

Sinske HATTORI* & Pang-juan LIN** : **Two new species**
of Chinese *Frullania* (Hepaticae)

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We found two new species of *Frullania* (Hepaticae) in the late Prof. P. C. Chen's collection; the descriptions follow :

1) ***Frullania* (Trachycolea) *chenii*** Hatt. & Lin, sp. nov. Fig. 1.

A *Frullania incisosuthiana* Hatt., specie affinisissima, differt lobis foliorum caulinarum ovatis, longioribus quam latioribus, basi semper distincte ligulatum appendiculata, cellulis parum majoribus, parietibus magis incrassatis, lobulis asymmetricis, rostro valido, oblique truncato, saepius marginem lobi superante, amphigastriis caulinis late obcuneatis, longioribus quam latioribus.

Plants small to medium-sized, sordid brown in herb., on trees and rock cliffs; stem 2-3 cm long, 0.17 mm in diam., brown, irregularly to subpinnately branched, branches obliquely spreading, often again branched and similar to the stem. Lobes of stem-leaves moderately to slightly imbricate, widely spreading, dorsally extending nearly the stem-width beyond the farther edge of stem, distally strongly inflexed, when flat 0.8-0.85 mm long and 0.7-0.75(-0.8) mm wide, ovate with obtuse (to rounded) apices and appendiculate dorsal bases, appendages large, ligulate; cavities of marginal cells 13-17×13-15 μ , of median cells 20-23×15-17 μ , of basal cells 30-37×20-25 μ , pale ocher, walls subhyaline to pale ocher, thick, \pm flexuose with large, subnodulose trigones and intermediate thickenings except for those of basal cells which are pale brown, thin, with triangular to subnodulose, often \pm confluent trigones; lobules contiguous to the stem, asymmetric-galeate, 0.27-0.3 mm long and wide, with rounded apices and strongly developed, obliquely subtruncate beaks often extending across the ventral margins of lobes; styli minute, filiform, of a row of 4 cells. Stem-underleaves widely obcuneate in outline, narrowly recurved along margins, when flat obovate, ca. 0.55 mm long and 0.5 mm wide, 1/6(-1/5) bifid, sinuses narrow, acute, lobes subtriangular with subacute or rarely acute or obtuse apices,

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insertions slightly sinuate; rhizoid-initial areas slightly developed, rhizoids very rare, subhyaline, in a short bundle. Branch-leaves and -underleaves similar to those of stem, but usually slightly smaller.

Dioicous (androecium not seen). Gynoecium terminal on stem or branch, innovating below, innovation repeatedly floriferous; bracts in 2-3 pairs, grading into subfloral leaves; innermost female bract-lobe ovate with obtuse apex, ca. 1.25 mm long and 0.9 mm wide, the lobule 1/6-1/5-connate, triangular, strongly recurved along lateral margins (canaliculate), acuminate-acute at apex, ca. 1 mm long; innermost bracteole often folded, strongly recurved along lateral margins, when flat ca. 1.25 mm long and 1 mm wide, to 1/2-bifid, sinus acute, lobes canaliculate-triangular, acuminate-acute at apices; perianth 2/3-exserted, clavate, \pm pedicellate below, ca. 2.5 mm long and 1.25 mm wide, distinctly 3-keeled (3rd keel ventral), often with a few, poorly developed additional plicae, apex subtruncate or slightly retuse, very shortly beaked (beak 0.05 mm long and 0.06 mm in diam. at opening).

Type: China. Shanxi Prov.: Zhenling Mountains, S slope, 2300 m, 25 July 1962, coll. P. C. Chen 531 (on decaying log) (NICH).

Other specimens examined. Same loc. as the type, Chen 465 & 497 (on rock cliffs), —, 2100 m, Chen 467 (on rock cliff). Ning Shan Xian, Huo De Pond, 2300 m, 25 July 1962, coll. Chen 444a (on tree trunk), —, 2390 m, Chen 627a (on tree trunk). (All in NICH; dupl. in Northwestern Institute of Botany).

Distr.: Known only from the type collections.

The present species seems to be closely related to Himalayan *Frullania incisoduthiana* Hatt., but the latter is distinguished from the present species by the lobes of stem-leaves wider than long, often widely obovate and usually lacking basal appendages, the somewhat smaller cells of leaf-lobes with thin walls, and by the orbicular stem-underleaves wider than long.

