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Studies on the cryptogamic vegetation of loess cliffs, IV.
Chenia leptophylla (C. Muell.) Zander new to Hungary

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Introduction

Chenia leptophylla (C. Muell.) Zander is a very inconspicuous moss belonging to the family of the Pottiaceae. The species was originally described by C. MUELLER (1888) from South Africa as *Phascum leptophyllum* C. Muell. Later the species was collected several times but not recognized as belonging to this taxon and therefore described under various names: *Pottia splachnobryoides* C. Muell. (1888) from China, *Pottia denticulata* Dix. & P. Varde. nom. illeg. (1927) from India, *Physcomitrium rhizophyllum* Sak. (1938) from Japan (transferred to *Tortula* as *T. rhizophylla* by IWATSUKI & SAITO 1972) and *Tortula vectensis* Warb. & Crundw. (1965) from Great Britain.

ZANDER (1989) created a new genus *Chenia* for the species because "it does not fit comfortably in either *Phascum, Pottia* or *Tortula*". In his monumental work "Genera of the Pottiaceae: Mosses of harsh Environments" (1993) he depicts 3 recognized species of the genus and gives an extensive genus description. The two other species of the genus are *Ch. lorentzii* (C. Muell.) Zander from Argentina and *Ch. subobliqua* (Williams) Zander from Peru. DUELL (1991, 1992), FREY & FRAHM (1995) and FRAHM (1999*b*, 1999*c*) use the binominal *Phascum leptophyllum* C. Muell. for the species.

Description of Hungarian specimen of *Chenia leptophylla* (C. Muell.) Zander

Plants forming low tufts on shaded soil; stems mostly unbranched, short, ca. 2-4 mm long. Leaves brittle at base, more or less contorted when dry, those of comal tufts light green, the older ones dark brownish green; comal leaves patent to widely spreading when wet, spathulate (widest part in or above midleaf), 1-2 mm long (innermost leaves often much smaller), plane or broadly channelled, apex rounded to broadly acute, usually with a recurved apiculus consisting of one elongate and pointed cell, margin plane, sharply crenulate to almost entire above, entire below, costa ending in apex, brownish, lamina cells hexagonal, 1 : 1-1.5, thin walled, slightly bulging on both sides, 15-19 μm long, those towards base rectangular, ca. 30-40 μm long and 20-25 μm wide. Lower leaves smaller than comal leaves. Rhizoidal tubers present in soil, variable in shape and size, spherical, clavate or somewhat elongate, ca. 80-180 μm in longest diameter, slightly darker than the pale brown, smooth rhizoids, outer cells somewhat bulging. Female plants with slightly shorter stems than those of vegetative plants (ca. 2 mm); perichaetia terminal with leaves ca. 2 mm long. Sporophytes and male plants absent. The sporophyte (only known from the South African type material) has a very short seta and a spherical, cleistocarpous capsule.

Distribution

Chenia leptophylla is a subcosmopolitan species with scattered occurrences on all continents except Antarctica (ARTS & SOLLMAN 1992). Because of its inconspicuous appearance and lack of sporophytes the species is certainly often overlooked. It grows from sea level in temperate regions up to ca. 2200 m in tropical mountains, on open or shaded, slightly acid, neutral or calcareous soils, often in man-made habitats, along tracks, riverbanks, in gardens etc.

In Europe the species has a Submediterranean-Subatlantic distribution. It is known from southern England (Isle of Wight, Cornwall and Scilly Isles, BLOCKEEL 1992, as *Tortula rhizophylla*), Spain (ELCHE, MARTINEZ et al. 1989, Sierra Nevada, ARTS & SOLLMAN 1992), Italy (Lake Como, SOLLMAN 1979, South Tyrol, Merano, DUELL 1991 and Ancona, CORTINI PEDROTTI & ALEFFI 1988) and Germany (Ahr- and Mosel-valley, DUELL 1992, 1995, FRAHM 1999*b*, Nette-valley, FRAHM 1999*c*). Its altitudinal range in Europe is from sea level to ca. 700 m in South Tyrol and 2000 m in Sierra Nevada. Outside Europe it is known from Macaronesia, E and S Africa, India, China, Japan, Philippines, New Guinea, Australia, New Zealand, southern USA and Latin America.

