

Frullania largiana var. *didyhatii* var. nov. from Kumaun region in Western Himalaya

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ABSTRACT

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A new variety of *Frullania largiana* Sushil K. Singh & D. K. Singh, known exclusively from its type locality in Himachal Pradesh, is being reported from Pithoragarh District in Kumaun region, Uttarakhand. The new variety, *Frullania largiana* var. *didyhatii* named after its place of occurrence, can be distinguished from *Frullania largiana* var. *largiana* in having (a) special 'oil-filled cells' scattered amongst the oil-body containing cells in median region of the leaf-lobe; (b) dark green plants; (c) caducous underleaves, especially on older part of the stem; and (d) rather indistinct trigones in leaves.

Key-words: *Frullania largiana* var. *didyhatii*, leafy liverwort, Kumaun region, Western Himalaya.

INTRODUCTION

A careful investigation of the collection of hepatic genus, *Frullania* Raddi, made from Pithoragarh District (Lat. 39°39'N: Long. 80°09'E, Alt. 2020 m) in Kumaun region of Uttarakhand revealed the occurrence of an interesting species, *F. largiana*, which has recently been instituted by Singh & Singh (2005) from the Himachal Pradesh. However, a critical examination of Pithoragarh specimens showed that though these plants largely agreed with the description of the 'type' yet they differ in having some unique features unrecorded in Himachal specimens. The most important varying feature in the proposed variety is the distribution of oil-filled cells scattered amongst the oil-body containing cells in the median region of the leaf-lobe. The other major differences include the dark green colour of the plants; the caducous nature of underleaves, especially on older stems; and the presence of indistinct trigones in leaf cells. As such, based on the place of collection, namely, 'Didyhat' in Pithoragarh district, these specimens are being designated as a new variety, var. *didyhatii*, as against the original Himachal variety, var. *largiana*, of the species *F. largiana* Sushil K. Singh & D. K. Singh.

A description of the new variety is given below.