2) **Frullania** (Trachycolea) **tubercularis** Hatt. & Lin, sp. nov. Fig. 2.

Planta saxicola, brunnea in herb.; caulis irregulariter ramosus; lobi foliorum caulinarum imbricati, marginibus distalibus arcte incurvis, oblongi-ovati vel -obovati, basi auriculatim appendiculata; lobuli galeati, ore subtruncato, rostro haud producto, truncato; styli majores, ovati, apice breviter pilifero, 20-30 cellulas constructi; amphigastria caulina \pm patentia, fere plana, subrectangulata (longiora quam latiora), ad 1/8 bifida, sinu acuto, angusto, caulem transverse inserta; perianthia triplicata, tuberculata.



Fig. 1. *Frullania chenii* Hatt. & Lin. a: Portion of stem, ventral view, $\times 22$. b: Perianth and innermost pair of bracts and bracteole, ventral v., $\times 22$. c: Stem-leaf, $\times 29$. d: Lobe of stem-leaf, flattened, $\times 29$. e: Stem-underleaf, flattened, $\times 29$. f: Branch-underleaf, flattened, $\times 29$. g-h: Lobules of stem-leaves, $\times 57$; i: Innermost female bracteole, $\times 22$. j: Innermost female bract, $\times 22$. k-m: Cells of lobe of stem-leaf, k from margin, l-m from middle, all $\times 550$. Drawn from paratype (Chen 497).

Plants small to medium in size, brown in herb., in patches on rock cliff; stem ca. 2 cm long, 0.14 mm in diam., brown, irregularly branched, branches obliquely spreading, often long and again branched (similar to the stem). Lobes of stem-leaves imbricate, widely spreading, dorsally extending $1/2-1$ the stem-width beyond the farther edge of stem, concave with inflexed apices and upper ventral margins, when flat oblong-ovate or -obovate with rounded apices and auriculate dorsal bases, 0.8-1 mm long and 0.8 mm wide; cavities of marginal cells $17-20 \times 15-17 \mu$, of median cells $25-30 \times 20-23 \mu$, of basal cells $30-50 \times 23-37 \mu$, subhyaline to pale red-brown, walls hyaline to very pale red-brown, thin, with large, triangular to subnodulose trigones; lobules contiguous to the stem,

