

*ORTHOTRICHUM SPRUCEI* MONT. (MUSCI),  
A EUROPEAN ENDEMIC DISCOVERED IN KAZAKHSTAN

*ORTHOTRICHUM SPRUCEI* MONT. (MUSCI),  
ЕВРОПЕЙСКИЙ ЭНДЕМИК НАЙДЕН В КАЗАХСТАНЕ

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Abstract

*Orthotrichum sprucei* is reported new to Asia based on several populations sampled on Poplar in Alma-Ata Oblast, Kazakhstan. The recent report of an eastward disjunction of this species historically known only from oceanic parts of Western Europe is here confirmed and widened. Morphological characters of these populations are described and illustrated.

Резюме

*Orthotrichum sprucei* приводится впервые для Азии – он был выявлен в нескольких местонахождениях на тополях в Алма-Атинской области, Казахстан. Недавние находки этого вида значительно восточнее его основного океанического распространения в пределах Европы подтверждены, а новые находки расширяют его ареал еще больше. Морфология растений из этих популяций описана и проиллюстрирована.

*Orthotrichum sprucei* was, until its recent discovery from Hungary (Erzberger & Papp 2000), known only from the lowlands of Western Europe (Lewinsky-Haapasaari & Norris, 1998), from Spain to Germany and westward to Great Britain. Based on the study of material held at NY, populations sampled on *Populus* along streams in Kazakhstan agree in all features with the samples from oceanic parts of Western Europe. The populations from Kazakhstan are here described and illustrated.

***Orthotrichum sprucei* Mont. (Fig. 1)**

Plants in compact cushions, ca. 7 mm tall, dark green; rhizoids smooth, well developed at base of stems only. Stem lacking central strand, with subapical branches. Axillary hairs with a single brown basal cell, to 200 µm long. Leaves oblong-ovate, 2.5 mm long and 1.0 mm wide; costa rather weak, ending about 4/5th the length of the leaf, covered on the abaxial surface by smooth, isodiametric cells; apex obtuse; margins entire, revolute from base to upper fifth of leaf. Leaves appressed ascending when dry, erect-spreading

upon becoming wet. Basal leaf cells smooth, thin-walled, with walls slightly wavy, inner cells rectangular, to 3 times as long as wide, to 50 µm long and 20 µm wide, marginal basal cells quadrate, 20 µm long and wide. Upper leaf cells smooth, oblate to irregularly isodiametric in upper fifth, 12-18 µm long and 15-24 µm wide. Gemmae uniseriate, born on adaxial leaf surface.

Cladoautoicous (subapical perigonia rare). Perigonia bud-shaped, leaves reduced, margins plane, cells smooth, and costa poorly differentiated to reaching upper fifth; antheridia long stalked, paraphyses absent. Perichaetial leaves not differentiated, paraphyses absent from perichaetium. Seta straight, 0.5 to 1.5 mm long, with central strand of small, thin-walled cells, cortical cells in one or two layers, with thick orange wall. Capsule shortly exserted when plant wet, appearing exserted when plants dry, widest below mouth, and gradually tapered or abruptly constricted to seta, urn about half the length of capsule, to with 8 deep furrows extending the length of the sporogenous region of the capsule when dry, to

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1.6 mm long and 1.0 mm wide. Exothecial cells differentiated into 8 bands composed of incrassate cells. Stomata immersed, with subsidiary cells covering most of the guard cells, restricted to median band. Differentiated annulus lacking. Peristome double. Exostome teeth 8, recurved when dry; OPL papillose to striate papillose toward apex, PPL thin, smooth. Endostome teeth 8, alternating with exostome teeth, erect and slightly bent inward, PPL thin and smooth, with median vertical wall remnant, IPL with scattered papillae, and thick transverse cell remnants. Operculum flat to conical, rostrate, rostrum erect and to 0.4 mm long. Prostome lacking. Calyptra conic oblong, mitrate, large, yellow, with red-brown apex, plicate, glabrous. Spores globose, 15-20  $\mu\text{m}$ , green, warty-papillose.

