PCR
SB8299	*S. divinum*	ERASMAG25	Pérez-Haase, A. & Rochés-Ribalta, R.	Europe	France	FRA-Estany del Racó	42.5536160	2.0089610	2011	NA	NA	Barcode PCR
SB8300	*S. divinum*	ERASMAG32	Pérez-Haase, A. & Rochés-Ribalta, R.	Europe	France	FRA-Estany del Racó	42.5536160	2.0089610	2011	NA	NA	Barcode PCR
SB8301	*S. divinum*	ERASMAG35	Pérez-Haase, A. & Rochés-Ribalta, R.	Europe	France	FRA-Estany del Racó	42.5536160	2.0089610	2011	NA	NA	Barcode PCR
SB8302	*S. divinum*	EstSmag01	Pérez-Haase, A., Escolà-Lamora, N. & Pladevall-Izard, E.	Europe	France	FRA-Estibèra	42.8435700	0.1855460	2046	Female	div-5	RADseq
SB8303	*S. divinum*	EstSmag03	Pérez-Haase, A., Escolà-Lamora, N. & Pladevall-Izard, E.	Europe	France	FRA-Estibèra	42.8435700	0.1855460	2046	Female	div-5	RADseq
SB8304	*S. divinum*	EstSMAG4	Pérez-Haase, A., Escolà-Lamora, N. & Pladevall-Izard, E.	Europe	France	FRA-Estibèra	42.8435700	0.1855460	2047	NA	NA	Barcode PCR
SB8305	*S. divinum*	EstSMAG7	Pérez-Haase, A., Escolà-Lamora, N. & Pladevall-Izard, E.	Europe	France	FRA-Estibèra	42.8435700	0.1855460	2047	NA	NA	Barcode PCR
SB8306	*S. divinum*	EstSMAG10	Pérez-Haase, A., Escolà-Lamora, N. & Pladevall-Izard, E.	Europe	France	FRA-Estibèra	42.8435700	0.1855460	2047	NA	NA	Barcode PCR
SB8307	*S. divinum*	EstSmag15	Pérez-Haase, A., Escolà-Lamora, N. & Pladevall-Izard, E.	Europe	France	FRA-Estibèra	42.8435700	0.1855460	2047	NA	NA	Barcode PCR
SB8308	*S. divinum*	EstSMAG17	Pérez-Haase, A., Escolà-Lamora, N. & Pladevall-Izard, E.	Europe	France	FRA-Estibèra	42.8435700	0.1855460	2047	NA	NA	Barcode PCR
SB8309	*S. divinum*	EstSmag20	Pérez-Haase, A., Escolà-Lamora, N. & Pladevall-Izard, E.	Europe	France	FRA-Estibèra	42.8435700	0.1855460	2047	NA	NA	Barcode PCR
SB8310	*S. divinum*	ISSSMAG1	Pérez-Haase, A.	Europe	France	FRA-Izarbe	43.0246550	-0.8165180	1464	Male	div-6	RADseq
SB8311	*S. divinum*	ISSSMAG3	Pérez-Haase, A.	Europe	France	FRA-Izarbe	43.0246550	-0.8165180	1466	NA	NA	Barcode PCR
SB8312	*S. divinum*	ISSSMAG5	Pérez-Haase, A.	Europe	France	FRA-Izarbe	43.0246550	-0.8165180	1466	NA	NA	Barcode PCR
SB8313	*S. divinum*	ISSSMAG8	Pérez-Haase, A.	Europe	France	FRA-Izarbe	43.0246550	-0.8165180	1466	NA	NA	Barcode PCR
SB8314	*S. divinum*	ISSSMAG13	Pérez-Haase, A.	Europe	France	FRA-Izarbe	43.0246550	-0.8165180	1466	NA	NA	Barcode PCR
SB8315	*S. divinum*	ISSMAG23	Pérez-Haase, A.	Europe	France	FRA-Izarbe	43.0246550	-0.8165180	1466	NA	NA	Barcode PCR

SB8316	*S. divinum*	ISSMAG28	Pérez-Haase, A.	Europe	France	FRA-Izarbe	43.0246550	-0.8165180	1466	NA	NA	Barcode PCR
SB8317	*S. divinum*	ISSSMAG32	Pérez-Haase, A.	Europe	France	FRA-Izarbe	43.0246550	-0.8165180	1466	NA	NA	Barcode PCR
SB8318	*S. medium*	LORSMAG1	Pérez-Haase, A. & Pladevall-Izard, E.	Europe	France	FRA-Lorda	43.1103430	-0.0962180	426	Female	med-2	RADseq
SB8319	*S. medium*	LORSMAG3	Pérez-Haase, A. & Pladevall-Izard, E.	Europe	France	FRA-Lorda	43.1103430	-0.0962180	427	NA	NA	Barcode PCR
SB8320	*S. medium*	LORSMAG6	Pérez-Haase, A. & Pladevall-Izard, E.	Europe	France	FRA-Lorda	43.1103430	-0.0962180	427	NA	NA	Barcode PCR
SB8321	*S. medium*	LORSMAG9	Pérez-Haase, A. & Pladevall-Izard, E.	Europe	France	FRA-Lorda	43.1103430	-0.0962180	427	NA	NA	Barcode PCR
SB8322	*S. medium*	LORSMAG15	Pérez-Haase, A. & Pladevall-Izard, E.	Europe	France	FRA-Lorda	43.1103430	-0.0962180	427	NA	NA	Barcode PCR
SB8324	*S. medium*	LORSMAG31	Pérez-Haase, A. & Pladevall-Izard, E.	Europe	France	FRA-Lorda	43.1103430	-0.0962180	427	NA	NA	Barcode PCR
SB8326	*S. medium*	RiuSMAG1	Pérez-Haase, A., Escolà-Lamora, N. & Pladevall-Izard, E.	Europe	France	FRA-Riumajor	42.7023580	0.3047230	2010	Male	med-3	RADseq
SB8327	*S. medium*	RiuSMAG2	Pérez-Haase, A., Escolà-Lamora, N. & Pladevall-Izard, E.	Europe	France	FRA-Riumajor	42.7023580	0.3047230	2010	Male	med-3	RADseq
SB8328	*S. divinum*	RiuSmag06	Pérez-Haase, A., Escolà-Lamora, N. & Pladevall-Izard, E.	Europe	France	FRA-Riumajor	42.7023580	0.3047230	2009	NA	NA	Barcode PCR
SB8331	*S. medium*	RIUSMAG22	Pérez-Haase, A., Escolà-Lamora, N. & Pladevall-Izard, E.	Europe	France	FRA-Riumajor	42.7023580	0.3047230	2009	NA	NA	Barcode PCR
SB8333	*S. medium*	RiuSMAG27	Pérez-Haase, A., Escolà-Lamora, N. & Pladevall-Izard, E.	Europe	France	FRA-Riumajor	42.7023580	0.3047230	2009	NA	NA	Barcode PCR
SB8334	*S. divinum*	TRESMAG2	Pérez-Haase, A. & Rosique-Esplugas, C.	Europe	Spain	ESP-Trescuro	42.5520410	1.0547130	2044	Male	div-7	RADseq
SB8335	*S. divinum*	TRESMAG4	Pérez-Haase, A. & Rosique-Esplugas, C.	Europe	Spain	ESP-Trescuro	42.5520410	1.0547130	2044	Male	div-7	RADseq
SB8336	*S. divinum*	TRESMAG6	Pérez-Haase, A. & Rosique-Esplugas, C.	Europe	Spain	ESP-Trescuro	42.5520410	1.0547130	2047	NA	NA	Barcode PCR
SB8337	*S. divinum*	TRESMAG11	Pérez-Haase, A. & Rosique-Esplugas, C.	Europe	Spain	ESP-Trescuro	42.5520410	1.0547130	2047	NA	NA	Barcode PCR
SB8338	*S. divinum*	TRESMAG16	Pérez-Haase, A. & Rosique-Esplugas, C.	Europe	Spain	ESP-Trescuro	42.5520410	1.0547130	2047	NA	NA	Barcode PCR
SB8339	*S. divinum*	TRESMAG18	Pérez-Haase, A. & Rosique-Esplugas, C.	Europe	Spain	ESP-Trescuro	42.5520410	1.0547130	2047	NA	NA	Barcode PCR
SB8340	*S. divinum*	TRESMAG20	Pérez-Haase, A. & Rosique-Esplugas, C.	Europe	Spain	ESP-Trescuro	42.5520410	1.0547130	2047	NA	NA	Barcode PCR
SB8341	*S. divinum*	TRESMAG25	Pérez-Haase, A. & Rosique-Esplugas, C.	Europe	Spain	ESP-Trescuro	42.5520410	1.0547130	2047	NA	NA	Barcode PCR
SB8342	*S. divinum*	MAUSMAG1	Pérez-Haase, A. & Pladevall-Izard, E.	Europe	France	FRA-La Maura	42.7197740	1.9814770	2034	Female	div-8	RADseq
SB8343	*S. divinum*	MAUSMAG2	Pérez-Haase, A. & Pladevall-Izard, E.	Europe	France	FRA-La Maura	42.7197740	1.9814770	2034	Female	div-8	RADseq
SB8344	*S. divinum*	MAUSMAG3	Pérez-Haase, A. & Pladevall-Izard, E.	Europe	France	FRA-La Maura	42.7197740	1.9814770	2036	NA	NA	Barcode PCR
SB8345	*S. divinum*	MAUSMAG4	Pérez-Haase, A. & Pladevall-Izard, E.	Europe	France	FRA-La Maura	42.7197740	1.9814770	2036	NA	NA	Barcode PCR
SB8346	*S. divinum*	MAUSMAG5	Pérez-Haase, A. & Pladevall-Izard, E.	Europe	France	FRA-La Maura	42.7197740	1.9814770	2036	NA	NA	Barcode PCR
SB8347	*S. divinum*	MAUSMAG7	Pérez-Haase, A. & Pladevall-Izard, E.	Europe	France	FRA-La Maura	42.7197740	1.9814770	2036	NA	NA	Barcode PCR
SB8348	*S. divinum*	MAUSMAG9	Pérez-Haase, A. & Pladevall-Izard, E.	Europe	France	FRA-La Maura	42.7197740	1.9814770	2036	NA	NA	Barcode PCR
SB8349	*S. divinum*	MAUSMAG11	Pérez-Haase, A. & Pladevall-Izard, E.	Europe	France	FRA-La Maura	42.7197740	1.9814770	2036	NA	NA	Barcode PCR
SB8350	*S. divinum*	PVLL3	Pérez-Haase, A.	Europe	Spain	ESP-Las Llamas	43.1172820	-4.9831270	1486	Female	div-9	RADseq
SB8351	*S. divinum*	PVLL4	Pérez-Haase, A.	Europe	Spain	ESP-Las Llamas	43.1172820	-4.9831270	1486	Female	div-9	RADseq
SB8352	*S. divinum*	PVLL6	Pérez-Haase, A.	Europe	Spain	ESP-Las Llamas	43.1172820	-4.9831270	1488	NA	NA	Barcode PCR
SB8353	*S. divinum*	PVLL10	Pérez-Haase, A.	Europe	Spain	ESP-Las Llamas	43.1172820	-4.9831270	1488	NA	NA	Barcode PCR
SB8354	*S. divinum*	PVLL15	Pérez-Haase, A.	Europe	Spain	ESP-Las Llamas	43.1172820	-4.9831270	1488	NA	NA	Barcode PCR
SB8355	*S. divinum*	PVLL18	Pérez-Haase, A.	Europe	Spain	ESP-Las Llamas	43.1172820	-4.9831270	1488	NA	NA	Barcode PCR
SB8356	*S. divinum*	PVLL21	Pérez-Haase, A.	Europe	Spain	ESP-Las Llamas	43.1172820	-4.9831270	1488	NA	NA	Barcode PCR
SB8357	*S. divinum*	PVLL25	Pérez-Haase, A.	Europe	Spain	ESP-Las Llamas	43.1172820	-4.9831270	1488	NA	NA	Barcode PCR
SB8453	*S. divinum*	TU153277	Kupper, T.	Europe	Estonia	EST-Karjatnurme Rubina	58.0516100	25.7883600	102	Male	div-66	RADseq
SB8454	*S. divinum*	TU153374	Kupper, T.	Europe	Estonia	EST-Lindi	58.3073200	24.2340100	15	Male	div-67	RADseq
SB8455	*S. divinum*	TU153483	Kupper, T.	Europe	Estonia	EST-Kõrvenurga	59.1075600	25.4295900	88	Female	div-68	RADseq
SB8457	*S. divinum*	TU153646	Ingerpuu, N.	Europe	Estonia	EST-Tähtvere	58.3919200	26.6543500	56	Female	div-69	RADseq
SB8458	*S. divinum*	TU153647	Kupper, T.	Europe	Estonia	EST-Tähtvere	58.3919300	26.6538400	55	NA	NA	Barcode PCR
SB8461	*S. divinum*	TU153723	Ingerpuu, N. & Vellak, K.	Europe	Estonia	EST-Tähtvere	58.3919500	26.6537500	56	NA	NA	Barcode PCR
SB8466	*S. medium*	TU168559	Vellak, K.	Europe	Estonia	EST-KuresooBog	58.4652800	25.0383300	30	Male	med-35	RADseq
SB8467	*S. divinum*	TU168601	Vellak, K.	Europe	Latvia	LVA-Madiešenu Mire	57.5402368	24.9831012	89	Male	div-70	RADseq
SB8469	*S. divinum*	TU168620	Vellak, K.	Europe	Estonia	EST-Kurtna	59.2533300	27.5519400	53	Male	div-71	RADseq
SB8470	*S. divinum*	TU168658	Vellak, K.	Europe	Estonia	EST-Kurtna	59.2533300	27.5519400	53	Female	div-72	RADseq
SB8471	*S. medium*	TU168690	Vellak, K.	Europe	Latvia	LVA-Suda-Zviedru Mire	59.5830600	25.5813900	35	Female	med-36	RADseq
SB8475	*S. divinum*	TU169338	Süld, M-L.	Europe	Estonia	EST-Ämma	57.9891700	25.2691700	73	Male	div-73	RADseq
SB8476	*S. divinum*	TU169353	Vellak, K.	Europe	Estonia	EST-Tähtvere	58.3980600	26.6508300	53	Female	div-74	RADseq
SB8477	*S. divinum*	TU169424	Vellak, K.	Europe	Estonia	EST-Rannametsa South	58.0950000	24.5144400	10	Female	div-75	RADseq
SB8478	*S. divinum*	TU169427	Vellak, K.	Europe	Estonia	EST-Kastolats	58.0811100	26.5102800	129	Male	div-76	RADseq
SB8490	*S. divinum*	TU173049	Müür, M.	Europe	Estonia	EST-Villevere	58.6959800	25.4390400	63	Female	div-77	RADseq
SB8493	*S. divinum*	TU173153	Roosaluste, E.	Europe	Estonia	EST-Karjatnurme Rubina	58.0488611	25.7889000	100	NA	NA	Barcode PCR
SB8497	*S. divinum*	TU173223	Vellak, K.	Europe	Estonia	EST-Palasi	59.2511390	26.7543380	77	Male	div-78	RADseq
SB8498	*S. divinum*	TU173224	Vellak, K.	Europe	Estonia	EST-Palasi	59.2511390	26.7543380	77	Female	div-79	RADseq
SB8500	*S. medium*	TU173230	Vellak, K.	Europe	Estonia	EST-Seli	59.1710400	27.2747600	58	NA	NA	Barcode PCR
SB8501	*S. medium*	TU173235	Vellak, K.	Europe	Estonia	EST-Endla Tooma	58.8734350	26.2509930	80	Female	med-37	RADseq
SB8502	*S. divinum*	TU173246	Vellak, K.	Europe	Estonia	EST-Rõhu	58.8946900	26.1055100	83	Female	div-80	RADseq
SB8503	*S. divinum*	TU173256	Vellak, K.	Europe	Estonia	EST-Rannametsa North	58.1364800	24.5129500	20	Male	div-81	RADseq
SB8504	*S. divinum*	TU173261	Vellak, K.	Europe	Estonia	EST-Rannametsa North	58.1364800	24.5129500	20	NA	NA	Barcode PCR
SB8505	*S. medium*	TU173262	Vellak, K.	Europe	Estonia	EST-Rannametsa North	58.1371000	24.5198000	10	NA	NA	Barcode PCR
SB8507	*S. divinum*	TU173279	Vellak, K.	Europe	Estonia	EST-Rannametsa North	58.1361900	24.5128400	21	NA	NA	Barcode PCR
SB8508	*S. medium*	TU173280	Vellak, K.	Europe	Estonia	EST-Seli	59.1700100	27.2782080	58	NA	NA	Barcode PCR
SB8509	*S. divinum*	TU173379	Vellak, K.	Europe	Estonia	EST-Karuse Kõvertamme	58.6074000	23.7001000	25	Female	div-82	RADseq
SB8514	*S. divinum*	TU173500	Vellak, K.	Europe	Estonia	EST-Helenurme	58.6623155	24.3132958	20	Male	div-83	RADseq
SB8515	*S. divinum*	TU173558	Vellak, K.	Europe	Estonia	EST-Karuse Kõvertamme	58.6084300	23.7091900	20	Female	div-84	RADseq
SB8517	*S. divinum*	TU173627	Vellak, K.	Europe	Estonia	EST-Jarise	58.4652860	22.3935370	36	NA	NA	Barcode PCR
SB8520	*S. divinum*	TU173681	Vellak, K.	Europe	Estonia	EST-Tähtvere	58.3917200	26.6543400	58	NA	NA	Barcode PCR
SB8522	*S. medium*	TU173738	Vellak, K.	Europe	Estonia	EST-Nigula	58.0154700	24.6810200	61	NA	NA	Barcode PCR
SB8523	*S. medium*	TU173741	Vellak, K.	Europe	Estonia	EST-Nigula	58.0152200	24.6810400	60	NA	NA	Barcode PCR
SB8524	*S. medium*	TU173742	Vellak, K.	Europe	Estonia	EST-Nigula	58.0151700	24.6817300	60	NA	NA	Barcode PCR
SB8525	*S. medium*	TU173744	Vellak, K.	Europe	Estonia	EST-Nigula	58.0153600	24.6818500	60	NA	NA	Barcode PCR
SB8526	*S. divinum*	TU173751	Vellak, K.	Europe	Estonia	EST-Palasi	59.2426400	26.7582100	75	Male	div-10	RADseq
SB8527	*S. divinum*	TU173752	Vellak, K.	Europe	Estonia	EST-Palasi	59.2426400	26.7582100	75	Male	div-10	RADseq
SB8528	*S. divinum*	TU173753	Vellak, K.	Europe	Estonia	EST-Palasi	59.2461200	26.7603000	80	Male	div-85	RADseq
SB8537	*S. divinum*	TU174405	Pensa, M.	Europe	Estonia	EST-Monitoring Area ABE	59.1893628	27.8000178	34	NA	NA	Barcode PCR
SB8538	*S. divinum*	TU174406	Pensa, M.	Europe	Estonia	EST-Monitoring Area ABE	59.1892847	27.7999805	34	NA	NA	Barcode PCR
SB8539	*S. divinum*	TU174407	Pensa, M.	Europe	Estonia	EST-Monitoring Area ABE	59.1957402	27.8042931	33	NA	NA	Barcode PCR
SB8540	*S. divinum*	TU174408	Pensa, M.	Europe	Estonia	EST-Monitoring Area ABE	59.1892847	27.7999805	34	NA	NA	Barcode PCR
SB8541	*S. divinum*	TU174409	Pensa, M.	Europe	Estonia	EST-Monitoring Area ABE	59.1892847	27.7999805	34	NA	NA	Barcode PCR
SB8542	*S. divinum*	TU174410	Pensa, M.	Europe	Estonia	EST-Monitoring Area ABE	59.1957402	27.8042931	33	NA	NA	Barcode PCR

