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Bryophyte flora of Hunan Province, China. 2. *Scapania koponenii sp. nova* (Scapaniaceae, Hepaticae)

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A new species, *Scapania koponenii* Potemkin, belonging to the subgenus *Scapania* (Dumort.) Dumort. sectio *Ciliatae* Grolle, is described on the basis of plants previously ascribed to SE Asian phenotypes of *S. aspera* M.&H. Bernet. Diagnostic characters and infrageneric position of *S. koponenii* are discussed and the species is illustrated in line drawings.

Key words: China, Hepaticae, Hunan, *Scapania,* Scapaniaceae, taxonomy

In a previous paper (Potemkin 1998), I mentioned the occurrence of *Scapania aspera* M.&H. Bernet in Asia. While studying the Hunanese Scapaniaceae for prof. Timo Koponen's project *Bryoflora of the Hunan Province, SE China*, I restudied the Asian specimens of *S. aspera.* A detailed comparison of about 70 morphological characters in Asian (20 specimens from the Fujian, Hunan, Jianxi, and Zhejiang Provinces of China) and European specimens (including type material G 26909, 26910) showed that there are two species at hand rather than one polymorphic taxon. Despite some overlap in the variability of Asian and European plants, there is a clear and consistent hiatus.

The first paper of the *Bryophyte flora of Hunan Province* (Koponen *et al.* 2000) series contains detailed locality data for the Hunan paratypes.

Scapania koponenii Potemkin, *sp. nova* (Fig. 1)

Scapania koponenii differt a S. aspera minoribus plantis, gemmis, lobis dorsalibus, cellulisque foliorum; papillis cuticularibus foliorum densis hemisphaericisque; margine foliorum spinoso-dentato; cellulis extremis dentium folii spinosis 1.6–2.0 longioribus quam latis.

Plants 1.2–2(–2.5) mm wide × 5–20(–40) mm long, brownish and fuscous to green, more rarely purplish brown or purple, ± opaque, with sporadic ventral intercalary branches. Cortex 2–3(–4)-stratose of rather strongly to exceedingly thick-walled cells with deeper pigmented middle lamellae; cortex often interrupted ventrally by several tiers of rather thin-walled cells; outer cortical cells ± more strongly thick-walled than internal corti-