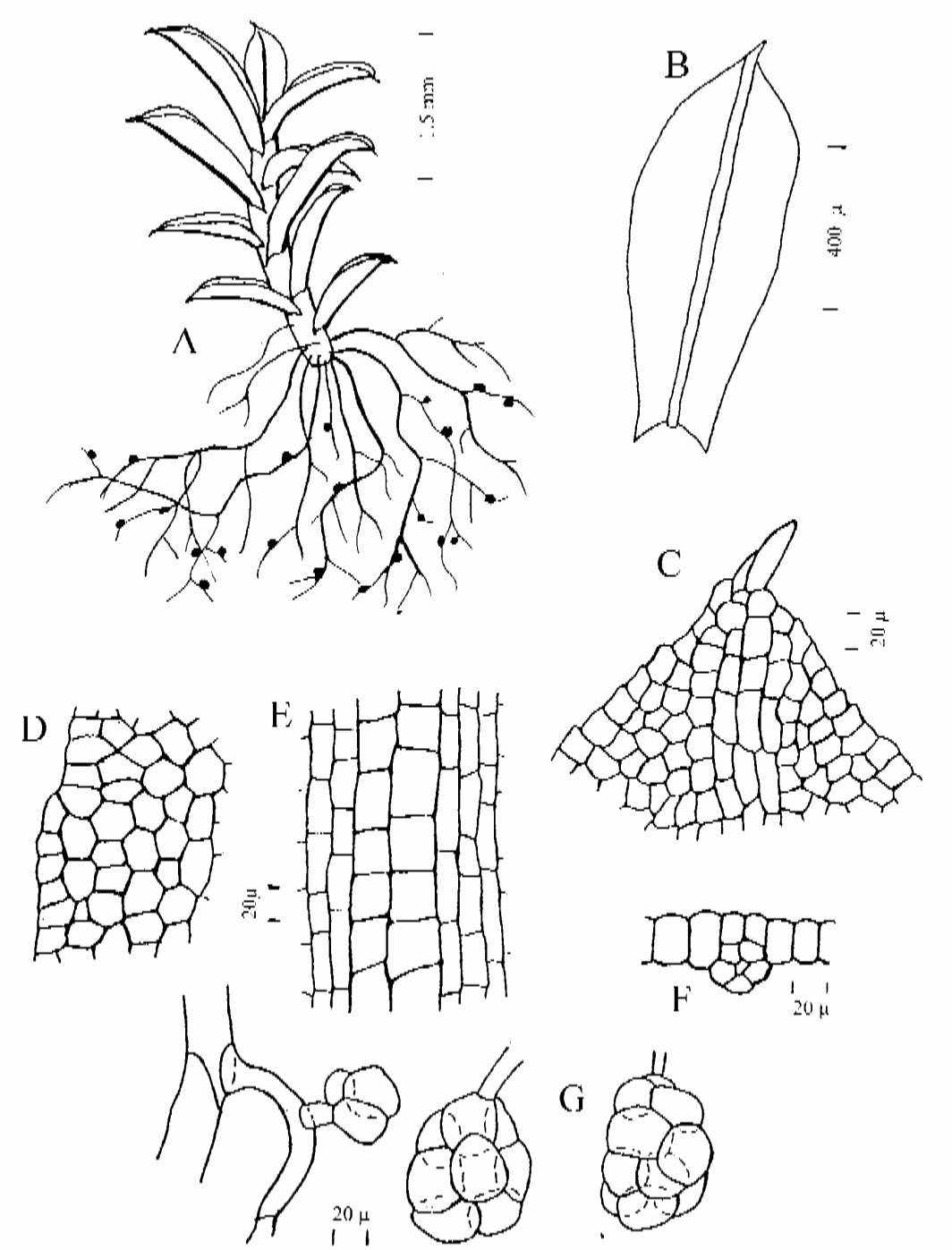

Fig. 1. A: Habitus of moist plant – Nedves növény habitusképe. B: Leaf – Levél. C:Leaf apex – Levélcsúcs. D: Leaf margin in midleaf – Levélszegély középmagasságban. E: Central cells of leaf base – A levélalap középső sejtjei. F: Cross section of nerve in midleaf – Levélgerinc keresztmetszete középmagasságban. G: Rhizoidal tubers – Rizoidgumók.

In view of the European distribution of *Chenia leptophylla*, its occurrence in Hungary is not surprising. Collection details: Hungary, Veszprém County, Balaton Highlands. Basaltic rocks on the S slope of Mt Szentgyörgyhegy between Hegymagas and Kisapáti, with *Ceterach officinarum* and *Asplenium septentrionale*, at 350 m alt., 46°50'N, 17°27'E. On loose, shaded soil among basaltic rocks, along track. Coll. T. Pócs & B.O. van Zanten No. 9826/H, 25-6-1998 (with *Bryum bicolor* and *B. argenteum*). Specimen in herb. EGR and the private herbarium of the author.