SB8543	*S. divinum*	TU174411	Pensa, M.	Europe	Estonia	EST-Monitoring Area ABE	59.2022328	27.8062900	34	NA	NA	Barcode PCR
SB8544	*S. divinum*	TU174412	Pensa, M.	Europe	Estonia	EST-Monitoring Area ABE	59.1893628	27.8000178	34	NA	NA	Barcode PCR
SB8545	*S. medium*	TU174417	Pensa, M.	Europe	Estonia	EST-Monitoring Area ABE	59.2206613	27.6412820	44	NA	NA	Barcode PCR
SB8546	*S. medium*	TU174418	Pensa, M.	Europe	Estonia	EST-Monitoring Area ABE	59.2140835	27.6407837	42	NA	NA	Barcode PCR
SB8547	*S. medium*	TU174419	Pensa, M.	Europe	Estonia	EST-Monitoring Area ABE	59.2206315	27.6414050	44	NA	NA	Barcode PCR
SB8548	*S. medium*	TU174420	Pensa, M.	Europe	Estonia	EST-Monitoring Area ABE	59.2140835	27.6407837	42	NA	NA	Barcode PCR
SB8549	*S. medium*	TU174422	Pensa, M.	Europe	Estonia	EST-Monitoring Area ABE	59.2206315	27.6414050	44	NA	NA	Barcode PCR
SB8550	*S. medium*	TU174423	Pensa, M.	Europe	Estonia	EST-Monitoring Area ABE	59.2206613	27.6412825	44	NA	NA	Barcode PCR
SB8551	*S. medium*	TU174424	Pensa, M.	Europe	Estonia	EST-Monitoring Area ABE	59.2206315	27.6414050	44	NA	NA	Barcode PCR
SB8552	*S. medium*	TU174425	Pensa, M.	Europe	Estonia	EST-Monitoring Area ABE	59.2206613	27.6412825	44	NA	NA	Barcode PCR
SB8553	*S. medium*	TU174426	Pensa, M.	Europe	Estonia	EST-Monitoring Area ABE	59.2140835	27.6407837	42	NA	NA	Barcode PCR
SB8554	*S. medium*	TU174427	Pensa, M.	Europe	Estonia	EST-Monitoring Area ABE	59.2140835	27.6407837	42	NA	NA	Barcode PCR
SB8555	*S. divinum*	TU175677	Vellak, K.	Europe	Estonia	EST-Tuhu	58.5675000	23.8258300	18	Male	div-86	RADseq
SB8556	*S. divinum*	TU178852	Vellak, K.	Europe	Estonia	EST-Tuhu	58.5706700	23.8314700	18	Female	div-11	RADseq
SB8559	*S. divinum*	TU179046	Kass, V.	Europe	Estonia	EST-Taagepera	57.9930621	25.6917237	103	Female	div-87	RADseq
SB8564	*S. divinum*	TU180494	Biedermann, A.	Europe	Estonia	EST-Tuhu	58.5685870	23.8297220	18	Female	div-11	RADseq
SB8565	*S. divinum*	TU180607	Ingerpuu, N.	Europe	Estonia	EST-Kogrejärv	58.1304100	26.7066600	137	Female	div-88	RADseq
SB8566	*S. divinum*	ARTSMAG23	Pérez-Haase, A. & Escolà-Lamora, N.	Europe	France	FRA-Artiga	42.9092200	0.7751830	1424	NA	NA	Barcode PCR
SB8567	*S. divinum*	ARTSMAG24	Pérez-Haase, A. & Escolà-Lamora, N.	Europe	France	FRA-Artiga	42.9092200	0.7751830	1424	NA	NA	Barcode PCR
SB8568	*S. divinum*	ARTSMAG33	Pérez-Haase, A. & Escolà-Lamora, N.	Europe	France	FRA-Artiga	42.9092200	0.7751830	1424	NA	NA	Barcode PCR
SB8569	*S. divinum*	ARTSMAG35	Pérez-Haase, A. & Escolà-Lamora, N.	Europe	France	FRA-Artiga	42.9092200	0.7751830	1424	NA	NA	Barcode PCR
SB8570	*S. divinum*	ARTSMAG37	Pérez-Haase, A. & Escolà-Lamora, N.	Europe	France	FRA-Artiga	42.9092200	0.7751830	1424	NA	NA	Barcode PCR
SB8571	*S. divinum*	ARTSMAG39	Pérez-Haase, A. & Escolà-Lamora, N.	Europe	France	FRA-Artiga	42.9092200	0.7751830	1424	NA	NA	Barcode PCR
SB8572	*S. divinum*	BAISMAG8	Pérez-Haase, A.	Europe	Spain	ESP-Baigura	42.8781800	-1.2320220	1259	NA	NA	Barcode PCR
SB8573	*S. divinum*	BAISMAG12	Pérez-Haase, A.	Europe	Spain	ESP-Baigura	42.8781800	-1.2320220	1259	NA	NA	Barcode PCR
SB8574	*S. divinum*	BAISMAG14	Pérez-Haase, A.	Europe	Spain	ESP-Baigura	42.8781800	-1.2320220	1259	NA	NA	Barcode PCR
SB8575	*S. divinum*	BAISMAG20	Pérez-Haase, A.	Europe	Spain	ESP-Baigura	42.8781800	-1.2320220	1259	NA	NA	Barcode PCR
SB8576	*S. divinum*	BAISMAG30	Pérez-Haase, A.	Europe	Spain	ESP-Baigura	42.8781800	-1.2320220	1259	NA	NA	Barcode PCR
SB8577	*S. divinum*	BAISMAG33	Pérez-Haase, A.	Europe	Spain	ESP-Baigura	42.8781800	-1.2320220	1259	NA	NA	Barcode PCR
SB8578	*S. divinum*	BN_SMAG6	Pérez-Haase, A., Escolà-Lamora, N., Pladevall-Izard, E. & Rosique-Esplugas, C.	Europe	Spain	ESP-Bassa Nera	42.6379970	0.9247840	1892	NA	NA	Barcode PCR
SB8579	*S. divinum*	BN_SMAG11	Pérez-Haase, A., Escolà-Lamora, N., Pladevall-Izard, E. & Rosique-Esplugas, C.	Europe	Spain	ESP-Bassa Nera	42.6379970	0.9247840	1892	NA	NA	Barcode PCR
SB8581	*S. divinum*	SBNSMAG3	Pérez-Haase, A., Escolà-Lamora, N., Pladevall-Izard, E. & Rosique-Esplugas, C.	Europe	Spain	ESP-Bassa Nera	42.6379970	0.9247840	1892	NA	NA	Barcode PCR
SB8582	*S. divinum*	SBNSmag1201N	Pérez-Haase, A., Escolà-Lamora, N., Pladevall-Izard, E. & Rosique-Esplugas, C.	Europe	Spain	ESP-Bassa Nera	42.6379970	0.9247840	1892	NA	NA	Barcode PCR
SB8583	*S. divinum*	SBNSMAG16	Pérez-Haase, A., Escolà-Lamora, N., Pladevall-Izard, E. & Rosique-Esplugas, C.	Europe	Spain	ESP-Bassa Nera	42.6379970	0.9247840	1892	NA	NA	Barcode PCR
SB8584	*S. divinum*	COLSMAG3	Pérez-Haase, A. & Escolà-Lamora, N. & Guardiola-Bufí, M.	Europe	Spain	ESP-Colomèrs	42.6279500	0.9353460	2166	Male	div-4	RADseq
SB8585	*S. divinum*	COLSMAG5	Pérez-Haase, A. & Escolà-Lamora, N. & Guardiola-Bufí, M.	Europe	Spain	ESP-Colomèrs	42.6279500	0.9353460	2169	NA	NA	Barcode PCR
SB8586	*S. divinum*	COLSMAG7	Pérez-Haase, A. & Escolà-Lamora, N. & Guardiola-Bufí, M.	Europe	Spain	ESP-Colomèrs	42.6279500	0.9353460	2169	NA	NA	Barcode PCR
SB8587	*S. divinum*	COLSMAG10	Pérez-Haase, A. & Escolà-Lamora, N. & Guardiola-Bufí, M.	Europe	Spain	ESP-Colomèrs	42.6279500	0.9353460	2169	NA	NA	Barcode PCR
SB8588	*S. divinum*	COLSMAG12	Pérez-Haase, A. & Escolà-Lamora, N. & Guardiola-Bufí, M.	Europe	Spain	ESP-Colomèrs	42.6279500	0.9353460	2169	NA	NA	Barcode PCR
SB8589	*S. divinum*	COLSMAG15	Pérez-Haase, A. & Escolà-Lamora, N. & Guardiola-Bufí, M.	Europe	Spain	ESP-Colomèrs	42.6279500	0.9353460	2169	NA	NA	Barcode PCR
SB8590	*S. divinum*	COLSMAG17	Pérez-Haase, A. & Escolà-Lamora, N. & Guardiola-Bufí, M.	Europe	Spain	ESP-Colomèrs	42.6279500	0.9353460	2169	NA	NA	Barcode PCR
SB8591	*S. divinum*	COLSMAG18	Pérez-Haase, A. & Escolà-Lamora, N. & Guardiola-Bufí, M.	Europe	Spain	ESP-Colomèrs	42.6279500	0.9353460	2169	NA	NA	Barcode PCR
SB8592	*S. divinum*	EPSMAG03APH	Pérez-Haase, A., Escolà-Lamora, N., Pladevall-Izard, E. & Rosique-Esplugas, C.	Europe	Spain	ESP-Era Planhòla	42.6453510	0.9312730	1829	Male	div-4	RADseq
SB8593	*S. divinum*	EP_SMAG7	Pérez-Haase, A., Escolà-Lamora, N., Pladevall-Izard, E. & Rosique-Esplugas, C.	Europe	Spain	ESP-Era Planhòla	42.6453510	0.9312730	1831	NA	NA	Barcode PCR
SB8594	*S. divinum*	EP_SMAG10	Pérez-Haase, A., Escolà-Lamora, N., Pladevall-Izard, E. & Rosique-Esplugas, C.	Europe	Spain	ESP-Era Planhòla	42.6453510	0.9312730	1831	NA	NA	Barcode PCR
SB8595	*S. divinum*	EP_SMAG17	Pérez-Haase, A., Escolà-Lamora, N., Pladevall-Izard, E. & Rosique-Esplugas, C.	Europe	Spain	ESP-Era Planhòla	42.6453510	0.9312730	1831	NA	NA	Barcode PCR
SB8596	*S. divinum*	SEPSMAG3	Pérez-Haase, A., Escolà-Lamora, N., Pladevall-Izard, E. & Rosique-Esplugas, C.	Europe	Spain	ESP-Era Planhòla	42.6453510	0.9312730	1831	NA	NA	Barcode PCR
SB8597	*S. divinum*	SEPSMAG06	Pérez-Haase, A., Escolà-Lamora, N., Pladevall-Izard, E. & Rosique-Esplugas, C.	Europe	Spain	ESP-Era Planhòla	42.6453510	0.9312730	1831	NA	NA	Barcode PCR
SB8598	*S. divinum*	SEPSMAG10	Pérez-Haase, A., Escolà-Lamora, N., Pladevall-Izard, E. & Rosique-Esplugas, C.	Europe	Spain	ESP-Era Planhòla	42.6453510	0.9312730	1831	NA	NA	Barcode PCR
SB8599	*S. divinum*	SEPSMAG12	Pérez-Haase, A., Escolà-Lamora, N., Pladevall-Izard, E. & Rosique-Esplugas, C.	Europe	Spain	ESP-Era Planhòla	42.6453510	0.9312730	1831	NA	NA	Barcode PCR
SB8600	*S. divinum*	SEPSMAG14	Pérez-Haase, A., Escolà-Lamora, N., Pladevall-Izard, E. & Rosique-Esplugas, C.	Europe	Spain	ESP-Era Planhòla	42.6453510	0.9312730	1831	NA	NA	Barcode PCR
SB8601	*S. divinum*	ERASMAG03	Pérez-Haase, A. & Rochés-Ribalta, R.	Europe	France	FRA-Estany del Racó	42.5536160	2.0089610	2011	NA	NA	Barcode PCR
SB8602	*S. divinum*	ERASMAG7	Pérez-Haase, A. & Rochés-Ribalta, R.	Europe	France	FRA-Estany del Racó	42.5536160	2.0089610	2011	NA	NA	Barcode PCR
SB8603	*S. divinum*	ERASMAG14	Pérez-Haase, A. & Rochés-Ribalta, R.	Europe	France	FRA-Estany del Racó	42.5536160	2.0089610	2011	NA	NA	Barcode PCR
SB8604	*S. divinum*	ERASMAG21	Pérez-Haase, A. & Rochés-Ribalta, R.	Europe	France	FRA-Estany del Racó	42.5536160	2.0089610	2011	NA	NA	Barcode PCR
SB8605	*S. divinum*	ERASMAG28	Pérez-Haase, A. & Rochés-Ribalta, R.	Europe	France	FRA-Estany del Racó	42.5536160	2.0089610	2011	NA	NA	Barcode PCR
SB8606	*S. divinum*	ERASMAG33	Pérez-Haase, A. & Rochés-Ribalta, R.	Europe	France	FRA-Estany del Racó	42.5536160	2.0089610	2011	NA	NA	Barcode PCR
SB8607	*S. divinum*	EstSMAG6	Pérez-Haase, A., Escolà-Lamora, N. & Pladevall-Izard, E.	Europe	France	FRA-Estibèra	42.8435700	0.1855460	2047	NA	NA	Barcode PCR
SB8608	*S. divinum*	EstSMAG9	Pérez-Haase, A., Escolà-Lamora, N. & Pladevall-Izard, E.	Europe	France	FRA-Estibèra	42.8435700	0.1855460	2047	NA	NA	Barcode PCR
SB8609	*S. divinum*	EstSMAG12	Pérez-Haase, A., Escolà-Lamora, N. & Pladevall-Izard, E.	Europe	France	FRA-Estibèra	42.8435700	0.1855460	2047	NA	NA	Barcode PCR
SB8610	*S. divinum*	EstSMAG16	Pérez-Haase, A., Escolà-Lamora, N. & Pladevall-Izard, E.	Europe	France	FRA-Estibèra	42.8435700	0.1855460	2047	NA	NA	Barcode PCR
SB8611	*S. divinum*	EstSMAG18	Pérez-Haase, A., Escolà-Lamora, N. & Pladevall-Izard, E.	Europe	France	FRA-Estibèra	42.8435700	0.1855460	2047	NA	NA	Barcode PCR
SB8612	*S. divinum*	ISSSMAG2	Pérez-Haase, A.	Europe	France	FRA-Izarbe	43.0246550	-0.8165180	1464	Male	div-6	RADseq
SB8613	*S. divinum*	ISSMAG04	Pérez-Haase, A.	Europe	France	FRA-Izarbe	43.0246550	-0.8165180	1466	NA	NA	Barcode PCR
SB8614	*S. divinum*	ISSSMAG6	Pérez-Haase, A.	Europe	France	FRA-Izarbe	43.0246550	-0.8165180	1466	NA	NA	Barcode PCR
SB8615	*S. divinum*	ISSSMAG9	Pérez-Haase, A.	Europe	France	FRA-Izarbe	43.0246550	-0.8165180	1466	NA	NA	Barcode PCR
SB8616	*S. divinum*	ISSMAG17	Pérez-Haase, A.	Europe	France	FRA-Izarbe	43.0246550	-0.8165180	1466	NA	NA	Barcode PCR
SB8617	*S. divinum*	ISSSMAG24	Pérez-Haase, A.	Europe	France	FRA-Izarbe	43.0246550	-0.8165180	1466	NA	NA	Barcode PCR
SB8618	*S. divinum*	ISSSMAG29	Pérez-Haase, A.	Europe	France	FRA-Izarbe	43.0246550	-0.8165180	1466	NA	NA	Barcode PCR
SB8619	*S. medium*	LORSMAG2	Pérez-Haase, A. & Pladevall-Izard, E.	Europe	France	FRA-Lorda	43.1103430	-0.0962180	426	Female	med-2	RADseq
SB8620	*S. medium*	LORSMAG5	Pérez-Haase, A. & Pladevall-Izard, E.	Europe	France	FRA-Lorda	43.1103430	-0.0962180	427	NA	NA	Barcode PCR
SB8621	*S. medium*	LORSMAG8	Pérez-Haase, A. & Pladevall-Izard, E.	Europe	France	FRA-Lorda	43.1103430	-0.0962180	427	NA	NA	Barcode PCR
SB8624	*S. medium*	LORSMAG26	Pérez-Haase, A. & Pladevall-Izard, E.	Europe	France	FRA-Lorda	43.1103430	-0.0962180	427	NA	NA	Barcode PCR
SB8628	*S. medium*	RiuSMAG17	Pérez-Haase, A., Escolà-Lamora, N. & Pladevall-Izard, E.	Europe	France	FRA-Riumajor	42.7023580	0.3047230	2009	NA	NA	Barcode PCR
SB8630	*S. medium*	RIUSMAG26	Pérez-Haase, A., Escolà-Lamora, N. & Pladevall-Izard, E.	Europe	France	FRA-Riumajor	42.7023580	0.3047230	2009	NA	NA	Barcode PCR
SB8631	*S. divinum*	TRESMAG8	Pérez-Haase, A. & Rosique-Esplugas, C.	Europe	Spain	ESP-Trescuro	42.5520410	1.0547130	2047	NA	NA	Barcode PCR
SB8632	*S. divinum*	TRESMAG13	Pérez-Haase, A. & Rosique-Esplugas, C.	Europe	Spain	ESP-Trescuro	42.5520410	1.0547130	2047	NA	NA	Barcode PCR
SB8633	*S. divinum*	TRESMAG17	Pérez-Haase, A. & Rosique-Esplugas, C.	Europe	Spain	ESP-Trescuro	42.5520410	1.0547130	2047	NA	NA	Barcode PCR
SB8634	*S. divinum*	TRESMAG19	Pérez-Haase, A. & Rosique-Esplugas, C.	Europe	Spain	ESP-Trescuro	42.5520410	1.0547130	2047	NA	NA	Barcode PCR
SB8635	*S. divinum*	TRESMAG24	Pérez-Haase, A. & Rosique-Esplugas, C.	Europe	Spain	ESP-Trescuro	42.5520410	1.0547130	2047	NA	NA	Barcode PCR
SB8636	*S. divinum*	MAUSMAG6	Pérez-Haase, A. & Pladevall-Izard, E.	Europe	France	FRA-La Maura	42.7197740	1.9814770	2036	NA	NA	Barcode PCR
SB8637	*S. divinum*	MAUSMAG8	Pérez-Haase, A. & Pladevall-Izard, E.	Europe	France	FRA-La Maura	42.7197740	1.9814770	2036	NA	NA	Barcode PCR