SYSTEMATIC DESCRIPTION

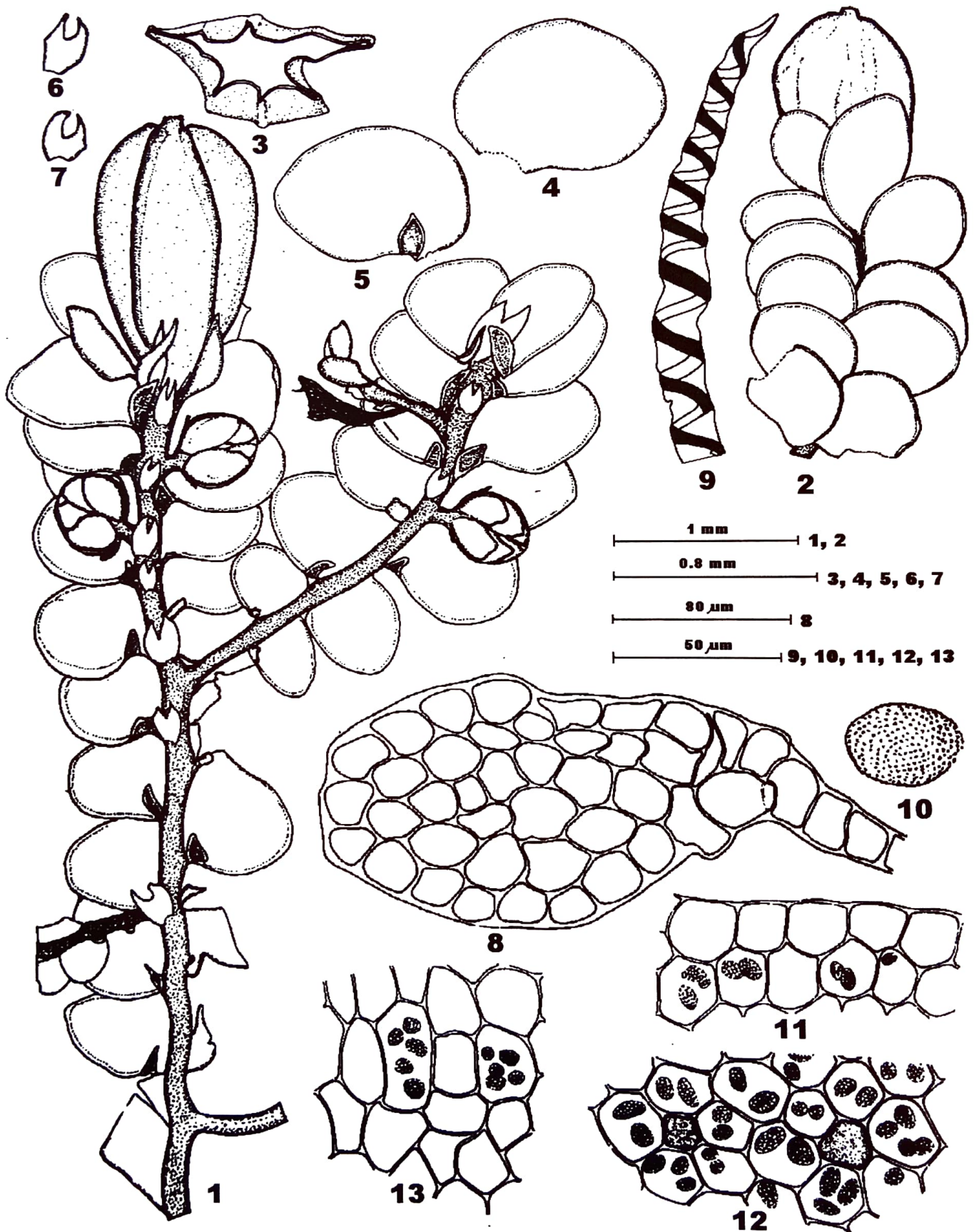
Genus: *Frullania* Raddi

Frullania largiana var. *didyhatii* S. N.

Srivastava & M. Rai, var. nov.

Text-figures 1-13

Description (Latin): Plantae nigrae viridis, flaccus, in nosce, 0.8-1.0 cm longa, 0.15 mm diametro, in stirpe, cum foliis 1.4-1.6 mm latis, irregulariter pinnatus; in crux crucis-section, accumsan in extima leviter minor praecipua cellulas cellulis, 20-30 µm, moenibus tenuis sine trigones. Folia leniter imbricate, horizontaliter serpit, folio-auricula leviter concava, late ovato 0.75-0.90 mm longis et 0.65-0.80 mm latis, apice rotundatis, margine longius et ultra dorsum margin conformicatio trunco; folium-lobule semper explanate, subparallel cum caulis, oblongo-lanceolatae, parvae, 0.1 mm longis 0.2 mm latis, apice acutis. Marginal cellulas folium auricula 20 x 15 µm, cellulae 20-25 x 15-20 µm median speciales oleum contineat cellulas (sine corporibus oleum) sparsi inter olei continens corpora cellulas cellulis 20-35 x 16-18 µm summus, parietes tenui, trigones non sic



Text-figures 1-13. *Frullania largiana* var. *didyhatii* Surendra N. Srivastava & Meena Rai. 1. Plant, ventral view. 2. Part of the plant, dorsal view. 3. Perianth, t.s. 4. Leaf, dorsal view. 5. Leaf, ventral view. 6-7. Underleaves. 8. Stem, t.s. 9. Elater (part only). 10. Spore. 11. Marginal cells of the leaf-lobe. 12. Median cells of the leaf-lobe showing two special oil-cells. 13. Basal cells of the leaf-lobe.

distinguuntur per oleum corpora 2-5 cellulis plerumque ellipsoidal, 4-6 x 6-12 μm , ex paucis multa granules. Underleaves distant angusti ovatis spatia aut paulo ultra lata, 0.2 - 0.3 mm longis 0.2 mm latis, apice II/V bilobed vel, sinus angustus, acutus, lobis lanceolatis, acutis; caducous saepe defluentibus supra priores partes in caulibus vel ramis. Monoecious. Male inflorescentiis in ramis brevibus lateralibus plerumque infra inflorescentiis female, capitates, bracteis 2-3 paria, prope imbricate; bracteoles minutis. Inflorescentiis e trunco nibh termination; bract auricula ovato-oblongis 0.9 mm longis et 0.6 mm latis, apice rotundatis, 0.6 mm longa, 0.35 mm latis bract lobule oblonga, apice subacute, margine integra, bracteis bracteoles libera, oblonga-lanceolatis, 0.40 mm 0.16 mm longis et latis, marginibus integris, vel media fere bilobed, lobis lanceolatis, acutis, sinus angustus et triangulares. De perianth II / III emergent, pyriform, 1.5 mm longis et 0.9 mm latae, laeves keeled-V (dorsum I, II et II ventral lateralibus), apice rotundatis, paulo rostratae. Suborbicular Spores, flavescens, 26 - 34 μm in diametro papillose. Elater unispiral.