*Specimens examined:* Kazakhstan: Alma-Ata Oblast, Little Almatimka Stream, South edge of Alma-Ata, on bark of Poplar, 43° N 77° E, *B. Allen* 10423, 7 July 1991 (AA, MO, NYBG); idem, Bolshoi Dalan Canyon, Zailiskiy Alatau Mountains, west of Alma Ata, on bark of hawthorn, 43° N 77° E, *B. Allen* 10443, 7 July 1991, (AA, MO); idem, on willow, *B. Allen* 10445 (AA, MO); idem, Levii Talgar Valley, Alma-Ata Wilderness Reserve, on bark of Poplar, 43° N, 77° E, *B. Allen* 10449, 8 July 1991 (AA, MO).

The specimens collected in Kazakhstan agree in all their features with current concepts of *O. sprucei* (Lewinsky-Haapasaari, Norris, 1998). These samples of *O. sprucei* were initially identified as *O. obtusifolium* Brid., a species that also occurs in Kazakhstan (Lewinsky, 1993). Although both species have ovate-oblong leaves that are obtuse, *O. sprucei* can be easily distinguished from the latter by the weaker costa, and the immersed stomata (Pierrot, 1982; Lewinsky-Haapasaari, Norris, 1998). *Orthotrichum sprucei* has been considered closely related to *O. rivulare*, a species disjunct between North Western Europe and Western North America, as both species were composing sect. *Rivulare* Schimp. within the subg. *Pulchella* (Schimp.) Vitt. (Lewinsky, 1993). *Orthotrichum euryphyllum* was recently resurrected from synonymy with *O. rivulare*. The former is endemic to semi-deserts of coastal states on Western North America (Lewinsky-Haapasaari, Norris, 1998). Although

these species may not be closely related as suggested (Lewinsky-Haapasaari, Hedenäs, 1998), they are morphologically rather similar. The populations referred to here differ 1) from *O. rivulare* by the upper laminal cells that have a diameter typically exceeding 15  $\mu\text{m}$  versus smaller than 13  $\mu\text{m}$  in *O. rivulare*, and 2) from *O. euryphyllum* by the straight costa, the complete lack of papillae on the upper laminal cells, and the plane leaf apex, versus a sinuose costa, smooth or weakly papillose laminal cells, and cucullate leaf apex in *O. euryphyllum* (Lewinsky-Haapasaari, Norris, 1999). More recently, Otnyukova (2001) described *O. furcatum* from the Tuva Republic. This species too, has obtuse leaves, but differs from *O. sprucei* by the presence of high and branched papillae on the laminal cells. Finally, from the description *O. sprucei* may resemble *O. macrocephalum*, a species endemic to Spain (Lara et al., 1994), but can be easily segregated based on larger smooth laminal cells.

*Orthotrichum sprucei* is considered a very rare species by Frahm (1995), although it is not included in the Red Data Book of European Bryophytes by Schumacker & Martiny (1995). This species was previously thought to be restricted to Oceanic parts of Western Europe, where it grows on tree trunks (i.e., trunks of *Alnus*, *Fraxinus* and *Salix* fide Lewinsky-Haapasaari, 1995) or, albeit more rarely, on rocks (Frahm, 1995) in river banks. Its discovery in Kazakhstan, where it was collected on *Crataegus*, *Populus*, and *Salix*, reveals a further significant range extension to the one reported recently by Erzberger and Papp (2000). Considering that this species is at least superficially similar to *O. obtusifolium*, a species whose ecological and geographic range includes those of *O. sprucei* it is possible that the latter is more widespread than previously thought.

#### ACKNOWLEDGMENTS

I am grateful to Drs. William Buck (NYBG) and Bruce Allen (MO) for arranging for the loans of the specimens. Virge Kask is credited for the habit drawing. Financial support from the U.S. National Science Foundation (DEB-9806955) made this study possible.