SB8638	*S. divinum*	MAUSMAG10	Pérez-Haase, A. & Pladevall-Izard, E.	Europe	France	FRA-La Maura	42.7197740	1.9814770	2036	NA	NA	Barcode PCR
SB8639	*S. divinum*	PVLL5	Pérez-Haase, A.	Europe	Spain	ESP-Las Llamas	43.1172820	-4.9831270	1488	NA	NA	Barcode PCR
SB8640	*S. divinum*	PVLL8	Pérez-Haase, A.	Europe	Spain	ESP-Las Llamas	43.1172820	-4.9831270	1488	NA	NA	Barcode PCR
SB8641	*S. divinum*	PVLL14	Pérez-Haase, A.	Europe	Spain	ESP-Las Llamas	43.1172820	-4.9831270	1488	NA	NA	Barcode PCR
SB8642	*S. divinum*	PVLL17	Pérez-Haase, A.	Europe	Spain	ESP-Las Llamas	43.1172820	-4.9831270	1488	NA	NA	Barcode PCR
SB8643	*S. divinum*	PVLL20	Pérez-Haase, A.	Europe	Spain	ESP-Las Llamas	43.1172820	-4.9831270	1488	NA	NA	Barcode PCR
SB8644	*S. divinum*	PVLL22	Pérez-Haase, A.	Europe	Spain	ESP-Las Llamas	43.1172820	-4.9831270	1488	NA	NA	Barcode PCR
SB9184	*S. medium*	s.n. 1	BenJeddi, S.	Europe	Ireland	IRL-Carnagopple	53.4956998	-8.4741886	61	Male	med-4	RADseq
SB9186	*S. medium*	s.n. 2	BenJeddi, S.	Europe	Ireland	IRL-Carnagopple	53.4956998	-8.4741886	61	Male	med-4	RADseq
SB9187	*S. medium*	s.n. 3	BenJeddi, S.	Europe	Ireland	IRL-Derry Bog	54.0918430	-9.5748460	90	Female	med-5	RADseq
SB9188	*S. medium*	s.n. 4	BenJeddi, S.	Europe	Ireland	IRL-Derry Bog	54.0918430	-9.5748460	90	Female	med-5	RADseq
Smag_ref_genome	*S. divinum*	ref-AGHCS	Weston, D.	North America	USA-Minnesota	MN-Spruce	47.5066390	-93.4558970	416	Male	div-89	RADseq
UP-1-12-r1	*S. medium*	1:12 (round 1)	Lizzy	Europe	Sweden	SWE-Hagshult	57.3409720	14.2044420	181	Male	med-18	RADseq
UP-1-12-r4	*S. medium*	1:12 (round 4)	Lizzy	Europe	Sweden	SWE-Hagshult	57.3409720	14.2044420	181	Male	med-18	RADseq
UP-1-13-r5	*S. medium*	1:13 (round 5)	Lizzy	Europe	Sweden	SWE-Långö Mosse	57.3357370	14.0208000	171	Female	med-38	RADseq
UP-1-3-m	*S. medium*	1:3 merged	Lizzy	Europe	Sweden	SWE-Uppebo	57.3366700	13.9747170	171	Female	med-39	RADseq
UP-1-4-m	*S. medium*	1:4 merged	Lizzy	Europe	Sweden	SWE-Jönshult	57.3385300	14.2807870	185	Male	med-40	RADseq
UP-1-6-m	*S. medium*	1:6 merged	Lizzy	Europe	Sweden	SWE-Råhult	57.2820280	14.2327200	173	Male	med-41	RADseq
UP-1-8-r2	*S. medium*	1:8 (round 2)	Lizzy	Europe	Sweden	SWE-Fryele	57.2625690	14.1367060	167	Male	med-42	RADseq
UP-1-S93-A	*S. medium*	1 S93 A	Granath, G.	Europe	Sweden	SWE-Våxmossen	58.5341720	15.4726750	87	Female	med-6	RADseq
UP-2-1-r3	*S. medium*	2:1 (round 3)	Lizzy	Europe	Sweden	SWE-Anderstorps Stormosse	57.3391200	13.5847470	165	Female	med-43	RADseq
UP-2-16-r1	*S. medium*	2:16 (round 1)	Lizzy	Europe	Sweden	SWE-Kvistbäck	57.4989000	13.5909500	186	Male	med-7	RADseq
UP-2-16-r3	*S. medium*	2:16 (round 3)	Lizzy	Europe	Sweden	SWE-Kvistbäck	57.4989000	13.5909500	186	Male	med-7	RADseq
UP-2-19-m	*S. medium*	2:19 merged	Lizzy	Europe	Sweden	SWE-Bobacka	57.2071720	13.7819750	163	Male	med-44	RADseq
UP-2-20-r4	*S. medium*	2:20 (round 4)	Lizzy	Europe	Sweden	SWE-Hassleas	57.4646000	13.3982280	184	Male	med-45	RADseq
UP-2-24-m	*S. medium*	2:24 merged	Lizzy	Europe	Sweden	SWE-Stegaryd	56.9801870	13.8928500	181	Female	med-46	RADseq
UP-2-26-m	*S. medium*	2:26 merged	Lizzy	Europe	Sweden	SWE-Kolasjön	57.4695700	13.8851330	273	Female	med-47	RADseq
UP-2-27-m	*S. medium*	2:27 merged	Lizzy	Europe	Sweden	SWE-Slättö	57.1067920	13.7169420	149	Female	med-48	RADseq
UP-2-28-m2	*S. medium*	2:28 merged (2)	Lizzy	Europe	Sweden	SWE-Torskinge	57.1118560	13.7850830	151	Male	med-49	RADseq
UP-2-3-m	*S. medium*	2:3 merged	Lizzy	Europe	Sweden	SWE-Åstorp	57.1680970	13.7937470	155	Female	med-50	RADseq
UP-2-5-m	*S. medium*	2:5 merged	Lizzy	Europe	Sweden	SWE-Horsnäsamossen	56.8239880	14.0830390	156	Male	med-51	RADseq
UP-2-6-m	*S. medium*	2:6 merged	Lizzy	Europe	Sweden	SWE-Össjö	56.7710500	14.0359170	143	Male	med-52	RADseq
UP-2-8-m	*S. medium*	2:8 merged	Lizzy	Europe	Sweden	SWE-Stackebo	57.4444370	13.4653250	216	Female	med-53	RADseq
UP-3-A26-B	*S. divinum*	3 A26 B	NA	Europe	Austria	AUT-Unternberg	47.1002933	13.7096233	1029	Female	div-25	RADseq
UP-A10-redo	*S. divinum*	A10	NA	Europe	Austria	AUT-Greith	47.1077680	13.8844000	1861	Female	div-90	RADseq
UP-A100	*S. medium*	A100	NA	Europe	Austria	AUT-Aussichtsturm Wenger	47.9289660	13.1771460	511	Female	med-8	RADseq
UP-A101	*S. medium*	A101	NA	Europe	Austria	AUT-Aussichtsturm Wenger	47.9289660	13.1771460	511	Female	med-54	RADseq
UP-A102	*S. divinum*	A102	NA	Europe	Austria	AUT-Aussichtsturm Wenger	47.9289660	13.1771460	511	Female	div-91	RADseq
UP-A103-r2	*S. divinum*	A103 repeated 2	NA	Europe	Austria	AUT-Aussichtsturm Wenger	47.9289660	13.1771460	511	Male	div-92	RADseq
UP-A105	*S. divinum*	A105	NA	Europe	Austria	AUT-Aussichtsturm Wenger	47.9289660	13.1771460	511	Male	div-12	RADseq
UP-A105x	*S. divinum*	A105x	NA	Europe	Austria	AUT-Aussichtsturm Wenger	47.9289660	13.1771460	511	Male	div-93	RADseq
UP-A106	*S. divinum*	A106	NA	Europe	Austria	AUT-Aussichtsturm Wenger	47.9289660	13.1771460	511	Male	div-13	RADseq
UP-A11	*S. divinum*	A11	NA	Europe	Austria	AUT-Greith	47.1077680	13.8844000	1861	Male	div-94	RADseq
UP-A110	*S. medium*	A110	NA	Europe	Austria	AUT-Aineck	47.0849983	13.6782217	1038	Male	med-9	RADseq
UP-A111	*S. medium*	A111	NA	Europe	Austria	AUT-Aineck	47.0849983	13.6782217	1038	Male	med-9	RADseq
UP-A114-redo	*S. medium*	A114	NA	Europe	Austria	AUT-Aineck	47.0849983	13.6782217	1038	Male	med-55	RADseq
UP-A115	*S. medium*	A115	NA	Europe	Austria	AUT-Aineck	47.0849983	13.6782217	1038	Male	med-56	RADseq
UP-A116	*S. medium*	A116	NA	Europe	Austria	AUT-Aineck	47.0849983	13.6782217	1038	Male	med-9	RADseq
UP-A118	*S. divinum*	A118	NA	Europe	Austria	AUT-Aineck	47.0849983	13.6782217	1038	Female	div-95	RADseq
UP-A120	*S. medium*	A120	NA	Europe	Austria	AUT-Aineck	47.0849983	13.6782217	1038	Male	med-9	RADseq
UP-A121	*S. medium*	A121	NA	Europe	Austria	AUT-Aineck	47.0849983	13.6782217	1038	Female	med-8	RADseq
UP-A123	*S. divinum*	A123	NA	Europe	Austria	AUT-Prebersee	47.1847853	13.8592817	1509	Female	div-96	RADseq
UP-A13	*S. divinum*	A13	NA	Europe	Austria	AUT-Greith	47.1077680	13.8844000	1861	Male	div-97	RADseq
UP-A14	*S. divinum*	A14	NA	Europe	Austria	AUT-Greith	47.1077680	13.8844000	1861	Female	div-98	RADseq
UP-A15	*S. divinum*	A15	NA	Europe	Austria	AUT-Greith	47.1077680	13.8844000	1861	Female	div-26	RADseq
UP-A16	*S. divinum*	A16	NA	Europe	Austria	AUT-Greith	47.1077680	13.8844000	1861	Male	div-99	RADseq
UP-A17	*S. divinum*	A17	NA	Europe	Austria	AUT-Greith	47.1077680	13.8844000	1861	Female	div-100	RADseq
UP-A20	*S. divinum*	A20	NA	Europe	Austria	AUT-Greith	47.1077680	13.8844000	1861	Female	div-101	RADseq
UP-A21	*S. divinum*	A21	NA	Europe	Austria	AUT-Greith	47.1077680	13.8844000	1861	Female	div-102	RADseq
UP-A22	*S. divinum*	A22	NA	Europe	Austria	AUT-Greith	47.1077680	13.8844000	1861	Female	div-26	RADseq
UP-A25	*S. divinum*	A25	NA	Europe	Austria	AUT-Unternberg	47.1002933	13.7096233	1029	Male	div-23	RADseq
UP-A26-m	*S. divinum*	A26 Merged	NA	Europe	Austria	AUT-Unternberg	47.1002933	13.7096233	1029	Female	div-25	RADseq
UP-A27	*S. divinum*	A27	NA	Europe	Austria	AUT-Unternberg	47.1002933	13.7096233	1029	Female	div-25	RADseq
UP-A28	*S. divinum*	A28	NA	Europe	Austria	AUT-Unternberg	47.1002933	13.7096233	1029	Unknown	div-103	RADseq
UP-A29	*S. divinum*	A29	NA	Europe	Austria	AUT-Unternberg	47.1002933	13.7096233	1029	Female	div-24	RADseq
UP-A3-my	*S. divinum*	A3 Merged Yvonne	NA	Europe	Austria	AUT-Aussichtsturm Wenger	47.9289660	13.1771460	511	Male	div-13	RADseq
UP-A30	*S. divinum*	A30	NA	Europe	Austria	AUT-Unternberg	47.1002933	13.7096233	1029	Female	div-24	RADseq
UP-A33-redo	*S. divinum*	A33	NA	Europe	Austria	AUT-Unternberg	47.1002933	13.7096233	1029	Female	div-104	RADseq
UP-A35	*S. divinum*	A35	NA	Europe	Austria	AUT-Unternberg	47.1002933	13.7096233	1029	Male	div-14	RADseq
UP-A36	*S. divinum*	A36	NA	Europe	Austria	AUT-Unternberg	47.1002933	13.7096233	1029	Male	div-14	RADseq
UP-A37	*S. divinum*	A37	NA	Europe	Austria	AUT-Unternberg	47.1002933	13.7096233	1029	Male	div-105	RADseq
UP-A38	*S. divinum*	A38	NA	Europe	Austria	AUT-Unternberg	47.1002933	13.7096233	1029	Female	div-24	RADseq
UP-A4	*S. medium*	A4	NA	Europe	Austria	AUT-Greith	47.1077680	13.8844000	1861	Female	med-8	RADseq
UP-A40	*S. divinum*	A40	NA	Europe	Austria	AUT-Tamsweg	47.0837863	13.7823538	1692	Male	div-15	RADseq
UP-A41	*S. divinum*	A41	NA	Europe	Austria	AUT-Tamsweg	47.0837863	13.7823538	1692	Male	div-106	RADseq
UP-A42	*S. divinum*	A42	NA	Europe	Austria	AUT-Tamsweg	47.0837863	13.7823538	1692	Male	div-15	RADseq
UP-A43	*S. divinum*	A43	NA	Europe	Austria	AUT-Tamsweg	47.0837863	13.7823538	1692	Male	div-107	RADseq
UP-A46	*S. divinum*	A46	NA	Europe	Austria	AUT-Tamsweg	47.0837863	13.7823538	1692	Male	div-108	RADseq
UP-A47	*S. divinum*	A47	NA	Europe	Austria	AUT-Tamsweg	47.0837863	13.7823538	1692	Male	div-109	RADseq
UP-A48	*S. divinum*	A48	NA	Europe	Austria	AUT-Tamsweg	47.0837863	13.7823538	1692	Male	div-110	RADseq
UP-A52	*S. divinum*	A52	NA	Europe	Austria	AUT-Tamsweg	47.0837863	13.7823538	1692	Male	div-111	RADseq
UP-A55	*S. divinum*	A55	NA	Europe	Austria	AUT-Tamsweg	47.0837863	13.7823538	1692	Male	div-15	RADseq