Description (English): Plants dark green, flaccid, in mats. Stem 0.8 - 1.0 cm long and 0.15 mm in diameter, with leaves 1.4 - 1.6 mm wide, irregularly pinnate; in cross-section, the cells of the outermost layer slightly smaller than central cells, 20-30 μm , walls thin, without trigones. Leaves loosely imbricate, horizontally spreading, leaf-lobe slightly concave, widely ovate 0.75 - 0.90 mm long and 0.65 - 0.80 mm wide, apex rounded, dorsal margin arching beyond the farther edge of the stem; leaf-lobule always explanate, subparallel with the stem, oblong-lanceolate, small, 0.2 mm long 0.1 mm wide, apex acute. Marginal cells of the leaf-lobe 20 x 15 μm , median cells 20-25 x 15-20 μm , special oil-containing cells (without having oil-bodies) scattered amongst oil-bodies containing cells, basal cells 20-35 x 16-18 μm , walls thin, trigones indistinct, oil bodies 2-5 per cell, usually ellipsoidal, 6-12 x 4-6 μm , consisting of numerous small granules. Underleaves distant, narrow, ovate, as wide as or a little longer than wide, 0.2-0.3 mm long and 0.2 mm wide, apex 2/5 or more bilobed, sinus narrow, acute, lobes lanceolate, acute; caducous, often falling off earlier in older parts of stems or branches. Monoecious. Male inflorescence

on short lateral branches, usually below the female inflorescence, capitates; bracts 2-3 pairs, closely imbricate; bracteoles diminutive. Female inflorescence terminal on the stem; bract-lobe ovate-oblong, 0.9 mm long and 0.6 mm wide, apex rounded; bract oblong, 0.60 mm long and 0.35 mm wide, apex subacute, margin entire; bracteoles free from the bracts, oblong-lanceolate, 0.40 mm long and 0.16 mm wide, margin entire, about half or more bilobed, lobes lanceolate, acute, sinus narrow and triangular. Perianth about 2/3 emergent, pyriform, 1.5 mm long and 0.9 mm wide, smooth 5-keeled (1 dorsal, 2 lateral and 2 ventral), apex rounded and shortly beaked. Spores suborbicular, yellowish, 26-34 μm in diameter, papillose. Elater unispiral.

Ecology and distribution: The species grows in pure stands on moist rocks under shady condition.

Type locality: India, Uttarakhand, Pithoragarh, Didyhat.

Specimens examined: India, Western Himalaya, Uttarakhand, Pithoragarh District, Didyhat (2020 m) April 1982, leg. S. N. Srivastava: H-82/1 (Holotype); H-82/2 (Isotype). Deposited in Allahabad University Herbarium.

DISCUSSION

While instituting the new species, *F. largiana*, from Himachal Pradesh, Singh and Singh (2005) compared it with its closely related species, *F. inflata* Gottsche, and justifiably reasoned out its creation. The former species has smaller yet wider shoots; larger leaf-lobes; consistently explanate leaf-lobules; underleaves as wide as stem; 5-keeled perianth; and smaller spores and elaters in comparison to the latter species. They also noted that *F. largiana* may grow as epiphyte or as lithophyte and were rare in the study area.

On the other hand, plants of *F. largiana* var. *didyhatii* could easily be distinguished from *F. largiana* var. *largiana* on the basis of having (a) deep green plants as against the light-green to brownish-green plants; (b) special oil-containing cells (other than the normal oil-body containing cells) scattered in the median region of the leaf-lobe; (c) older parts of stem being bereft of underleaves which are caducous as against

persistent underleaves; and (d) indistinct as against distinct trigones.

The paper extends the range of distribution of species from Himachal Pradesh to Kumaun region in Uttarakhand State though both collection sites lie within the West Himalayan territory. The var. *didyhatii* has been observed growing as lithophyte only (not as epiphyte) and is 'abundant' in the study area.

With the inclusion of *F. largiana* var. *didyhatii*, the number of *Frullania* taxa represented in Western Himalaya become fifteen; the others being *F. dilatata* (L.) Dumort; *F. duthiana* Steph.; *F. ericoides* (Nees) Mont [= *F. suarrosa* (Reinw. et al.) Dumort.]; *F. gollani* Steph.; *F. gracillima* Steph.; *F. grevilleana* Tayl.; *F. himalayensis* Steph.; *F. largiana* var. *largiana* Sushil K. Singh & D. K. Singh; *F. muscicola* Steph.; *F. neurota* Tayl.; *F. pariharii* Hatt. & Thait.; *F. polyptera* Tayl.; *F. pyriflora* Steph.; *F. retusa* var.

retusa Mitt. (Kashyap 1932, Parihar et al. 1994, Dandotiya et al. 2007, Singh & Singh 2009).

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