

Frullania rotundistipula Steph.- an addition to the Indian bryoflora

Ajit Pratap Singh and Virendra Nath

Bryology Laboratory, National Botanical Research Institute, Lucknow-226 001

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Study on the liverworts collected from heavily moist Mawaiban forest, Nongstoin, West Khasi Hills, Meghalaya (alt. ca. 1370 m) revealed the occurrence of *Frullania rotundistipula* Steph. which was growing epiphytically. This species, earlier described only from China (Yunnan and Szechwan), is a new addition to the Indian bryoflora. The taxon is characterised by yellowish green to brown plants; leaf lobes concave with incurved apices, when flat ovate with obtuse apices, dorsal margin extending beyond farther edge of the stem with appendaged base; lobules erect, helmet shaped with rounded heads and truncate wide mouth, farther portion of mouth more or less acute; underleaves rotund, margin entire and sinuately inserted.

Key-words—*Frullania rotundistipula* Steph. liverwort, Indian bryoflora, Meghalaya.

INTRODUCTION

FRULLANIA Raddi belonging to the family Frullaniaceae stands as one of the most advanced genus in the Jungermanniales. The genus *Frullania* widely distributed throughout the world includes about one thousand taxa (Yuzawa 1991). However, Indian subcontinent hosts for only 58 taxa. The study on *Frullania* Raddi in India dates back since the time of Mitten (1861), who studied and instituted most of the *Frullania* species from Khasi Hills, Meghalaya on the basis of the collections made by J.D. Hooker and T. Thomson. Stephani (1910-1912, 1924) described about 69 species from Asia, most of them from India. Additionally, Verdoorn (1930), Chopra (1938a,b, 1943), Parihar (1961-62, 1994) and Kachroo (1970) studied *Frullania* species. However, Hattori (1972a,b, 1973, 1974, 1975a,b, 1976, 1978) made studies on the Asiatic species of *Frullania* and described a number of species from Indian subcontinent. Apart from the above, Udari and Nath (1971, 1976, 1979, 1981), Udari and Kumar (1983) and Nath and Asthana (1992, 1998) made significant contributions on the genus *Frullania* from India. All the previous studies were made from Eastern Himalaya, Western Ghat (Megabiobiodiversity centre) and Western Himalaya. Out of the total 58 taxa of *Frullania* from India, Eastern Himalaya represents 38 species, Western Himalaya 14 species and South India 17 species

as per the census (Parihar 1994). Recently, during our studies on liverworts of Meghalaya, *Frullania rotundistipula* Steph. from Mawaiban forest, Nongstoin, West Khasi Hills, Meghalaya has been encountered, which is an addition to the Indian bryoflora. The morphotaxonomical details with its distribution has been provided.