UP-A56	*S. divinum*	A56	NA	Europe	Austria	AUT-Tamsweg	47.0837863	13.7823538	1692	Male	div-112	RADseq
UP-A57	*S. divinum*	A57	NA	Europe	Austria	AUT-Tamsweg	47.0837863	13.7823538	1692	Male	div-15	RADseq
UP-A58	*S. divinum*	A58	NA	Europe	Austria	AUT-Tamsweg	47.0837863	13.7823538	1692	Male	div-15	RADseq
UP-A59	*S. divinum*	A59	NA	Europe	Austria	AUT-Tamsweg	47.0837863	13.7823538	1692	Male	div-15	RADseq
UP-A6-redo	*S. divinum*	A6	NA	Europe	Austria	AUT-Greith	47.1077680	13.8844000	1861	Male	div-113	RADseq
UP-A62	*S. divinum*	A62	NA	Europe	Austria	AUT-Tamsweg	47.0837863	13.7823538	1692	Male	div-15	RADseq
UP-A65	*S. divinum*	A65	NA	Europe	Austria	AUT-Tamsweg	47.0837863	13.7823538	1692	Female	div-114	RADseq
UP-A66	*S. divinum*	A66	NA	Europe	Austria	AUT-Tamsweg	47.0837863	13.7823538	1692	Female	div-16	RADseq
UP-A69	*S. divinum*	A69	NA	Europe	Austria	AUT-Tamsweg	47.0837863	13.7823538	1692	Female	div-16	RADseq
UP-A7	*S. divinum*	A7	NA	Europe	Austria	AUT-Greith	47.1077680	13.8844000	1861	Male	div-115	RADseq
UP-A70	*S. divinum*	A70	NA	Europe	Austria	AUT-Tamsweg	47.0837863	13.7823538	1692	Female	div-16	RADseq
UP-A71	*S. divinum*	A71	NA	Europe	Austria	AUT-Tamsweg	47.0837863	13.7823538	1692	Female	div-16	RADseq
UP-A72	*S. divinum*	A72	NA	Europe	Austria	AUT-Wolfgang	47.7660933	13.4832400	795	Female	div-17	RADseq
UP-A73	*S. divinum*	A73	NA	Europe	Austria	AUT-Wolfgang	47.7660933	13.4832400	795	Female	div-17	RADseq
UP-A8	*S. medium*	A8	NA	Europe	Austria	AUT-Greith	47.1077680	13.8844000	1861	Female	med-8	RADseq
UP-A80	*S. divinum*	A80	NA	Europe	Austria	AUT-Wolfgang	47.7660933	13.4832400	795	Female	div-116	RADseq
UP-A83-redo	*S. divinum*	A83	NA	Europe	Austria	AUT-Wolfgang	47.7660933	13.4832400	795	Female	div-117	RADseq
UP-A9	*S. divinum*	A9	NA	Europe	Austria	AUT-Greith	47.1077680	13.8844000	1861	Female	div-118	RADseq
UP-A92	*S. divinum*	A92	NA	Europe	Austria	AUT-Aussichtsturm Wenger	47.9289660	13.1771460	511	Male	div-119	RADseq
UP-A93	*S. divinum*	A93	NA	Europe	Austria	AUT-Aussichtsturm Wenger	47.9289660	13.1771460	511	Male	div-120	RADseq
UP-A94	*S. divinum*	A94	NA	Europe	Austria	AUT-Aussichtsturm Wenger	47.9289660	13.1771460	511	Male	div-12	RADseq
UP-A95	*S. divinum*	A95	NA	Europe	Austria	AUT-Aussichtsturm Wenger	47.9289660	13.1771460	511	Male	div-23	RADseq
UP-A97	*S. divinum*	A97	NA	Europe	Austria	AUT-Aussichtsturm Wenger	47.9289660	13.1771460	511	Female	div-18	RADseq
UP-A98	*S. medium*	A98	NA	Europe	Austria	AUT-Aussichtsturm Wenger	47.9289660	13.1771460	511	Female	med-8	RADseq
UP-A99rep	*S. divinum*	A99rep	NA	Europe	Austria	AUT-Aussichtsturm Wenger	47.9289660	13.1771460	511	Female	div-18	RADseq
UP-CR10	*S. divinum*	CR10	Hassel, K.	Europe	Norway	NOR-Stormyran	63.0807900	11.4010500	422	Male	div-121	RADseq
UP-CR11	*S. medium*	CR11	Granath, G.	Europe	Sweden	SWE-Kulflyten	59.9038000	15.8282900	133	Female	med-57	RADseq
UP-CR13AB	*S. medium*	CR13A+B	Robroek, B.	Europe	Ireland	IRL-Rathbeg	53.0402760	-7.9307210	50	Female	med-58	RADseq
UP-CR16	*S. medium*	CR16	Robroek, B.	Europe	Ireland	IRL-Rathbeg	53.0402760	-7.9307210	50	Female	med-59	RADseq
UP-CR22	*S. divinum*	CR22	Jiroušek, M.	Europe	Czech Republic	CZE-Jindřichov	50.1588410	17.1067650	1310	Female	div-34	RADseq
UP-CR22dup	*S. divinum*	CR22dup	Jiroušek, M.	Europe	Czech Republic	CZE-Jindřichov	50.1588410	17.1067650	1310	Female	div-34	RADseq
UP-CR24	*S. divinum*	CR24	Piilo, S. & Juselius, T.	Europe	Finland	FIN-Kaamanen	69.1404530	27.2706140	157	Male	div-19	RADseq
UP-CR26	*S. medium*	CR26	Hassel, K.	Europe	Norway	NOR-Hegg Storvatnet	63.6154600	9.6038700	31	Male	med-60	RADseq
UP-CR28	*S. medium*	CR28	Hassel, K.	Europe	Norway	NOR-Bjørnemyra Tiller	63.3365600	10.4056800	134	Female	med-61	RADseq
UP-CR29	*S. medium*	CR29	Hassel, K.	Europe	Norway	NOR-Høstamyra Byneset	63.4052300	10.1186200	108	Male	med-62	RADseq
UP-CR30	*S. medium*	CR30	Robroek, B.	Europe	Ireland	IRL-Rathbeg	53.0402760	-7.9307210	50	Female	med-63	RADseq
UP-CR32	*S. medium*	CR32	Granath, G.	Europe	Sweden	SWE-Kulflyten	59.9038000	15.8282900	133	Female	med-64	RADseq
UP-CR33	*S. divinum*	CR33	Piilo, S. & Juselius, T.	Europe	Finland	FIN-Kaamanen	69.1404530	27.2706140	157	Female	div-20	RADseq
UP-CR34	*S. medium*	CR34	Granath, G.	Europe	Sweden	SWE-Kulflyten	59.9038000	15.8282900	133	Female	med-65	RADseq
UP-CR35	*S. divinum*	CR35	Piilo, S. & Juselius, T.	Europe	Finland	FIN-Kaamanen	69.1404530	27.2706140	157	Female	div-122	RADseq
UP-CR38	*S. divinum*	CR38	Piilo, S. & Juselius, T.	Europe	Finland	FIN-Kaamanen	69.1404530	27.2706140	157	Female	div-20	RADseq
UP-CR38dup	*S. divinum*	CR38dup	Piilo, S. & Juselius, T.	Europe	Finland	FIN-Kaamanen	69.1404530	27.2706140	157	Female	div-20	RADseq
UP-CR39	*S. medium*	CR39	Robroek, B.	Europe	Ireland	IRL-Rathbeg	53.0402760	-7.9307210	50	Female	med-66	RADseq
UP-CR41	*S. medium*	CR41	Hassel, K.	Europe	Norway	NOR-Hegg Storvatnet	63.6113800	9.6080100	51	Male	med-67	RADseq
UP-CR45	*S. medium*	CR45	Hassel, K.	Europe	Norway	NOR-Kattåtjønna Bymarka	63.3737500	10.2860900	213	Female	med-68	RADseq
UP-CR46	*S. medium*	CR46	Hassel, K.	Europe	Norway	NOR-Bjørnemyra Tiller	63.3365600	10.4056800	134	Female	med-69	RADseq
UP-CR47	*S. divinum*	CR47	Jiroušek, M.	Europe	Czech Republic	CZE-Jindřichov	50.1588410	17.1067650	1310	Female	div-123	RADseq
UP-CR48	*S. medium*	CR48	Hassel, K.	Europe	Norway	NOR-Løstamyran North	63.6240800	9.7130900	73	Male	med-70	RADseq
UP-CR49	*S. medium*	CR49	Granath, G.	Europe	Sweden	SWE-Kulflyten	59.9038000	15.8282900	133	Female	med-71	RADseq
UP-CR51	*S. divinum*	CR51	Piilo, S. & Juselius, T.	Europe	Finland	FIN-Kaamanen	69.1404530	27.2706140	157	Male	div-124	RADseq
UP-CR52	*S. divinum*	CR52	Hassel, K.	Europe	Norway	NOR-Stormyran	63.0807900	11.4010500	422	Male	div-125	RADseq
UP-CR54	*S. medium*	CR54	Granath, G.	Europe	Sweden	SWE-Kulflyten	59.9038000	15.8282900	133	Male	med-72	RADseq
UP-CR55	*S. medium*	CR55	Hassel, K.	Europe	Norway	NOR-Rørmyra	63.3600560	10.2961940	173	Female	med-73	RADseq
UP-CR56	*S. divinum*	CR56	Jiroušek, M.	Europe	Czech Republic	CZE-Jindřichov	50.1641040	17.1153030	1290	Male	div-126	RADseq
UP-CR57	*S. medium*	CR57	NA	Europe	Norway	NOR-Momyra Svean	63.2821600	10.4610200	124	Male	med-74	RADseq
UP-CR7	*S. divinum*	CR7	Jiroušek, M.	Europe	Czech Republic	CZE-Jindřichov	50.1641040	17.1153030	1289	Female	div-127	RADseq
UP-CR9	*S. divinum*	CR9	Piilo, S. & Juselius, T.	Europe	Finland	FIN-Kaamanen	69.1404530	27.2706140	157	Male	div-19	RADseq
UP-D1-my	*S. medium*	D1 Merged Yvonne	Krebs, M.	Europe	Denmark	DNK-Vildmosse	56.8410280	10.1849170	8	Male	med-75	RADseq
UP-G11	*S. divinum*	G11	Lamkowski, P.	Europe	Germany	DEU-Blauenseemoor	47.7538280	9.7311860	664	Female	div-21	RADseq
UP-G12	*S. divinum*	G12	Lamkowski, P.	Europe	Germany	DEU-Blauenseemoor	47.7493860	9.7300470	666	Female	div-128	RADseq
UP-G13	*S. divinum*	G13	Lamkowski, P.	Europe	Germany	DEU-Blauenseemoor	47.7498970	9.7298470	666	Male	div-129	RADseq
UP-G14	*S. divinum*	G14	Lamkowski, P.	Europe	Germany	DEU-Vorderwiddum	47.7428890	9.7171780	665	Male	div-130	RADseq
UP-G15	*S. divinum*	G15	Lamkowski, P.	Europe	Germany	DEU-Kemptener Wald	47.7114440	10.4751530	839	Male	div-131	RADseq
UP-G18	*S. divinum*	G18	Lamkowski, P.	Europe	Germany	DEU-Kemptener Wald	47.7039170	10.4782030	845	Male	div-132	RADseq
UP-G2	*S. divinum*	G2	Lamkowski, P.	Europe	Germany	DEU-Grundloser Theerofen	53.2798610	13.0353890	69	Female	div-133	RADseq
UP-G22	*S. medium*	G22	Lamkowski, P.	Europe	Germany	DEU-Brambosteler Moor Nord	52.9427970	10.2381280	70	Female	med-76	RADseq
UP-G23	*S. medium*	G23	Lamkowski, P.	Europe	Germany	DEU-Brambosteler Moor Nord	52.9428670	10.2355640	70	Female	med-77	RADseq
UP-G24	*S. medium*	G24	Lamkowski, P.	Europe	Germany	DEU-Brambosteler Moor Süd	52.9345250	10.2298690	71	Female	med-10	RADseq
UP-G25	*S. medium*	G25	Lamkowski, P.	Europe	Germany	DEU-BrambostelerMoorSüd	52.9345250	10.2298690	71	Female	med-10	RADseq
UP-G27	*S. medium*	G27	Lamkowski, P.	Europe	Germany	DEU-Bornriethmoor	52.7775060	10.1060110	54	Female	med-78	RADseq
UP-G28	*S. medium*	G28	Lamkowski, P.	Europe	Germany	DEU-Bornriethmoor	52.7762060	10.1027560	54	Male	med-79	RADseq
UP-G29	*S. medium*	G29	Lamkowski, P.	Europe	Germany	DEU-Bornriethmoor	52.7760940	10.1028780	54	Male	med-80	RADseq
UP-G3	*S. divinum*	G3	Lamkowski, P.	Europe	Germany	DEU-Grundloser Theerofen	53.2873610	13.0385000	62	Unknown	div-134	RADseq
UP-G30	*S. medium*	G30	Lamkowski, P.	Europe	Germany	DEU-Bornriethmoor	52.7784640	10.1032280	54	Male	med-81	RADseq
UP-G31	*S. medium*	G31	Lamkowski, P.	Europe	Germany	DEU-Breites Moor	52.6941670	10.1734750	61	Male	med-82	RADseq
UP-G33	*S. medium*	G33	Krebs, M. & Lamkowski, P.	Europe	Germany	DEU-Fockbeker Moor	54.3215110	9.5925050	9	Female	med-83	RADseq
UP-G34	*S. medium*	G34	Krebs, M. & Lamkowski, P.	Europe	Germany	DEU-Fockbeker Moor	54.3222638	9.5938329	9	Female	med-84	RADseq
UP-G35	*S. medium*	G35	Krebs, M. & Lamkowski, P.	Europe	Germany	DEU-Owschlager Moor	54.3720312	9.6043281	8	Male	med-85	RADseq
UP-G36	*S. medium*	G36	Krebs, M. & Lamkowski, P.	Europe	Germany	DEU-Groß Wittenseer Moor	54.4141513	9.7579208	26	Female	med-86	RADseq
UP-G39	*S. medium*	G39	Lamkowski, P.	Europe	Germany	DEU-Wolfskrug	54.4548154	9.6471154	25	Female	med-87	RADseq
UP-G4	*S. medium*	G4	Lamkowski, P.	Europe	Germany	DEU-Weißes Moor	53.3182750	11.5579610	37	Female	med-88	RADseq
UP-G6	*S. divinum*	G6	Lamkowski, P.	Europe	Germany	DEU-Mahdtalhaus	47.3644530	10.1772860	1021	Male	div-135	RADseq