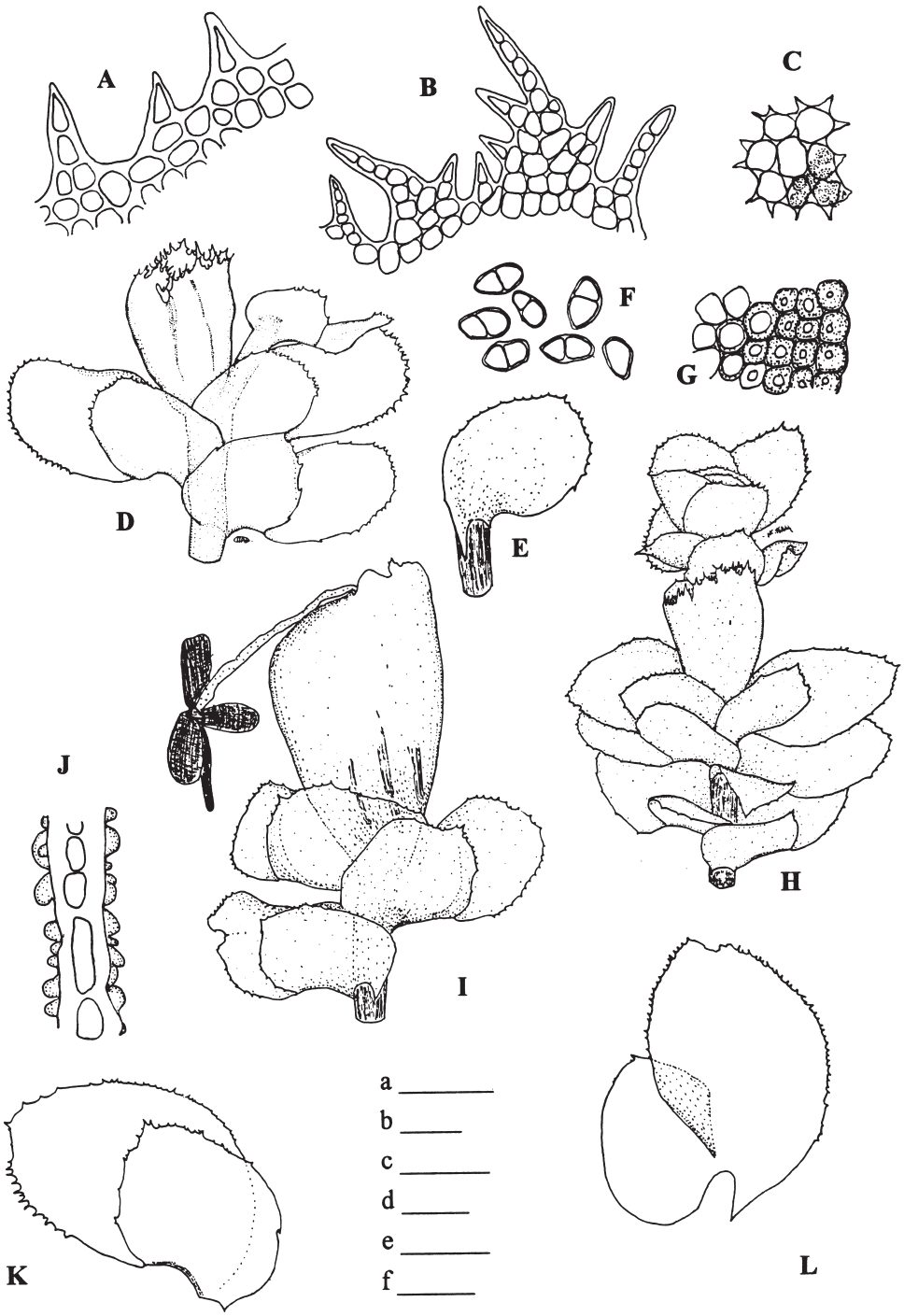

Fig. 1. *Scapania koponenii* Potemkin (A, C–H, K, L drawn from the holotype; B from *Koponen, Huttunen, Piippo & Rao 56055a*, H; I from *P. C. Chen 445*, LE). — A: Sector of postical margin of ventral lobe. — B: Sector of perianth mouth. — C: Median cells of ventral lobe, papillae shown. — D: Shoot sector with unfertilized, somewhat plicate perianth. — E: Leaf on stem, postical aspect. — F: Gemmae. — G: Stem cross-section, lateral sector. — H: Shoot sector with unfertilized eplicate perianth. — I: Shoot sector with mature perianth and capsule. — J: Sector of leaf cross-section, papillae shown. — K, L: Leaves. — Scale bars: a = 40 μm (A, C, F, G, J), b = 40 μm (B), c = 0.8 mm (D), e = 1 mm (E, H, I), f = 0.5 mm (K, L).