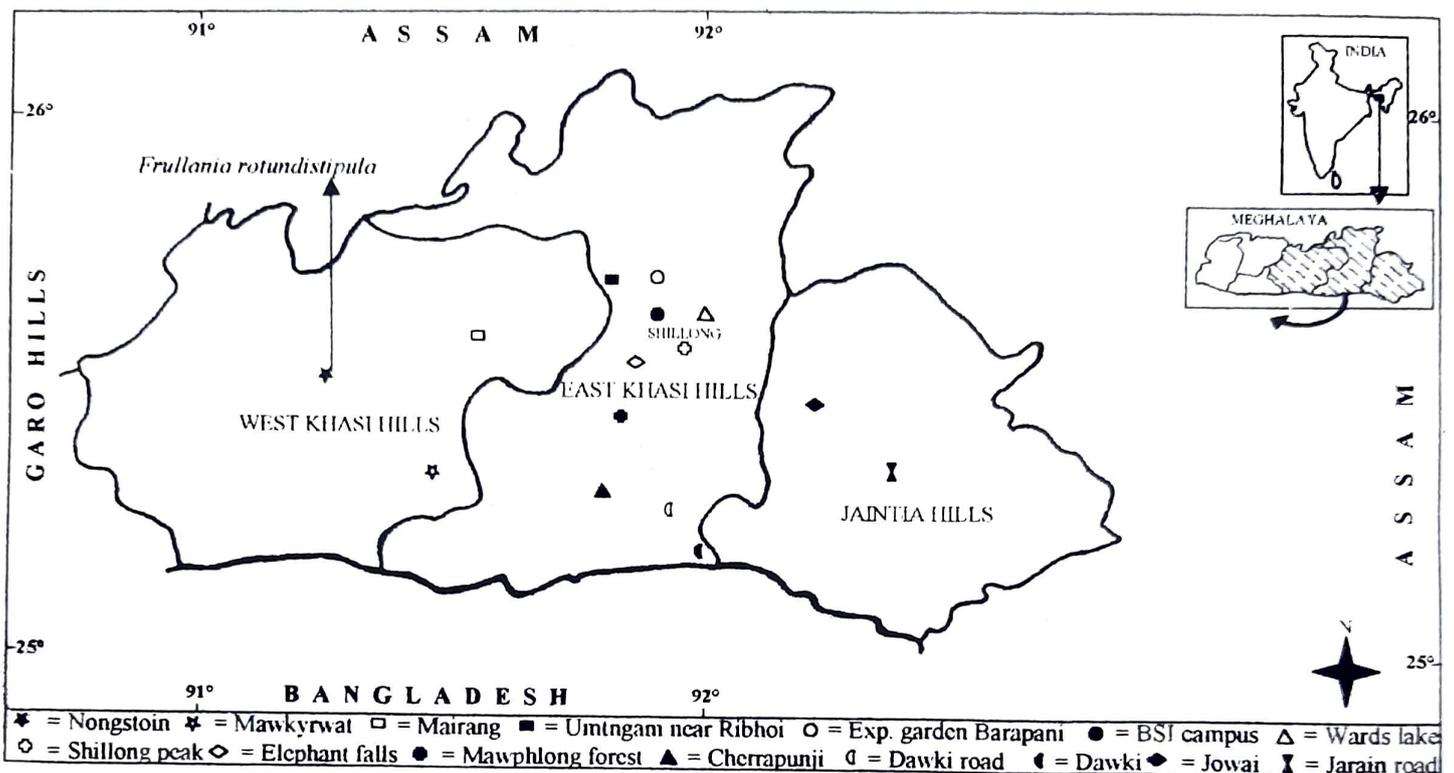
MATERIAL AND METHOD

The plant materials were collected in the month of September, 2000 from heavily moist Mawaiban forest, Nongstoin, West Khasi Hills, Meghalaya, alt. ca. 1370 m growing on bark of trees (Map). The collected materials have been properly processed and deposited in the Bryophyte Herbarium of National Botanical Research Institute, Lucknow, India (LWG).

OBSERVATION

Frullania rotundistipula Steph., Hedwigia 33: 147 (1894).

Plants large, light yellowish green to brown, prostrate, 35-40 mm long and 2.50 mm wide including leaves. Branching irregular of *Frullania* type; primary branches 30 mm long and 2.25 mm wide including leaves; secondary branches 7 mm long and 1.88 mm wide including leaves. Stem yellowish brown, cylindrical, prostrate, 0.28-0.29x0.32-0.37 mm in diameter, 14-15 cells across; cortical cells thick walled, quad-



Map Showing distribution of *Frullania rotundistipula* Steph. in Khasi Hills, Meghalaya

rate, 10-15x15-22.5 μm ; medullary cells larger; thick walled, angular, 15-25x20-27.5 μm . Leaf lobes imbricate, widely spreading, concave with incurved apices and dorsally extending beyond the farther edge of the stem, when flat ovate with obtuse apices, dorsally convex and developed appendages rounded and so closed, 1.63-1.90 mm long and 1.50-1.75 mm wide; leaf marginal cells thin walled, 10-15x20-22.5 μm , trigonous with intermediate thickenings; median cells thin walled, 20-25x30-32.5 μm with large nodulose trigones; basal cells thin walled, 22.5-30x35-42.5 μm with large nodulose, often more or less confluent trigones; lobules helmet shaped, erect, 0.42-0.45 mm long and 0.34-0.35 mm wide with rounded heads and truncate, wide mouth, distal portion of mouth more or less acute (beaked). Underleaves loosely imbricate to remote, large, nearly flat, rotund, wider than the length, 0.75-1.10 mm long and 1.18-1.63 mm wide, margin entire, base cordate, insertion sinuate. Rhizoids ventrally from the centre of the underleaf.

Distribution and ecology: North Eastern Himalaya, Meghalaya, West Khasi Hills, Nongstoin, Mawaiban forest.

Plants grow epiphytically on the bark at 1370 m altitude, 26.3°C temperature and 61% relative humidity.

Range: China (known only in Yunnan and Szechwan) and India.

Specimen examined: India, Meghalaya, West Khasi Hills, Mawaiban forest, 14.09.2000, Leg., A.P. Singh, 208526-A (LWG), Det., V. Nath & A. P. Singh.