UP-G7	*S. divinum*	G7	Lamkowski, P.	Europe	Germany	DEU-Mahdtalhaus	47.3643530	10.1767640	1021	Male	div-136	RADseq
UP-G9-2	*S. divinum*	G9 (2)	Lamkowski, P.	Europe	Germany	DEU-Blauenseemoor	47.7533310	9.7321440	664	Female	div-21	RADseq
UP-LA1	*S. divinum*	LA1	Krebs, M.	Europe	Latvia	LVA-Nähe Normans Fläche	56.9691200	25.0872800	104	Male	div-137	RADseq
UP-LA2	*S. divinum*	LA2	Krebs, M.	Europe	Latvia	LVA-Nähe Normans Fläche	56.9645100	25.0808100	104	Male	div-22	RADseq
UP-LA2-y	*S. divinum*	LA2 Yvonne	Krebs, M.	Europe	Latvia	LVA-Nähe Normans Fläche	56.9645100	25.0808100	104	Male	div-22	RADseq
UP-LA4	*S. divinum*	LA4	Krebs, M.	Europe	Latvia	LVA-Nähe Normans Fläche	56.9645100	25.0808100	104	Female	div-138	RADseq
UP-LA5	*S. medium*	LA5	Krebs, M.	Europe	Latvia	LVA-Nähe Normans Fläche	56.9690000	25.0889200	104	Male	med-89	RADseq
UP-LI1	*S. medium*	LI1	Krebs, M.	Europe	Lithuania	LTU-Augstumal	55.3920650	21.3703070	1	Female	med-90	RADseq
UP-LI3	*S. medium*	LI3	Krebs, M.	Europe	Lithuania	LTU-Augstumal	55.3920650	21.3703070	1	Male	med-91	RADseq
UP-NL2	*S. medium*	NL2	Krebs, M.	Europe	The Netherlands	NLD-Bargerveen	52.6944510	7.0353130	19	Female	med-92	RADseq
UP-NL3	*S. medium*	NL3	Krebs, M.	Europe	The Netherlands	NLD-Bargerveen	52.6943120	7.0353150	19	Female	med-93	RADseq
UP-NL4	*S. medium*	NL4	Krebs, M.	Europe	The Netherlands	NLD-Bargerveen	52.6965750	7.0340820	19	Female	med-94	RADseq
UP-NL5	*S. medium*	NL5	Krebs, M.	Europe	The Netherlands	NLD-Bargerveen	52.6959300	7.0371950	19	Female	med-95	RADseq
UP-R1	*S. divinum*	R1	Krebs, M. & Lamkowski, P.	Europe	Russia	RUS-Chistoye Bog	61.0469520	69.4087360	43	Male	div-139	RADseq
UP-R4	*S. divinum*	R4	Krebs, M. & Lamkowski, P.	Europe	Russia	RUS-Cloudberry Bog	60.9561870	68.7684250	28	Female	div-140	RADseq
UP-R5	*S. divinum*	R5	Krebs, M. & Lamkowski, P.	Europe	Russia	RUS-Potanay Aapa Mire	61.2876330	65.4899220	101	Female	div-141	RADseq
UP-R6	*S. divinum*	R6	Krebs, M. & Lamkowski, P.	Europe	Russia	RUS-Bazovoye Bog	60.8527060	63.5234950	71	Male	div-142	RADseq
UP-R8-2	*S. divinum*	R8 (2)	Krebs, M. & Lamkowski, P.	Europe	Russia	RUS-Alas Mire	60.8280100	63.6336530	76	Male	div-143	RADseq
UP-S1	*S. medium*	S1	Granath, G.	Europe	Sweden	SWE-Växmossen	58.5341720	15.4726750	87	Male	med-96	RADseq
UP-S10	*S. medium*	S10	Granath, G.	Europe	Sweden	SWE-Växmossen	58.5341720	15.4726750	87	Male	med-97	RADseq
UP-S100	*S. medium*	S100	Granath, G.	Europe	Sweden	SWE-Växmossen	58.5341720	15.4726750	87	Male	med-98	RADseq
UP-S103-my	*S. medium*	S103 Merged Yvonne	Granath, G.	Europe	Sweden	SWE-Trälsbromossen	57.1955420	14.3713720	195	Male	med-99	RADseq
UP-S105	*S. medium*	S105	Granath, G.	Europe	Sweden	SWE-Trälsbromossen	57.1985720	14.3693030	195	Female	med-100	RADseq
UP-S106	*S. medium*	S106	Granath, G.	Europe	Sweden	SWE-Trälsbromossen	57.1990250	14.3729440	195	Male	med-101	RADseq
UP-S108	*S. medium*	S108	Granath, G.	Europe	Sweden	SWE-Åkhultsmosse	57.1034810	14.5351920	228	Female	med-102	RADseq
UP-S109-2	*S. medium*	S109 (2)	Granath, G.	Europe	Sweden	SWE-Åkhultsmosse	57.1035750	14.5359920	228	Male	med-103	RADseq
UP-S110	*S. medium*	S110	Granath, G.	Europe	Sweden	SWE-Åkhultsmosse	57.1012640	14.5393440	228	Female	med-104	RADseq
UP-S111	*S. medium*	S111	Granath, G.	Europe	Sweden	SWE-Åkhultsmosse	57.1009640	14.5380190	228	Male	med-105	RADseq
UP-S112-2	*S. medium*	S112 (2)	Granath, G.	Europe	Sweden	SWE-Åkhultsmosse	57.0988580	14.5347860	228	Female	med-106	RADseq
UP-S113-2	*S. medium*	S113 (2)	Granath, G.	Europe	Sweden	SWE-Åkhultsmosse	57.0986280	14.5359000	228	Female	med-107	RADseq
UP-S114	*S. medium*	S114	Granath, G.	Europe	Sweden	SWE-Osby	56.3879016	13.9654887	86	Female	med-108	RADseq
UP-S12-2	*S. medium*	S12 (2)	Granath, G.	Europe	Sweden	SWE-Växmossen	58.5341720	15.4726750	87	Female	med-12	RADseq
UP-S13	*S. medium*	S13	Granath, G.	Europe	Sweden	SWE-Växmossen	58.5341720	15.4726750	87	Female	med-12	RADseq
UP-S14	*S. medium*	S14	Granath, G.	Europe	Sweden	SWE-Växmossen	58.5341720	15.4726750	87	Male	med-13	RADseq
UP-S17	*S. medium*	S17	Granath, G.	Europe	Sweden	SWE-Växmossen	58.5341720	15.4726750	87	Male	med-109	RADseq
UP-S18	*S. medium*	S18	Granath, G.	Europe	Sweden	SWE-Växmossen	58.5341720	15.4726750	87	Male	med-13	RADseq
UP-S19	*S. medium*	S19	Granath, G.	Europe	Sweden	SWE-Växmossen	58.5341720	15.4726750	87	Male	med-13	RADseq
UP-S2-2	*S. medium*	S2 (2)	Granath, G.	Europe	Sweden	SWE-Växmossen	58.5341720	15.4726750	87	Female	med-12	RADseq
UP-S21	*S. medium*	S21	Granath, G.	Europe	Sweden	SWE-Växmossen	58.5341720	15.4726750	87	Male	med-14	RADseq
UP-S22	*S. medium*	S22	Granath, G.	Europe	Sweden	SWE-Växmossen	58.5341720	15.4726750	87	Male	med-13	RADseq
UP-S24	*S. medium*	S24	Granath, G.	Europe	Sweden	SWE-Växmossen	58.5341720	15.4726750	87	Male	med-13	RADseq
UP-S25	*S. medium*	S25	Granath, G.	Europe	Sweden	SWE-Växmossen	58.5341720	15.4726750	87	Male	med-14	RADseq
UP-S26	*S. medium*	S26	Granath, G.	Europe	Sweden	SWE-Växmossen	58.5341720	15.4726750	87	Male	med-13	RADseq
UP-S27	*S. medium*	S27	Granath, G.	Europe	Sweden	SWE-Växmossen	58.5341720	15.4726750	87	Male	med-13	RADseq
UP-S3	*S. medium*	S3	Granath, G.	Europe	Sweden	SWE-Växmossen	58.5341720	15.4726750	87	Female	med-110	RADseq
UP-S30	*S. medium*	S30	Granath, G.	Europe	Sweden	SWE-Växmossen	58.5341720	15.4726750	87	Male	med-111	RADseq
UP-S32	*S. medium*	S32	Granath, G.	Europe	Sweden	SWE-Växmossen	58.5341720	15.4726750	87	Male	med-112	RADseq
UP-S33	*S. medium*	S33	Granath, G.	Europe	Sweden	SWE-Växmossen	58.5341720	15.4726750	87	Female	med-113	RADseq
UP-S34	*S. medium*	S34	Granath, G.	Europe	Sweden	SWE-Växmossen	58.5341720	15.4726750	87	Female	med-114	RADseq
UP-S35	*S. medium*	S35	Granath, G.	Europe	Sweden	SWE-Växmossen	58.5341720	15.4726750	87	Male	med-115	RADseq
UP-S36	*S. medium*	S36	Granath, G.	Europe	Sweden	SWE-Växmossen	58.5341720	15.4726750	87	Male	med-116	RADseq
UP-S37	*S. medium*	S37	Granath, G.	Europe	Sweden	SWE-Växmossen	58.5341720	15.4726750	87	Male	med-117	RADseq
UP-S38-redo	*S. medium*	S38	Granath, G.	Europe	Sweden	SWE-Växmossen	58.5341720	15.4726750	87	Female	med-118	RADseq
UP-S4	*S. medium*	S4	Granath, G.	Europe	Sweden	SWE-Växmossen	58.5341720	15.4726750	87	Female	med-12	RADseq
UP-S40	*S. medium*	S40	Granath, G.	Europe	Sweden	SWE-Växmossen	58.5341720	15.4726750	87	Male	med-119	RADseq
UP-S41	*S. medium*	S41	Granath, G.	Europe	Sweden	SWE-Växmossen	58.5341720	15.4726750	87	Male	med-120	RADseq
UP-S42	*S. medium*	S42	Granath, G.	Europe	Sweden	SWE-Växmossen	58.5341720	15.4726750	87	Female	med-121	RADseq
UP-S44	*S. medium*	S44	Granath, G.	Europe	Sweden	SWE-Växmossen	58.5341720	15.4726750	87	Male	med-122	RADseq
UP-S45	*S. medium*	S45	Granath, G.	Europe	Sweden	SWE-Växmossen	58.5341720	15.4726750	87	Male	med-123	RADseq
UP-S48-redo	*S. medium*	S48	Granath, G.	Europe	Sweden	SWE-Växmossen	58.5341720	15.4726750	87	Male	med-124	RADseq
UP-S49	*S. medium*	S49	Granath, G.	Europe	Sweden	SWE-Växmossen	58.5341720	15.4726750	87	Male	med-125	RADseq
UP-S50	*S. medium*	S50	Granath, G.	Europe	Sweden	SWE-Växmossen	58.5341720	15.4726750	87	Male	med-126	RADseq
UP-S52rep	*S. medium*	S52rep	Granath, G.	Europe	Sweden	SWE-Växmossen	58.5341720	15.4726750	87	Male	med-127	RADseq
UP-S54	*S. medium*	S54	Granath, G.	Europe	Sweden	SWE-Växmossen	58.5341720	15.4726750	87	Female	med-128	RADseq
UP-S6-redo	*S. medium*	S6	Granath, G.	Europe	Sweden	SWE-Växmossen	58.5341720	15.4726750	87	Female	med-129	RADseq
UP-S61	*S. medium*	S61	Granath, G.	Europe	Sweden	SWE-Växmossen	58.5341720	15.4726750	87	Female	med-130	RADseq
UP-S64	*S. medium*	S64	Granath, G.	Europe	Sweden	SWE-Växmossen	58.5341720	15.4726750	87	Male	med-131	RADseq
UP-S66	*S. medium*	S66	Granath, G.	Europe	Sweden	SWE-Växmossen	58.5341720	15.4726750	87	Male	med-15	RADseq
UP-S67	*S. medium*	S67	Granath, G.	Europe	Sweden	SWE-Växmossen	58.5341720	15.4726750	87	Female	med-132	RADseq
UP-S68	*S. medium*	S68	Granath, G.	Europe	Sweden	SWE-Växmossen	58.5341720	15.4726750	87	Male	med-15	RADseq
UP-S71	*S. medium*	S71	Granath, G.	Europe	Sweden	SWE-Växmossen	58.5341720	15.4726750	87	Female	med-133	RADseq
UP-S72	*S. medium*	S72	Granath, G.	Europe	Sweden	SWE-Växmossen	58.5341720	15.4726750	87	Male	med-134	RADseq
UP-S73	*S. medium*	S73	Granath, G.	Europe	Sweden	SWE-Växmossen	58.5341720	15.4726750	87	Female	med-135	RADseq
UP-S74	*S. medium*	S74	Granath, G.	Europe	Sweden	SWE-Växmossen	58.5341720	15.4726750	87	Male	med-136	RADseq
UP-S76	*S. medium*	S76	Granath, G.	Europe	Sweden	SWE-Växmossen	58.5341720	15.4726750	87	Male	med-137	RADseq
UP-S79	*S. medium*	S79	Granath, G.	Europe	Sweden	SWE-Växmossen	58.5341720	15.4726750	87	Male	med-138	RADseq
UP-S8	*S. medium*	S8	Granath, G.	Europe	Sweden	SWE-Växmossen	58.5341720	15.4726750	87	Female	med-12	RADseq
UP-S80	*S. medium*	S80	Granath, G.	Europe	Sweden	SWE-Växmossen	58.5341720	15.4726750	87	Male	med-139	RADseq
UP-S82	*S. medium*	S82	Granath, G.	Europe	Sweden	SWE-Växmossen	58.5341720	15.4726750	87	Female	med-140	RADseq
UP-S84	*S. medium*	S84	Granath, G.	Europe	Sweden	SWE-Växmossen	58.5341720	15.4726750	87	Male	med-141	RADseq
UP-S85	*S. medium*	S85	Granath, G.	Europe	Sweden	SWE-Växmossen	58.5341720	15.4726750	87	Male	med-11	RADseq
UP-S86	*S. medium*	S86	Granath, G.	Europe	Sweden	SWE-Växmossen	58.5341720	15.4726750	87	Male	med-11	RADseq