The collection area has been investigated intensively by Á. BOROS and L. VAJDA in the 1960s (pers. comm. by BOROS and VAJDA). As the species grow along the track towards the mountain plateau it is unlikely that BOROS and VAJDA should have overlooked the species. It seems therefore plausible that the species established itself after their investigations. This is probably another example of a warmth-loving species that react on global warming by expending its range north- and eastwards. This is in line with the recent discovery of the species in the Ahr-, Mosel- and Nette- valleys in Germany (DUELL 1992 and 1995). The mean winter temperatures raised between 1985-1996 by 1.5° C and the 3.5° C January isotherm moved from Paris 400 km east and now runs through Germany. There are several Mediterranean(-Atlantic) moss species in the process of expending their ranges northwards (FRAHM & KLAUS 1997; FRAHM 1999*a*).

Dispersal

Although the sporophyte of *Chenia leptophylla*, as said before, is only known from the type material (South Africa) the species propagates easily vegetatively by means of rhizoidal tubers and caducous leaves. Tubers are usually present in the soil. Because they are not easily becoming airborne, aerial transport is unlikely, but local dispersal by animals or men (e.g. at the wheels of cars, shoes, etc.) or water flows during heavy rains is likely. In this respect it is indicative that the species was found by the author and PH. SOLLMAN (in 1993) e.g. in caravan parks in Australia. NEUMAN (1972) notes that all then known localities of *T. vectensis* (a synonym of *Chenia leptophylla*) are near seaports (Porthmouth, New Orleans and Tokyo). Experiments by T. ARTS show that tubers are still viable after 10 years of storage in the herbarium (ARTS & SOLLMAN 1992). They can therefore bridge harsh conditions (e.g. summer drought) for a considerable span of time. Caducous leaves are usually also abundant, they sprout easily from the dorsal side of the nerve, mostly by the formation of secondary protonema, more rarely also from buds which are similar to the rhizoidal tubers. Under dry herbarium conditions detached leaves retained their regeneration capacity for ca. 10 months (ARTS & SOLLMAN 1992). Experiments by the author with detached leaves of the Hungarian specimen showed also a good viability after 8 months of desiccation, but after 9 months no regeneration was observed. When exposed to direct sunlight they retained their viability for up to 30 hours (in February, at sea level), 42 hours of direct sunlight, however, proved to be lethal, due to a combination of desiccation and UV-radiation (these data are also mentioned in ARTS & SOLLMAN 1992). The experiments were carried out with material of *Chenia leptophylla* collected by the author in New Zealand (N. Island, Hawke's Bay, Taradale cemetery, on sandy soil of path near entrance, No. 93.08.30 A, 26-08-1993). The survival of at least 30 to ca. 40 hours (as shown above) is probably too short for surviving a possible aerial transoceanic transport by air currents unless the transport takes place during winter at low altitude and under cloudy conditions when most of the UV-radiation is absorbed and reflected by clouds. During summer detached leaves will almost certainly not survive a supposed transoceanic transport by air currents.

Conclusions: 1. Transoceanic dispersal by air currents via rhizoidal tubers or detached leaves seems very unlikely (an effective transoceanic transport at the feet or feathers of migratory birds, however, can not be excluded totally). 2. Rhizoidal tubers serve to bridge adverse conditions (e.g. summer droughts) and local dispersal by animals or men (e.g. at wheels of cars), water flows during heavy rains, etc. 3. For detached leaves the same holds, but they can also be transported by local air currents. 4. In view of the preference of the species for man-made habitats, the most plausible cause of its cosmopolitan range is, in my opinion, human transport activity.

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Abstract

Chenia leptophylla (C. Muell.) Zander (Pottiaceae) is recorded for the first time from Hungary (Veszprém County, Balaton Highlands, Szentgyörgyhegy). It is argued that this warmth-loving species is extending its range because of global-warming.

Összefoglalás

A löszfalak virágtalan növényzete IV.
Chenia leptophylla (C. Muell.) Zander Magyarországon
B.O. VAN ZANTEN

A *Chenia leptophylla* (C.Muell.) Zander, Pottiaceae családba tartozó lombosmohát első alkalommal közli a Szerző Magyarországról, a Balaton felvidéki Szentgyörgyhegyről. Érvek szólnak amellett, hogy ez a melegkedvelő (melegmérsékeltövi, szubtrópusi és trópusi hegyvidéki, Európában atlanti-szubmediterrán elterjedésű) faj a globális felmelegedés következtében terjedőben van.

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