cal cells, tangentially flattened or not; mycorrhizal infection unknown. Leaves spinose-dentate to subentire, with teeth usually ± suppressed on antical margin and proximal sector of postical margin. Dorsal lobe 0.45–0.55(–0.65) the size of ventral, slightly divergent from to subparallel with it, divergent from stem at an angle of ca. (30–)45–60°, obliquely cordate and ovate to rounded-rectangular, ± triangulary narrowed in sharp or rarely blunt to rounded apex, crossing the stem and often ± extending beyond its further edge (± proportionally to size of plants), × 0.75–1.0(–1.15) as wide as long, arcuately inserted, shortly decurrent. Ventral lobe divergent from stem at an angle of ca. 45–85°, oblong to lingulate and subelliptical, rarely obovate, often 2–4-stratose near keel, broadly rounded to triangularly pointed at apex, × (0.6–)0.65–0.75(–0.93) as wide as long, decurrent below keel insertion, not differentiated near basal margin. Keel acute, 2–4-stratose and at least 2 cells wide from leaf base to sinus**,** 0.24–0.37(–0.5) of ventral lobe length, slightly arched, wing unknown. Marginal teeth 1–3 cells at base, 1–3(–5) cells long with 1–3(–4)-celled uniseriate ends of mostly elongated cells with ± spinose terminal cells × (1.45–)1.6–2.0 as long as wide. Marginal cells distally ca. (7–)8–14(–16) × 11.5–17(–20) µm, thick-walled in 1–2 rows or thin-walled. Median cells of ventral lobe ca. (11–)13–16(–20) × (14–) 16–20(–24) µm, thin-walled, with small acute to rarely moderate slightly bulging trigones. Basal cells of ventral lobe forming an ± extensive area of lax tissue, ca. 14–21 × 23–45 µm, thin-walled, with moderate longitudinally elongated, bulging to acute trigones, often different from trigones of median cells. Oil bodies nonpersistent, unknown. Cuticle densely and coarsely papillose; papillae mostly almost invariable in shape, ± hemispherical and very distinct in leaf cross section. Gemmae often present, (1–)2-celled, green, with a small admixture of brownish, thin- to slightly thick-walled, mostly ellipsoid and ovoid, with sporadically projected ends, occasionally some rounded triangular, broadly ovoid and subspherical, 12–15(–20) × 16–23(–27) µm, × (1.1–)1.35–1.8(–2.1) as long as wide; intensive gemma production leading to formation of subequally bilobed leaves with triangulary narrowed lobes with entire margins.

Dioicous. Androecia short, slightly distinct from sterile shoot sectors, of 2–3 pairs of smaller, subequally bilobed and moderately convex 2–3-androus bracts with longer keels, purplish in keel area; paraphyses ± numerous, filamentous and/or narrowly lanceolate. Female bracts similar or larger than adjacent sterile leaves, with dorsal lobe to × 0.85 the ventral and keel to × 0.42 the ventral lobe length. Perianths rather common, campanulate, truncate, varying from moderately compressed often with a few irregular plicae (when immature and unfertilized) to strongly compressed and mostly eplicate (when mature and fertilized); mouth lobulate dentate-ciliate, lobules rather broad, with longer terminal and mostly shorter lateral teeth; terminal teeth of lobules 1–2(–3) cells at base, 4–8 cells long, with 2–6-celled uniseriate ends and terminal cells × 2.5–3.2 as long as wide. Fruiting in spring. Capsule wall (3–)4-stratose, ca. 42–49 µm thick, outer layer ca. 17–20 µm thick, inner layers thinner. Outer layer with small nodular thickenings largely on longitudinal walls; inner layer with complete and incomplete semi-annular thickenings, which are pigmented in adjacent cell wall sectors only. Capsule cell walls mostly not pigmented and rather broad**,** 14–25 µm wide**.** Spores and elaters unknown.

TYPE: China. Hunan Prov.: Yizhang Co., Mt. Mangshan, Guizizhai, core area of the forest reserve. Primeval subtropical (warm temperate) *Cyclobalanopsis, Lithocarpus, Pinus kwantungensis, Rhododendron, Schisma* forest on slope, alt. 1 160 m, 24°57´N 112°55´E, on cliff on open moist slope, 2.X.1997 *T. Koponen, S. Huttunen & P.-C. Rao 50767a* (holotype H, isotypes LE! and herb. Forest Botanical Garden, Changsha).

HABITATS. On moist to rather dry, open to completely shaded rocks and soil, at 500–1 500 m. Known altitude range in Hunan is 500–1 180 m.

REPRODUCTION. Most of the examined specimens of *Scapania koponenii* are with gemmae and/or with perianth. Mature capsules were seen only in spring (mid-April) collections from Fujian (*Chen, 436, 445*, LE, PE).