UP-S88	*S. medium*	S88	Granath, G.	Europe	Sweden	SWE-Våxmossen	58.5341720	15.4726750	87	Male	med-142	RADseq
UP-S89	*S. medium*	S89	Granath, G.	Europe	Sweden	SWE-Våxmossen	58.5341720	15.4726750	87	Female	med-143	RADseq
UP-S9	*S. medium*	S9	Granath, G.	Europe	Sweden	SWE-Våxmossen	58.5341720	15.4726750	87	Male	med-144	RADseq
UP-S93D-4EP-y	*S. medium*	S93D_4EP Yvonne	Granath, G.	Europe	Sweden	SWE-Våxmossen	58.5341720	15.4726750	87	Female	med-6	RADseq
UP-S96-my	*S. medium*	S96 Merged Yvonne	Granath, G.	Europe	Sweden	SWE-Våxmossen	58.5341720	15.4726750	87	Female	med-16	RADseq
UP-S97	*S. medium*	S97	Granath, G.	Europe	Sweden	SWE-Våxmossen	58.5341720	15.4726750	87	Female	med-16	RADseq
UP-S98-r	*S. medium*	S98 repeated	Granath, G.	Europe	Sweden	SWE-Våxmossen	58.5341720	15.4726750	87	Female	med-16	RADseq
UP-S99	*S. medium*	S99	Granath, G.	Europe	Sweden	SWE-Våxmossen	58.5341720	15.4726750	87	Male	med-145	RADseq
UP-SM141	*S. medium*	SM141	Granath, G. & Granath, L.	Europe	Sweden	SWE-Store Mosse	57.2839746	13.9294599	168	Female	med-146	RADseq
UP-SM145	*S. medium*	SM145	Granath, G. & Granath, L.	Europe	Sweden	SWE-Store Mosse	57.2847936	13.9310837	168	Male	med-147	RADseq
UP-SM147	*S. medium*	SM147	Granath, G. & Granath, L.	Europe	Sweden	SWE-Store Mosse	57.2839810	13.9318348	168	Male	med-19	RADseq
UP-SM187	*S. medium*	SM187	Granath, G. & Granath, L.	Europe	Sweden	SWE-Store Mosse	57.2784495	13.9255838	168	Male	med-148	RADseq
UP-SM193	*S. medium*	SM193	Granath, G. & Granath, L.	Europe	Sweden	SWE-Store Mosse	57.2830321	13.9332020	168	Male	med-19	RADseq
UP-SM193dup	*S. medium*	SM193dup	Granath, G. & Granath, L.	Europe	Sweden	SWE-Store Mosse	57.2830321	13.9332020	168	Male	med-19	RADseq
UP-SM208	*S. medium*	SM208	Granath, G. & Granath, L.	Europe	Sweden	SWE-Store Mosse	57.2821272	13.9313687	168	Female	med-149	RADseq
UP-SM211	*S. medium*	SM211	Granath, G. & Granath, L.	Europe	Sweden	SWE-Store Mosse	57.2819322	13.9309764	168	Female	med-150	RADseq
UP-SM224-2	*S. medium*	SM224-2	Granath, G. & Granath, L.	Europe	Sweden	SWE-Store Mosse	57.2805535	13.9265237	168	Male	med-151	RADseq
UP-SM228	*S. medium*	SM228	Granath, G. & Granath, L.	Europe	Sweden	SWE-Store Mosse	57.2802158	13.9256918	168	Female	med-152	RADseq
UP-SM242	*S. medium*	SM242	Granath, G. & Granath, L.	Europe	Sweden	SWE-Store Mosse	57.2842536	13.9319145	168	Male	med-153	RADseq
UP-SM244	*S. medium*	SM244	Granath, G. & Granath, L.	Europe	Sweden	SWE-Store Mosse	57.2836803	13.9320541	168	Male	med-23	RADseq
UP-SM244dup	*S. medium*	SM244dup	Granath, G. & Granath, L.	Europe	Sweden	SWE-Store Mosse	57.2836803	13.9320541	168	Male	med-23	RADseq
UP-SM257	*S. medium*	SM257	Granath, G. & Granath, L.	Europe	Sweden	SWE-Store Mosse	57.2830545	13.9292819	168	Female	med-154	RADseq
UP-SM281	*S. medium*	SM281	Granath, G. & Granath, L.	Europe	Sweden	SWE-Store Mosse	57.2815914	13.9249437	168	Male	med-155	RADseq
UP-SM289	*S. medium*	SM289	Granath, G. & Granath, L.	Europe	Sweden	SWE-Store Mosse	57.2816139	13.9227217	168	Female	med-156	RADseq
UP-SM324	*S. medium*	SM324	Granath, G. & Granath, L.	Europe	Sweden	SWE-Store Mosse	57.2794822	13.9270835	168	Female	med-24	RADseq
UP-SM324dup	*S. medium*	SM324dup	Granath, G. & Granath, L.	Europe	Sweden	SWE-Store Mosse	57.2794822	13.9270835	168	Female	med-24	RADseq
UP-SM326	*S. medium*	SM326	Granath, G. & Granath, L.	Europe	Sweden	SWE-Store Mosse	57.2795234	13.9262227	168	Female	med-25	RADseq
UP-SM326dup	*S. medium*	SM326dup	Granath, G. & Granath, L.	Europe	Sweden	SWE-Store Mosse	57.2795234	13.9262227	168	Female	med-25	RADseq
UP-SM333	*S. medium*	SM333	Granath, G. & Granath, L.	Europe	Sweden	SWE-Store Mosse	57.2786651	13.9251360	168	Female	med-157	RADseq
UP-SM353	*S. medium*	SM353	Granath, G. & Granath, L.	Europe	Sweden	SWE-Store Mosse	57.2814511	13.9312443	168	Male	med-17	RADseq
UP-SM355	*S. medium*	SM355	Granath, G. & Granath, L.	Europe	Sweden	SWE-Store Mosse	57.2816301	13.9317887	168	Male	med-17	RADseq
UP-SM367	*S. medium*	SM367	Granath, G. & Granath, L.	Europe	Sweden	SWE-Store Mosse	57.2821401	13.9331082	168	Male	med-158	RADseq

Supplemental Table S2. Sample counts by country and site for *S. divinum* and *S. medium* gametophytes identified to species using either RADseq data or barcoding PCR.

	S. divinum			*S. medium*		
Country-Site	**RADseq**	**Barcode**	**Total**	**RADseq**	**Barcode**	**Total**
Total	**161**	**154**	**315**	**183**	**29**	**212**
Austria	**69**	**0**	**69**	**12**	**0**	**12**
AUT-Aineck	1		1	7		7
AUT-AussichtsturmWenger	12		12	3		3
AUT-Dürrenecksee	1		1			0
AUT-Greith	13		13	2		2
AUT-LudlalmMoor	1		1			0
AUT-Prebersee	2		2			0
AUT-PürgschachenMoor	2		2			0
AUT-Rotmoss	2		2			0
AUT-Tamsweg	19		19			0
AUT-Unternberg	12		12			0
AUT-Wolfgang	4		4			0
Czech Republic	**7**	**0**	**7**	**0**	**0**	**0**
CZE-FarskéBažiny	1		1			0
CZE-Jeseníky	2		2			0
CZE-Jindřichov	4		4			0
Denmark	**0**	**0**	**0**	**1**	**0**	**1**
DNK-Vildmosse			0	1		1
Estonia	**26**	**15**	**41**	**2**	**17**	**19**
EST-Ämma	1		1			0
EST-EndlaTooma			0	1		1
EST-Helenurme	1		1			0
EST-Jarise		1	1			0
EST-KarjatnurmeRubina	1	1	2			0
EST-KaruseKõvertamme	2		2			0
EST-Kastolats	1		1			0
EST-Kogrejärv	1		1			0
EST-Kõrvenurga	1		1			0
EST-KuresooBog			0	1		1
EST-Kurtna	2		2			0
EST-Lindi	1		1			0
EST-MonitoringAreaABE		8	8		10	10
EST-Nigula			0		4	4

EST-Palasi	5		5			0
EST-RannametsaNorth	1	2	3		1	1
EST-RannametsaSouth	1		1			0
EST-Rõhu	1		1			0
EST-Seli			0		2	2
EST-Taagepera	1		1			0
EST-Tähtvere	2	3	5			0
EST-Tuhu	3		3			0
EST-Villevere	1		1			0
Finland	**6**	**0**	**6**	**0**	**0**	**0**
FIN-Kaamanen	6		6			0
France	**9**	**58**	**67**	**4**	**12**	**16**
FRA-Artiga	1	12	13			0
FRA-EstanydelRacó	2	12	14			0
FRA-Estibèra	2	11	13			0
FRA-Izarbe	2	13	15			0
FRA-LaMaura	2	9	11			0
FRA-Lorda			0	2	8	10
FRA-Riumajor		1	1	2	4	6
Germany	**11**	**0**	**11**	**15**	**0**	**15**
DEU-Blauenseemoor	4		4			0
DEU-Bornriethmoor			0	4		4
DEU-BrambostelerMoorNord			0	2		2
DEU-BrambostelerMoorSüd			0	2		2
DEU-BreitesMoor			0	1		1
DEU-FockbekerMoor			0	2		2
DEU-GroßWittenseerMoor			0	1		1
DEU-GrundloserTheerofen	2		2			0
DEU-KemptenerWald	2		2			0
DEU-Mahdtalhaus	2		2			0
DEU-OwschlagerMoor			0	1		1
DEU-Vorderwiddum	1		1			0
DEU-WeißesMoor			0	1		1
DEU-Wolfskrug			0	1		1
Iceland	**0**	**0**	**0**	**2**	**0**	**2**
ISL-Borgarfijaroarhraur			0	2		2
Ireland	**0**	**0**	**0**	**8**	**0**	**8**
IRL-Carnagopple			0	2		2