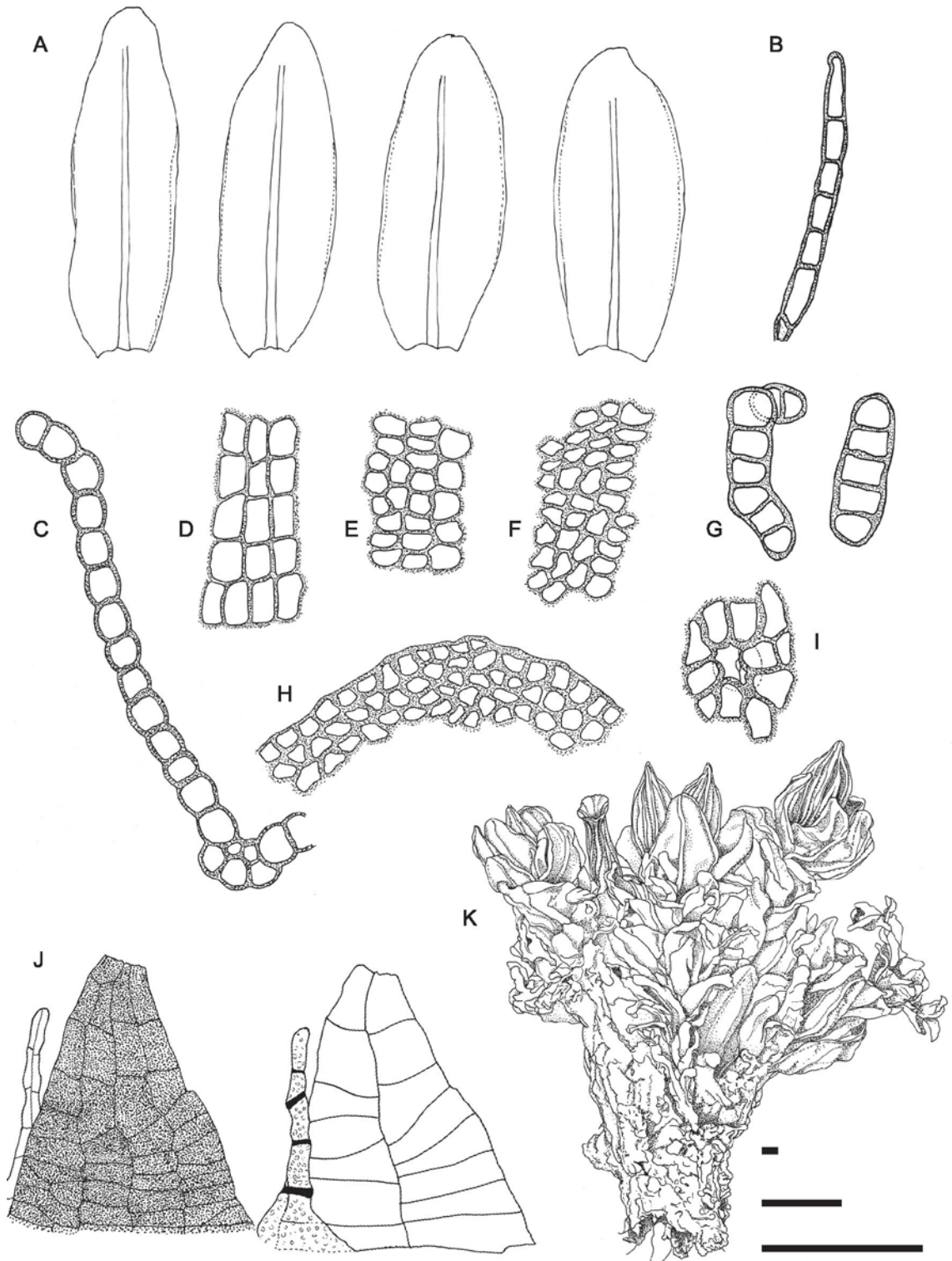


Fig. 1. *Orthotrichum sprucei*. A. Vegetative leaves. B. Axillary hair. C. transverse section of leaf. D. Basal laminal cells. E. Median laminal cells. F. Apical laminal cells. G. Gemmae. H. Leaf apex. I. Stoma. J. Peristome: left view from the outside, right view from the inside. K. Habit. Scale bars: top bar (= 100  $\mu$ m) is for A, middle bar (= 1 mm) is for K, and lower bar (=100  $\mu$ m) is for B to I (all drawings based on Allen 10423 NY).

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