RANGE IN HUNAN (paratypes): *3a. Koponen, Huttunen, Rao 51769. 6.* 51201. *7a.* 50931. *7b.* 50905. *7c.* 50767a. *7e.* 50626. *18a. 52954b. 19d.* 51981. *21c. Koponen, Huttunen, Piippo, Rao 56055a* (H, LE).

TOTAL RANGE (paratypes): SE China. Fujian Prov.: *Chen 157*, *436*, *445*, *451*, *Moss training course 600* (LE, PE as *S. aspera*). Guandong Prov.: *Liao Wenbo et al. 9611* (det. as *S. integerrima* Steph.), *Li Zhihua et al. 95233* (det. as *S. nemorea* (L.) Grolle) (Herbarium of Zhongshan Univ. Guangzhou, China; LE). Hunan Prov.: (present report); Jiangxi

Prov.: *Chen 50, 98*, *111* (PE as *S. aspera*, LE). Zhejiang Prov.: *Wu P.C. 530* (LE, PE as *S. aspera*).

Diagnostic characters and infrageneric position

Scapania koponenii may be confused especially with *S. aspera*, *S. stephanii* Müll. Frib., and *S. ciliata* Sande Lac.

Scapania koponenii is distinct from *Scapania aspera* in the smaller size of (1) the plants (mostly 1.2–2 mm wide, 5–20 mm long vs. 2–5 mm wide, 10–60 mm long), (2) dorsal leaf lobes (× 0.45–0.55(–0.65) vs. × 0.5–0.75 the ventral lobe), (3) leaf cells (marginal 8–14 × 11.5–17 µm vs. 12–16 × 12–18 µm; median 13–16 × 16–20 µm vs. 16–25 × 18–30 µm), and (4) gemmae (12–15 × 16–23 µm vs. 14–20 × 19–40 µm), (5) a more coarsely papillose cuticle with dense ± hemispherical papillae (vs. moderately and rather irregularly coarsely papillose cuticle with ± flattened papillae), (6) more elongated ± spinose (vs. mostly triangular, not spinose) terminal tooth cells of leaf margin and perianth mouth, (7) presence of purple pigmentation, and (8) non-persistent oil bodies.

The clearest differences from *Scapania stephanii* are the coarsely and densely papillose cuticle, the spinose terminal cells of marginal teeth and perianth mouth teeth, as well as the lobulate-dentate perianth mouth. Distinguishing *S. koponenii* from the rare mod. *parvifolia-paucidentata* of *S. ciliata* (e.g. *Koponen, Huttunen & Rao 48504*, H) is more problematic. However, such etiolated plants of *S. ciliata* have the characteristic dull-green color and at least solitary, rather strongly elongated and notably bleached spines, neither of which characters is encountered in *S. koponenii*. The latter is distinct from mature plants of *S. ciliata* in (1) the usually more distant marginal leaf teeth, (2) more strongly developed in distal leaf portions, (3) more weakly elongated terminal cells of marginal leaf teeth (× 1.6–2.0 vs. × (2.5–)3–7(–9.5) as long as wide) and of perianth teeth (× 2.5–3.2 vs. × 4.5–6.5(–10) as long as wide), (4) a usually not bleached and less distinct leaf border, (5) dorsal lobes mostly triangularly narrowed to apex, and (6) an invariably dioicous sexual condition.

The tendency of *Scapania koponenii* to develop elongated, spinose terminal tooth cells in the leaves and perianth mouth, a cuticle with dense hemispherical papillae, non-persistent oil bodies**,** and a resemblance with mod. *paucidentata* of *S. ciliata* suggest that it belongs to the sectio *Ciliatae* rather than to the *Aequilobae* (Müll. Frib.) H. Buch to which *S. koponenii* (as *S. aspera*) was ascribed in my previous paper (Potemkin 1998).

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