IRL-Derry Bog			0	2		2
IRL-Rathbeg			0	4		4
Latvia	**5**	**0**	**5**	**2**	**0**	**2**
LVA-MadiešenuMire	1		1			0
LVA-NäheNormansFläche	4		4	1		1
LVA-Suda-ZviedruMire			0	1		1
Lithuania	**0**	**0**	**0**	**2**	**0**	**2**
LTU-Augstumal			0	2		2
Norway	**2**	**0**	**2**	**9**	**0**	**9**
NOR-BjørnemyraTiller			0	2		2
NOR-HeggStorvatnet			0	2		2
NOR-HøstamyraByneset			0	1		1
NOR-KattåtjønnaBymarka			0	1		1
NOR-LøstamyranNorth			0	1		1
NOR-MomyraSvean			0	1		1
NOR-Rørmyra			0	1		1
NOR-Stormyran	2		2			0
Poland	**0**	**0**	**0**	**4**	**0**	**4**
POL-BagnoKusowo			0	2		2
POL-MechaczWielkiBog			0	1		1
POL-Smolniki			0	1		1
Russia	**7**	**0**	**7**	**0**	**0**	**0**
RUS-AlasMire	1		1			0
RUS-BazovoyeBog	1		1			0
RUS-ChistoyeBog	1		1			0
RUS-CloudberryBog	1		1			0
RUS-PolosatoyeKO	1		1			0
RUS-PotanayAapaMire	1		1			0
RUS-PriobskoeMestorozhdenie	1		1			0
Spain	**14**	**81**	**95**	**0**	**0**	**0**
ESP-Aiguadassi	2	8	10			0
ESP-Baigura	2	11	13			0
ESP-BassaNera	2	11	13			0
ESP-Colomèrs	2	13	15			0
ESP-EraPlanhòla	2	15	17			0
ESP-LasLlamas	2	12	14			0
ESP-Trescuro	2	11	13			0

Sweden	**1**	**0**	**1**	**118**	**0**	**118**
SWE-Åkhultsmosse			0	6		6
SWE-AnderstorpsStormosse			0	1		1
SWE-Åstorp			0	1		1
SWE-Bobacka			0	1		1
SWE-Fryele			0	1		1
SWE-Hagshult			0	2		2
SWE-Hassleas			0	1		1
SWE-Horsnäsamossen			0	1		1
SWE-Jönshult			0	1		1
SWE-Kolasjön			0	1		1
SWE-Kulflyten			0	5		5
SWE-Kvistbäck			0	2		2
SWE-LångöMosse			0	1		1
SWE-Osby			0	1		1
SWE-Össjö			0	1		1
SWE-Råhult			0	1		1
SWE-Ramsmossen	1		1			0
SWE-Slättö			0	1		1
SWE-Stackebo			0	1		1
SWE-Stegaryd			0	1		1
SWE-StoreMosse			0	20		20
SWE-Torskinge			0	1		1
SWE-Trälsbromossen			0	3		3
SWE-Uppebo			0	1		1
SWE-Våxmossen			0	63		63
Switzerland	**4**	**0**	**4**	**0**	**0**	**0**
CHE-PianSegno	1		1			0
CHE-UntererHüttenbüel	3		3			0
The Netherlands	**0**	**0**	**0**	**4**	**0**	**4**
NLD-Bargerveen			0	4		4

Supplemental Table S3. Sex ratio and genetic diversity statistics for European populations of S. divinum and S. medium. F, M, ? = number of female, male, and unknown sex ramets or genets; Sex rato = males / (males + females); R/G = Ramets per genet; Hexp = Nei's 1978 expected heterozygosity; PPL = Percent polymorphic loci; PPr = Percent private alleles; (G-1)/(R-1) = genotypic diversity (0.0 = all ramets share the same genotype; 1.0 = all ramets have different genotypes). Values are based on RADseq loci that are polymorphic in that species.

	Ramets				**Genets**								
Species - Site	**F**	**M**	**?**	**Sex ratio**	**F**	**M**	**?**	**Sex ratio**	**R/G**	**Hexp**	**PPL**	**PPr**	**(G-1)/(R-1)**
S. divinum	75	84	2	0.528	57	64	2	0.529	1.31	0.263	100.0	NA	0.76
AUT-Aineck	1			0.000	1			0.000	1.00	0.000	0.0	0.18	NA
AUT-AussichtsturmWenger	3	9		0.750	2	7		0.778	1.33	0.218	30.0	1.02	0.73
AUT-Dürrenecksee	1			0.000	1			0.000	1.00	0.000	0.0	0.30	NA
AUT-Greith	8	5		0.385	7	5		0.417	1.08	0.159	30.2	4.00	0.92
AUT-LudlalmMoor		1		1.000		1		1.000	1.00	0.000	0.0	0.21	NA
AUT-Prebersee	2			0.000	2			0.000	1.00	0.003	14.3	0.21	1.00
AUT-PürgschachenMoor		2		1.000		2		1.000	1.00	0.543	1.9	0.18	1.00
AUT-Rotmoss	1	1		0.500	1	1		0.500	1.00	0.001	14.6	0.42	1.00
AUT-Tamsweg	5	14		0.737	2	8		0.800	1.90	0.204	35.7	1.88	0.50
AUT-Unternberg	7	4	1	0.364	3	3	1	0.500	1.71	0.202	23.4	1.55	0.55
AUT-Wolfgang	4			0.000	3			0.000	1.33	0.484	15.2	0.63	0.67
CHE-PianSegno		1		1.000		1		1.000	1.00	0.000	0.0	0.18	NA
CHE-UntererHüttenbüel	2	1		0.333	2	1		0.333	1.00	0.006	22.1	0.66	1.00
CZE-FarskéBažiny	1			0.000	1			0.000	1.00	0.000	0.0	0.21	NA
CZE-Jeseníky	2			0.000	1			0.000	2.00	0.000	0.0	0.15	0.00
CZE-Jindřichov	3	1		0.250	3	1		0.250	1.00	0.278	17.9	0.24	1.00
DEU-Blauenseemoor	3	1		0.250	2	1		0.333	1.33	0.145	17.8	0.69	0.67
DEU-GrundloserTheerofen	1		1	0.000	1		1	0.000	1.00	0.080	7.3	0.24	1.00
DEU-KemptenerWald		2		1.000		2		1.000	1.00	0.104	5.8	0.33	1.00
DEU-Mahdtalhaus		2		1.000		2		1.000	1.00	0.010	12.5	0.27	1.00
DEU-Vorderwiddum		1		1.000		1		1.000	1.00	0.000	0.0	0.09	NA
ESP-Aiguadassi		2		1.000		1		1.000	2.00	0.000	0.0	0.24	0.00

ESP-Baigura	2		0.000	1		0.000	2.00	0.000	0.0	0.06	0.00
ESP-BassaNera		2	1.000		1	1.000	2.00	0.000	0.0	0.00	0.00
ESP-Colomèrs		2	1.000		1	1.000	2.00	0.000	0.0	0.03	0.00
ESP-EraPlanhòla	1	1	0.500	1	1	0.500	1.00	0.205	5.6	0.06	1.00
ESP-LasLlamas	2		0.000	1		0.000	2.00	0.000	0.0	0.33	0.00
ESP-Trescuro		2	1.000		1	1.000	2.00	0.000	0.0	0.12	0.00
EST-Ämma		1	1.000		1	1.000	1.00	0.000	0.0	0.12	NA
EST-Helenurme		1	1.000		1	1.000	1.00	0.000	0.0	0.18	NA
EST-KarjatnurmeRubina		1	1.000		1	1.000	1.00	0.000	0.0	0.21	NA
EST-KaruseKõvertamme	2		0.000	2		0.000	1.00	0.009	11.5	0.21	1.00
EST-Kastolats		1	1.000		1	1.000	1.00	0.000	0.0	0.12	NA
EST-Kogrejärv	1		0.000	1		0.000	1.00	0.000	0.0	0.18	NA
EST-Kõrvenurga	1		0.000	1		0.000	1.00	0.000	0.0	0.03	NA
EST-Kurtna	1	1	0.500	1	1	0.500	1.00	0.001	12.6	0.12	1.00
EST-Lindi		1	1.000		1	1.000	1.00	0.000	0.0	0.24	NA
EST-Palasi	1	4	0.800	1	3	0.750	1.25	0.004	24.2	0.45	0.75
EST-RannametsaNorth		1	1.000		1	1.000	1.00	0.000	0.0	0.03	NA
EST-RannametsaSouth	1		0.000	1		0.000	1.00	0.000	0.0	0.15	NA
EST-Rõhu	1		0.000	1		0.000	1.00	0.000	0.0	0.09	NA
EST-Taagepera	1		0.000	1		0.000	1.00	0.000	0.0	0.18	NA
EST-Tähtvere	2		0.000	2		0.000	1.00	0.006	12.6	0.12	1.00
EST-Tuhu	2	1	0.333	1	1	0.500	1.50	0.019	11.8	0.42	0.50
EST-Villevere	1		0.000	1		0.000	1.00	0.000	0.0	0.03	NA
FIN-Kaamanen	3	3	0.500	2	2	0.500	1.50	0.006	24.6	0.57	0.60
FRA-Artiga		1	1.000		1	1.000	1.00	0.000	0.0	0.15	NA
FRA-EstanydelRacó		2	1.000		2	1.000	1.00	0.174	6.3	0.27	1.00
FRA-Estibèra	2		0.000	1		0.000	2.00	0.000	0.0	0.00	0.00
FRA-Izarbe		2	1.000		1	1.000	2.00	0.000	0.0	0.12	0.00
FRA-LaMaura	2		0.000	1		0.000	2.00	0.000	0.0	0.93	0.00
LVA-MadiešenuMire		1	1.000		1	1.000	1.00	0.000	0.0	0.09	NA
LVA-NäheNormansFläche	1	3	0.750	1	2	0.667	1.33	0.059	17.9	0.27	0.67

NOR-Stormyran		2		1.000		2		1.000	1.00	0.004	13.8	0.21	1.00
RUS-AlasMire		1		1.000		1		1.000	1.00	0.000	0.0	0.06	NA
RUS-BazovoyeBog		1		1.000		1		1.000	1.00	0.000	0.0	0.15	NA
RUS-ChistoyeBog		1		1.000		1		1.000	1.00	0.000	0.0	0.03	NA
RUS-CloudberryBog	1			0.000	1			0.000	1.00	0.000	0.0	0.03	NA
RUS-PolosatoyeKO		1		1.000		1		1.000	1.00	0.000	0.0	0.06	NA
RUS-PotanayAapaMire	1			0.000	1			0.000	1.00	0.000	0.0	0.09	NA
RUS-PriobskoeMestorozhdenie	1			0.000	1			0.000	1.00	0.000	0.0	1.02	NA
SWE-Ramsmossen	1			0.000	1			0.000	1.00	0.000	0.0	0.06	NA
S. medium	89	94	0	0.514	74	76	0	0.507	1.22	0.231	100.0	NA	0.82
AUT-Aineck	1	6		0.857	1	3		0.750	1.75	0.245	10.7	0.42	0.50
AUT-AussichtsturmWenger	3			0.000	2			0.000	1.50	0.084	6.3	0.13	0.50
AUT-Greith	2			0.000	1				2.00	0.000	0.0	0.00	0.00
DEU-Bornriethmoor	1	3		0.750	1	3		0.750	1.00	0.095	12.8	0.08	1.00
DEU-BrambostelerMoorNord	2			0.000	2			0.000	1.00	0.097	6.8	0.42	1.00
DEU-BrambostelerMoorSüd	2			0.000	1			0.000	2.00	0.000	0.0	0.13	0.00
DEU-BreitesMoor		1		1.000		1		1.000	1.00	0.000	0.0	0.17	NA
DEU-FockbekerMoor	2			0.000	2			0.000	1.00	0.104	2.2	0.51	1.00
DEU-GroßWittenseerMoor	1			0.000	1			0.000	1.00	0.000	0.0	0.13	NA
DEU-OwschlagerMoor		1		1.000		1		1.000	1.00	0.000	0.0	0.25	NA
DEU-WeißesMoor	1			0.000	1			0.000	1.00	0.000	0.0	0.13	NA
DEU-Wolfskrug	1			0.000	1			0.000	1.00	0.000	0.0	0.08	NA
DNK-Vildmosse		1		1.000		1		1.000	1.00	0.000	0.0	0.00	NA
EST-EndlaTooma	1			0.000	1			0.000	1.00	0.000	0.0	0.13	NA
EST-KuresooBog		1		1.000		1		1.000	1.00	0.000	0.0	0.08	NA
FRA-Lorda	2			0.000	1			0.000	2.00	0.000	0.0	0.08	0.00
FRA-Riumajor		2		1.000		1		1.000	2.00	0.000	0.0	0.08	0.00
IRL-Carnagopple		2		1.000		1		1.000	2.00	0.000	0.0	1.01	0.00
IRL-DerryBog	2			0.000	1			0.000	2.00	0.000	0.0	0.04	0.00
IRL-Rathbeg	4			0.000	4			0.000	1.00	0.047	16.5	0.46	1.00

ISL-Borgarfijaroarhraur	2		0.000	1		0.000	2.00	0.000	0.0	5.32	0.00
LTU-Augstumal	1	1	0.500	1	1	0.500	1.00	0.066	3.7	0.21	1.00
LVA-NäheNormansFläche		1	1.000		1	1.000	1.00	0.000	0.0	0.13	NA
LVA-Suda-ZviedruMire	1		0.000	1		0.000	1.00	0.000	0.0	0.00	NA
NLD-Bargerveen	4		0.000	4		0.000	1.00	0.420	15.8	0.76	1.00
NOR-BjørnemyraTiller	2		0.000	2		0.000	1.00	0.084	0.8	0.76	1.00
NOR-HeggStorvatnet		2	1.000		2	1.000	1.00	0.165	2.1	1.06	1.00
NOR-HøstamyraByneset		1	1.000		1	1.000	1.00	0.000	0.0	0.08	NA
NOR-KattåtjønnaBymarka	1		0.000	1		0.000	1.00	0.000	0.0	0.00	NA
NOR-LøstamyranNorth		1	1.000		1	1.000	1.00	0.000	0.0	0.21	NA
NOR-MomyraSvean		1	1.000		1	1.000	1.00	0.000	0.0	0.13	NA
NOR-Rørmyra	1		0.000	1		0.000	1.00	0.000	0.0	0.08	NA
POL-BagnoKusowo	1	1	0.500	1	1	0.500	1.00	0.001	8.6	0.04	1.00
POL-MechaczWielkiBog		1	1.000		1	1.000	1.00	0.000	0.0	0.04	NA
POL-Smolniki	1		0.000	1		0.000	1.00	0.000	0.0	0.25	NA
SWE-Åkhultsmosse	4	2	0.333	4	2	0.333	1.00	0.174	20.1	0.34	1.00
SWE-AnderstorpsStormosse	1		0.000	1		0.000	1.00	0.000	0.0	0.00	NA
SWE-Åstorp	1		0.000	1		0.000	1.00	0.000	0.0	0.13	NA
SWE-Bobacka		1	1.000		1	1.000	1.00	0.000	0.0	0.00	NA
SWE-Fryele		1	1.000		1	1.000	1.00	0.000	0.0	0.25	NA
SWE-Hagshult		2	1.000		1	1.000	2.00	0.000	0.0	0.25	0.00
SWE-Hassleas		1	1.000		1	1.000	1.00	0.000	0.0	0.08	NA
SWE-Horsnäsamossen		1	1.000		1	1.000	1.00	0.000	0.0	0.17	NA
SWE-Jönshult		1	1.000		1	1.000	1.00	0.000	0.0	0.00	NA
SWE-Kolasjön	1		0.000	1		0.000	1.00	0.000	0.0	0.00	NA
SWE-Kulflyten	4	1	0.200	4	1	0.200	1.00	0.030	17.4	0.04	1.00
SWE-Kvistbäck		2	1.000		1	1.000	2.00	0.000	0.0	0.00	0.00
SWE-LångöMosse	1		0.000	1		0.000	1.00	0.000	0.0	0.08	NA
SWE-Osby	1		0.000	1		0.000	1.00	0.000	0.0	0.04	NA
SWE-Össjö		1	1.000		1	1.000	1.00	0.000	0.0	0.30	NA
SWE-Råhult		1	1.000		1	1.000	1.00	0.000	0.0	0.00	NA