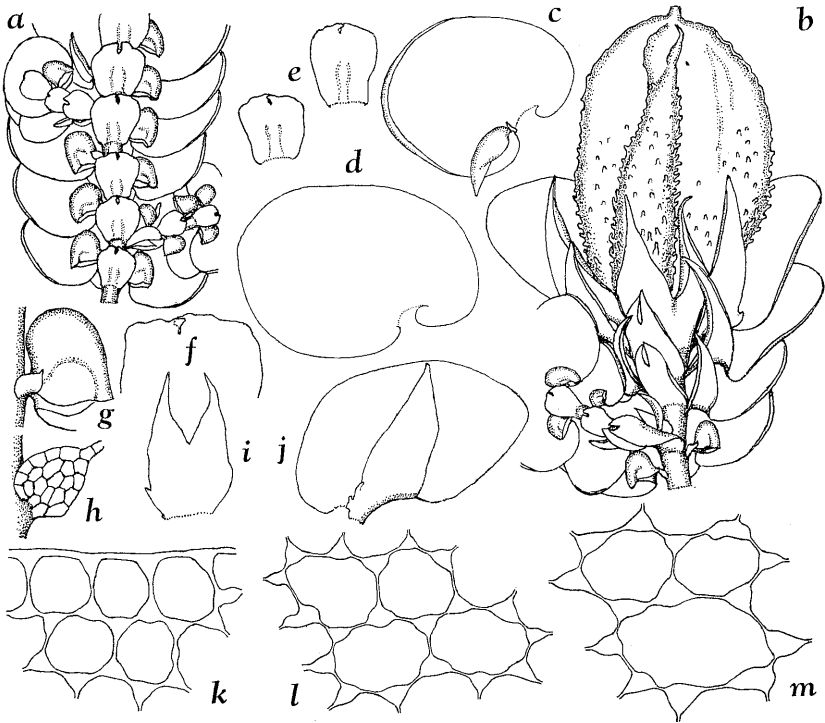


Fig. 2. *Frullania tubercularis* Hatt. & Lin. a: Portion of stem, ventral view, $\times 22$. b: Shoot-apex with perianth and innovation, ventral v., $\times 22$. c: Stem-leaf, $\times 29$. d: Lobe of stem-leaf, flattened, $\times 29$. e: Stem-underleaves, flattened, $\times 29$. f: Upper portion of stem-underleaf, $\times 57$. g: Lobule and stylus of stem-leaf, $\times 57$. h: Stylus, $\times 115$. i-j: Innermost female bracteole (i) and bract (j), $\times 22$. k-m: Cells of lobe of stem-leaf, k from margin, l from middle, m from base, all $\times 455$. Drawn from type (Chen 465).

galeate, ca. 0.25 mm long and 0.2 mm wide, with rounded apices and subtruncate (to \pm arched) mouths, beaks not well-developed, truncate; styli large, 20-25(-30)-celled, ovate with small, 1-2-celled apical teeth. Stem-underleaves remote, \pm patent, nearly flat but often narrowly recurved along upper margins, subrectangular with subtruncate (often \pm angular) apices, 0.33-0.37 mm long and 0.3-0.33 mm wide above, 0.24 mm wide below, to 1/8-bifid, sinuses narrow, acute, lobes small, subtriangular, usually \pm crossing each other, insertions subtransverse; rhizoid-initial areas poorly developed, slightly below the centers, rhizoids rare, subhyaline or, with age, brown, in short bundles. Branch-leaves

and -underleaves similar to those of stem (usually \pm smaller).

Dioicous (androecium not seen). Gynoecium terminal on stem, innovating below, innovation repeatedly floriferous; bracts in 3 pairs: innermost bract-lobe ovate-oblong with obtuse apex, 1.1-1.2 mm long and 0.85 mm wide, the lobule 1/4-1/3-connate, lanceolate-canaliculate, narrowed toward acute or subacute apex, 0.9-1 mm long and 0.4-0.45 mm wide; innermost bracteole oblong-ovate in outline, 0.9-1 mm long and 0.5-0.6 mm wide, usually with 1 tooth at one side near base, to 1/2-bifid, sinus acute, lobes lanceolate-canaliculate, when flat narrowly triangular, attenuate to \pm pilose apices; perianth semi-exserted, long pyriform with widely obtuse apex, 2-2.2 mm long and 1.2 mm wide, strongly 3-keeled, tuberculate outgrowths scattered on the surface, 1-4(-6)-celled, smaller and remote, and finally absent toward the apex of perianth, larger and dense toward the middle (or below the middle), apical beak small (ca. 0.1 mm long and 0.08 mm in diam.), with slightly crenulate opening; outgrowth not or slightly developed when the perianth is young.

Type: China. Shanxi Prov.: Zhenling Mountains, S slope, 2300 m, on rock cliff, 25 July 1962, coll. P.C. Chen 465 (NICH-holo; Northwestern Institute of Botany-iso).

Distr.: Known only from the type collection.

The present new species was collected at the same locality by the same collector and on the same date as those of *Frullania chenii* Hatt. & Lin and seems to be more or less closely related to the latter. However, *Frullania chenii* is different from the present species by its smooth perianth, minute stylus, leaf-lobule with a well-developed beak, 1/6(-1/5)-bifid, obovate underleaves without angles along upper margins, and by its thick-walled cells of leaf-lobes.

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1962年7月故陳邦傑教授が陝西省秦嶺で採集されたヤスデゴケ属苔類の中に上記2新種を見出した。*Frullania chenii* はヒマラヤ産の *F. incisosuthiana* に極めて近縁であるが、葉上片がせまく(長さが幅より大)卵状で、背側基部が耳状をなす点、葉細胞がやや大形で細胞膜の肥厚が著しい点、および腹葉がだ円形に近く、幅よりも長さが大である点で区別出来る。*F. tubercularis* は花被表面に小突起が散生する点と、花被が3褶、鈍頭で頂部突起部が小さい点、stylusが卵形、20-25細胞で短かい頂刺をもつ点、腹葉がほぼ方形で、ごく短かく(約1/8)2裂すること、そして頂端が殆ど載形をなす点、葉上片が広円頭で背面の基部が耳状をなす点、雌苞葉下片や苞腹葉に殆ど側齒をみない点などの特徴で他種から区別される。