Arctoa (2000) **9**: *1-2*

MALE PLANTS OF *CYRTOMNIUM HYMENOPHYLLOIDES* (BRYOPHYTA: MNIACEAE) IN SIBERIA

МУЖСКИЕ РАСТЕНИЯ *CYRTOMNIUM HYMENOPHYLLOIDES* (BRYOPHYTA: MNIACEAE) В СИБИРИ

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Abstract

Male plants of the arctic-alpine moss *Cyrtomnium hymenophylloides* are present in a collection of this species from the unglaciated Lena River Valley, Siberia, Asian Russia. Male plants are otherwise known from near or in unglaciated refugia in arctic Canada and Alaska. Female plants are more widespread in northern regions of glaciated North America and Fennoscandia. The differential distribution of male and female plants, and the apparent absence of sporophytes in the few known places were males and females occur together, indicate that there is limited potential of dispersal by spores throughout the range of this moss, and not only in North America as was previously documented.

Abstract

Мужские растения аркто-альпийского мха *Cyrtomnium hymenophylloides* найдены в сборах из долины реки Лена, Восточная Сибирь, из района, который не подвергался оледенению. Кроме этого места мужские растения данного вида известны из арктических районов Аляски и Канады, которые также не покрывались ледником. Женские растения имеют более широкое распространение в Северной Америке и Фенноскандии, на территориях покрывавшихся ледниками. Различия в распространении мужских и женских растений, а также отстутствие спорофитов в немногих местах, где встречаются оба пола, указывает на ограниченную возможность расселения этого вида при помощи спор по всему ареалу, а не только в Северной Америке, как это было показано для этого вида ранее.

Cyrtomnium hymenophylloides (Hüb.) Nyh. ex T.Kop. occurs mainly north of the arctic treeline in North America, but it is known also from a large area in and near the Canadian Rocky Mountains (south to southern Alberta and British Columbia), and from lower elevation, mainly forested sites in a disjunct area from southeastern New York State to western Newfoundland (Miller, 1996). In this dioicous moss, the distribution of male and female plants is distinctly different, with female plants occurring throughout the North American range of the species, and the rarer males restricted to the far northern fringe of its range (northern Alaska; western, coastal Northwest Territories; and coastal areas of Baffin and Ellesmere Islands [Miller & Mogensen, 1997]). Known occurrences of male plants are all in or very close to areas that are recognized by biologists and geologists to have escaped Pleistocene glaciation. Although there are two places in northern North America at which male and female plants were collected near one another, neither we nor apparently anyone else has detected mixtures of both in single gatherings preserved as herbarium specimens. Also, no plants with sporophytes have yet been found in North America. In fact, the capsule of *C. hymenophylloides* is known from a single sporophyte collected in Jämtland, Sweden, and reported by Persson (1915).

We recently visited the Naturhistoriska Riksmuseum, Stockholm, to examine additional material of *Cyrtomnium hymenophylloides* as part of our continuing investigations of the genus for the Flora of North America Project, and specifically to locate the sporophyte of *C. hymenophylloides* for further study. We examined at S all specimens of this moss from Fennoscandia (301 packets; 49% from Sweden, 45% from Norway, 6% from Finland). We found no male plants and could not locate the sporophyte studied by Persson (1915). However, we recorded the occur-

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rence of numerous female plants from all three countries (211 packets; 71% of total examined), in parallel with the pattern we documented for North America (Miller & Mogensen, 1997). In Fennoscandia, particularly Sweden and Norway, female plants appear to be much more common than in North America (71% vs. 18% of the total number of specimens examined, 301 and 515, respectively). These percentages may reflect actual population differences in the two regions, but it is difficult to evaluate this possibility accurately from herbarium specimens alone, because of incomplete label data, specimen duplication, and mixed gatherings in the same packet from adjacent but potentially independent populations.

Our studies of specimens of this moss at the Botanical Museum, University of Copenhagen (C); the British Museum of Natural History (BM); Charles University (PRC); Muséum National d'Histoire Naturelle (P); and 22 North American herbaria (cited in Miller & Mogensen, 1997) did not reveal any examples of male plants.

However, during our studies of specimens at S from outside glaciated Fennoscandia, we discovered male plants in a collection from Asian Russia: **Siberia**: Bulhur (72° N. Lat.) [71°53' N, 127°06' E], Lena River valley, *Nilsson-Ehle*, 4 September 1898 (as *Astrophyllum hymenophylloides* [= *C. hymenophylloides*]), det. H. W. Arnell. !GSM & NGM, 6/1999. See Arnell (1913).

The Lena River valley, through which flows drainage from a part of the Central Siberian Upland, was not glaciated during the Pleistocene Weichselian stage (Larsen & al., 1999; Svendsen & al., 1999), a circumstance similar to places where male plants of *Cyrtomnium hymenophylloides* have been found in North America. Female and male plants of this moss appear to occupy different areas within the circumarctic-montane range of the species, with male and sometimes female plants occurring in areas that have no history of glaciation and evidently only limited dispersal from such places. Female plants, on the other hand, occur within a much greater area, which includes, for example, the region just north of the limit of glaciation in eastern North America. This implies that female plants are or were more successful in their dispersal and establishment on glaciated terrain.

We present our findings here to stimulate searches for additional examples of mixed populations of male and female plants in herbaria or the field, and more importantly the discovery of sporophytes, which are needed to help verify the taxonomic placement and systematic homogeneity of *Cyrtomnium*. Unglaciated parts of arctic Russia, where the species is known to be widely distributed (Afonina & Czernyadjeva, 1995), are promising areas in which to look for sporophytes and additional occurrences of male plants.

ACKNOWLEDGMENTS

We thank Svend Funder, Geological Museum, University of Copenhagen, Denmark, for information on the glacial history of north Russia. Irina Goldberg, Institute of Plant and Animal Ecology, Yekaterinburg, Russia, also helped with the Russian geological literature and provided information about *Cyrtomnium hymenophylloides* in the Ural Mountains. Lars Hedenäs facilitated our work at S and arranged for the loan of specimens.

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