SWE-Slättö	1		0.000	1		0.000	1.00	0.000	0.0	0.00	NA
SWE-Stackebo	1		0.000	1		0.000	1.00	0.000	0.0	0.00	NA
SWE-Stegaryd	1		0.000	1		0.000	1.00	0.000	0.0	0.04	NA
SWE-StoreMosse	9	11	0.550	9	9	0.500	1.11	0.129	39.9	2.70	0.89
SWE-Torskinge		1	1.000		1	1.000	1.00	0.000	0.0	0.00	NA
SWE-Trälsbromossen	1	2	0.667	1	2	0.667	1.00	0.123	19.3	1.56	1.00
SWE-Uppebo	1		0.000	1		0.000	1.00	0.000	0.0	0.00	NA
SWE-Våxmossen	23	40	0.635	16	31	0.660	1.34	0.179	39.2	7.47	0.74

Supplemental Table 4. Mantel tests of Isolation by geographic distance, Isolation by climate distance, and Isolation by climate distance when accounting for the effect of geographic distance, for European plants of *S. divinum* and *S. medium* based on 10,000 replicates. Climate distance between sites was measured as multidimensional euclidean distance on the Principal Components Analysis of 19 CHELSA climate variables. Bold = statistically significant at p<0.05.

	Isolation by geographic distance		**Isolation by climate distance**		**Isolation by climate distance adjusted for geography**	
	Observed value	**p**	**Observed value**	**p**	**Observed value**	**p**
S. divinum	0.142	**0.0013**	0.149	**3e-04**	0.0565	0.1056
S. medium	0.197	**7e-05**	0.202	**0.0023**	-0.0004	0.5045

Supplemental Table S5. Parameter estimates, model likelihoods, and Akaike Information Criterion (AIC) values for the four-deme demographic models. The two No migration models differ in whether *S. divinum* in Europe (Eur) and North America (NA) diverged before *S. medium* in Europe and North America ("*S. divinum* first") or vice versa ("*S. medium* first"). The other models use the "*S. medium* first" divergence order and included different combination of gene flow matrices to estimate gene flow rates between current and ancestral populations. Times, population sizes, and gene flow rates are relative, not absolute. Time = divergence time in generations; popN = effective population size. Notes identify categories of gene flow: bswc = between species,within continent; wsbc = within species, between continents; bsbc = between species, between continents.

Parameter	***S. divinum* first No gene flow**	***S. medium* first No gene flow**	**Partial 1**	**Partial 2**	**Partial 3**	**Partial 4**	**Partial 5**	**Partial 6**	**Full gene flow**	**Note**
Time 1	1628	1140	12	533	697	525	162	212	778	
Time 2	1538	2150	3697	4263	918	753	257	1996	1086	
Time 3 (fixed)	15000	15000	15000	15000	15000	15000	15000	15000	15000	
S. divinum Europe popN	11778	10205	32	7306	745	5361	245	2768	847	
S. medium Europe popN	8077	7412	922	6846	675	3308	188	3071	666	
S. divinum North America popN	264210	518336	106847	125909	3023	310968	1303	98648	3561	
S. medium North America popN	497943	129254	42534	17116	3891	298869	1240	8190	4867	
S. divinum ancestral popN	8591	8257	9612	6454	11	3797	150	3454	17	
S. medium ancestral popN	4713	4937	2133	69	12	2910	23	18	17	
Ancestor popN	39094	33312	13935	22692	334	12625	567789	29085	1117	
Gene flow matrix 0:										
S. divinum Eur to *S. medium* Eur			5E-06		1E-06		7E-06		1E-06	bswc
S. medium Eur to *S. divinum* Eur			3E-05		3E-06		2E-05		1E-06	bswc
S. divinum NA to *S. medium* NA			2E-04		3E-06		1E-05		3E-06	bswc
S. medium NA to *S. divinum* NA			2E-04		5E-06		2E-05		5E-06	bswc
S. divinum Eur to *S. divinum* NA			4E-05		3E-03		1E-02		2E-03	wsbc
S. divinum NA to *S. divinum* Eur			1E-01		2E-03		5E-03		2E-03	wsbc
S. medium Eur to *S. medium* NA			2E-02		1E-05		6E-05		6E-05	wsbc
S. medium NA to *S. medium* Eur			5E-03		1E-03		4E-03		1E-03	wsbc
S. divinum Eur to *S. medium* NA			8E-06		2E-06		3E-05		3E-06	bsbc

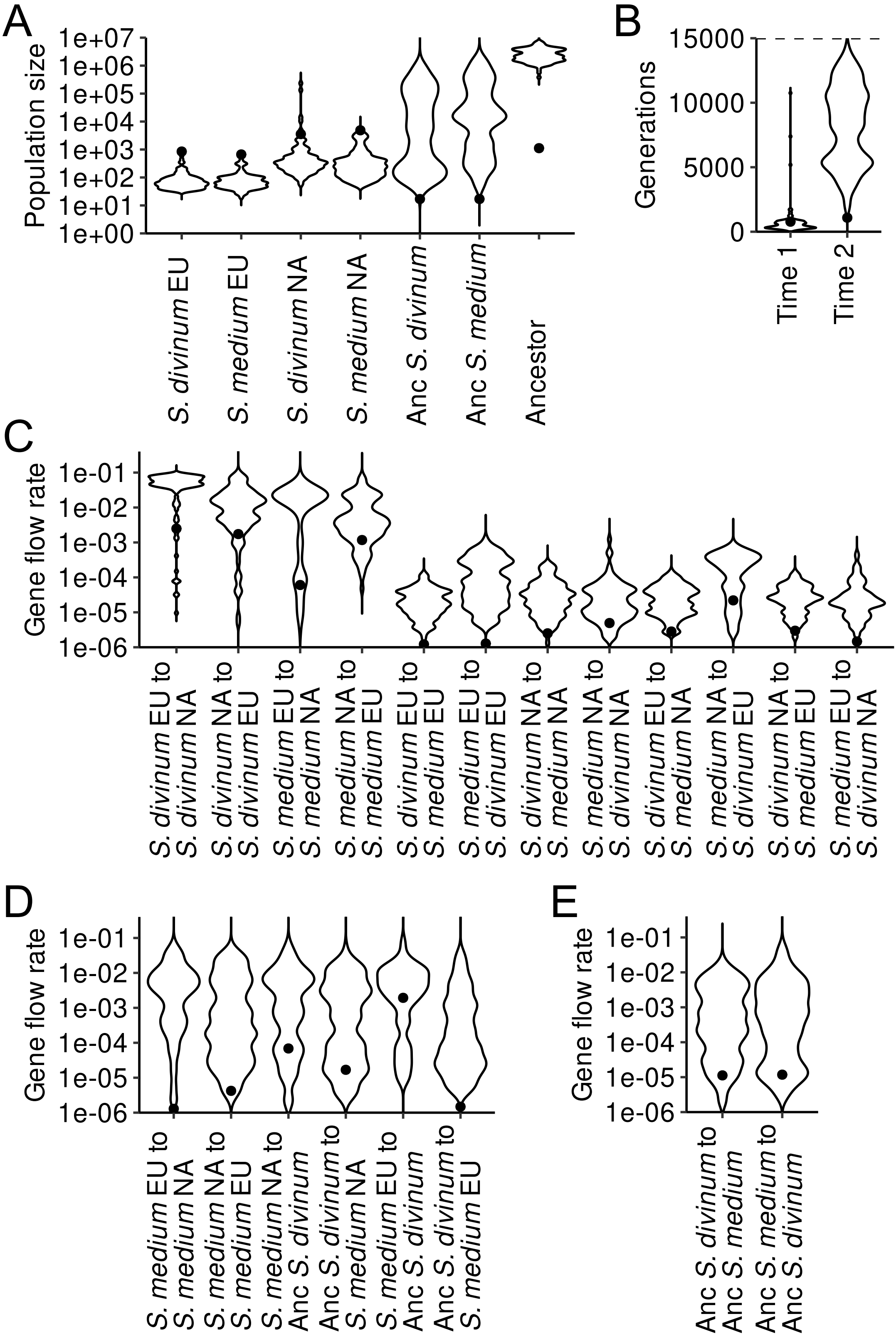
S. medium NA to *S. divinum* Eur			5E-04		2E-05		8E-05		2E-05	bsbc
S. medium Eur to *S. divinum* NA			3E-05		2E-06		3E-06		1E-06	bsbc
S. divinum NA to *S. divinum* Eur			1E-05		3E-06		3E-06		3E-06	bsbc
Gene flow matrix 1:										
S. medium Eur to *S. medium* NA				2E-04	3E-03			1E-04	1E-06	wsbc
S. medium NA to *S. medium* Eur				5E-04	2E-05			6E-04	4E-06	wsbc
S. medium Eur to *S. divinum* Anc				3E-06	1E-05			2E-06	2E-03	bsbc?
S. divinum Anc to *S. medium* Eur				1E-06	2E-06			2E-06	1E-06	bsbc?
S. medium NA to *S. divinum* Anc				3E-06	4E-03			9E-06	7E-05	bswc?
S. divinum Anc to *S. medium* NA				3E-06	2E-05			6E-06	2E-05	bswc?
Gene flow matrix 2:										
S. medium Anc to *S. divinum* Anc						1E-05	5E-04	3E-06	1E-05	bswc?
S. divinum Anc to *S. medium* Anc						2E-06	2E-04	1E-04	1E-05	bswc?
MaxEstLhood	-5040.6	-5020.6	-4755.3	-4910.7	-4741.5	-4976.3	-4740.2	-4908.1	-4743.3	
AIC	23233	23141	21943	22646	21892	22941	21878	22639	21904	

Supplemental Table S6. Parameter estimates, model likelihoods, and Akaike Information Criterion (AIC) scores from two-deme demographic models for European plants of S. divinum and S. medium. Times, population sizes, and gene flow rates are relative, not absolute. Time = divergence or admixture time in generations; popN = effective population size.

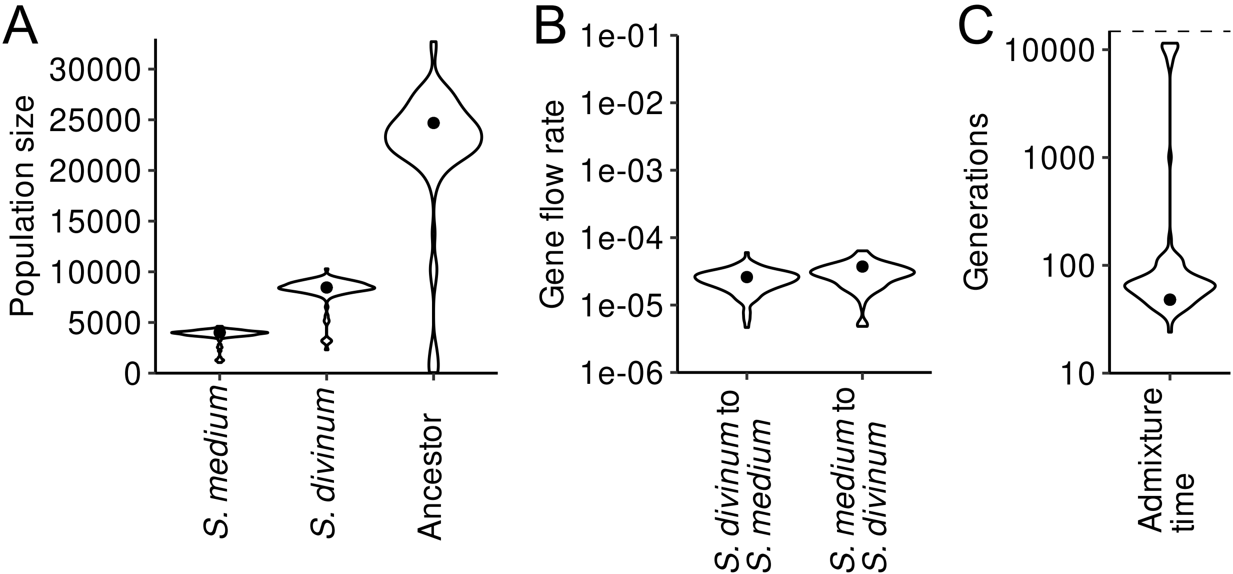
Parameter	**No gene flow**	**Early gene flow**	**Recent gene flow**	**Full gene flow**
Divergence time (fixed)	15000	15000	15000	15000
Admixture time		1	48	
Ancestor popN	32401	9932	24686	11354
S. medium popN	5186	3493	4012	3643
S. divinum popN	10701	6965	8450	7269
Gene flow rates:				
S. divinum to *S. medium*		4.1E-06	2.6E-05	3.4E-06
S. medium to *S. divinum*		3.7E-06	3.7E-05	3.8E-06
MaxEstLhood	-5800.8	-5641.5	-5597.7	-5641.3
AIC	26722	25994	25792	25991

Supplemental Figure S1. Phylogenetic relationships among European and North American representatives of the *S. magellanicum* complex. Tip labels joined by black bars have indistinguishable RADseq genotypes. Tip labels in violet, blue, green, and brown are North American *S. diabolicum*, *S. divinum*, *S. magniae*, and *S. medium*, respectively. European samples are labeled in black text. Node labels indicate maximum likelihood bootstrap support. Diagonal lines indicate branches that have been shortened to better display relationships within the complex.

Supplemental Figure S2. Four-deme Full gene flow model bootstraps of parameter estimates. A) Deme estimated population sizes. B) Divergence time in generations. C-E) Gene flow estimates for Gene flow matirix 0, 1, and 2, respectively.



Supplemental Figure S3. Two-deme Recent gene flow (Secondary contact) model bootstraps of parameter estimates. A) Deme estimated population sizes. B) Gene flow rate estimates. C) Estimated admixture time in generations.



Supplemental Figure S4. Plots of genetic distance versus climate distance for European samples of *S. divinum* (A) and *S. medium* (B), plots of the portion of genetic distance not explained by geographic distance (the residuals) versus climate distance for European samples of *S. divinum* (C) and *S. medium* (D), and plots of the relationship between geographic ditance and climate distances for European samples of *S. divinum* (E) and *S. medium* (F).