DISCUSSION

Frullania rotundistipula Steph. was instituted for the first time by Stephani (1894) from China on the basis of the study on the specimens collected by Delavay from Yunnan, Hokin, Yem-han (China). Moreover, in 'Species Hepaticarum' Stephani (1910) referred its distribution with full description from China. Hattori (1973) studied the same specimens drawn on loan, included a single shoot of *F. delavayii* Steph. too, and described it as *F. rotundistipula*. Furthermore, this species has not shown its extended range of distribution. The present study is based on the plants

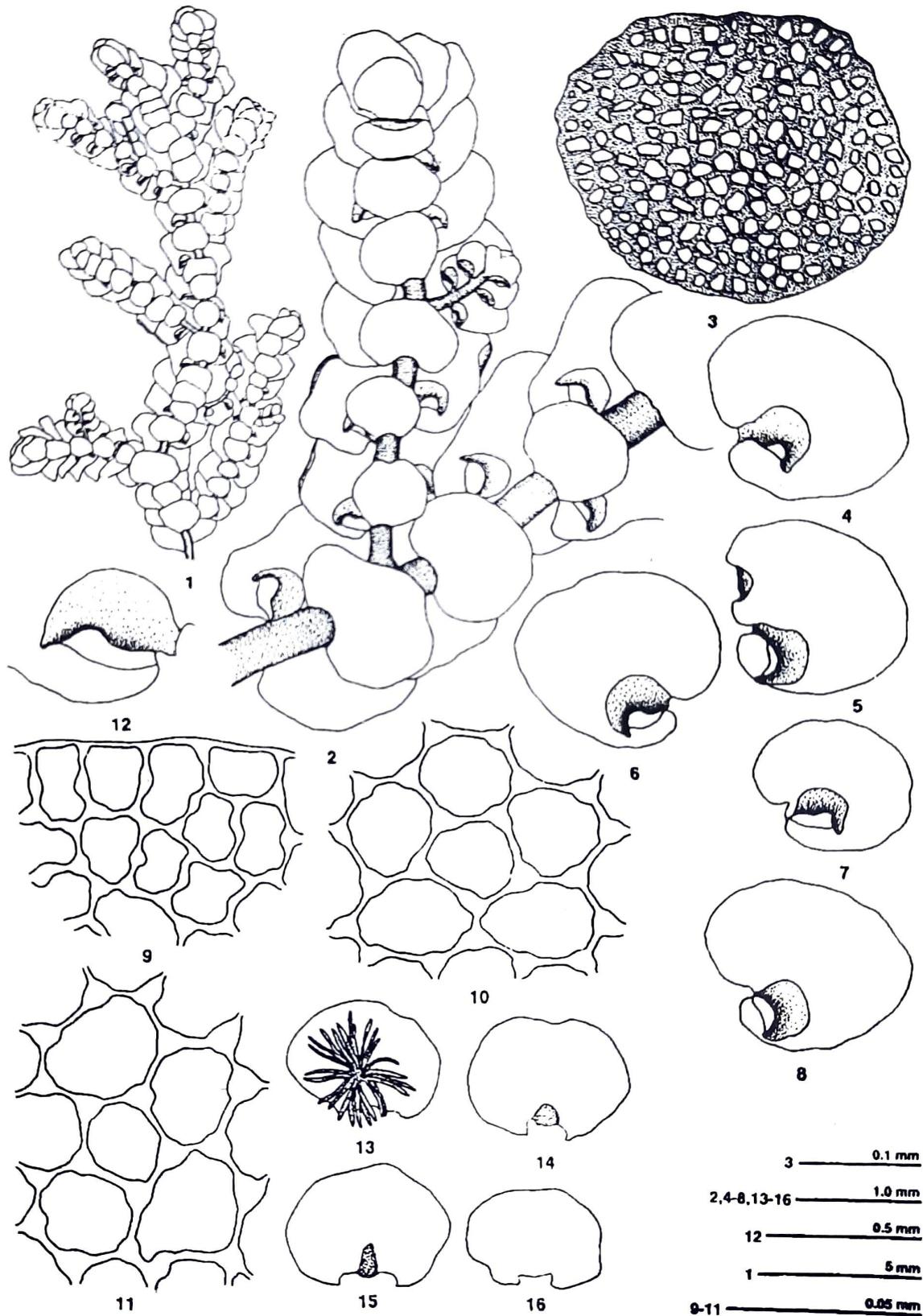


Fig. 1-16. *Frullania rotundistipula* Steph. 208526-A (LWG): 1. Plant in ventral view, 2. Magnified view of the plant, 3. Cross section of stem, 4-8. Leaf lobes, 9. Marginal cells of leaf, 10. Median cells of leaf, 11. Basal cells of leaf, 12. Leaf lobule, 13-16. Underleaves.

collected from Mawaiban forest, Nongstoin, West Khasi Hills, Meghalaya. The *F. rotundistipula* itself is uncommon in India and has remarkable diversity among plants of same population (35-40 mm long); colour (light yellowish green to brown); leaf lobes (1.63-1.90 mm long and 1.5-1.75 mm wide), apices incurved, when flat ovate with obtuse apices, and rounded appendaged dorsal base; lobules 0.42-0.45 mm long and 0.34-0.35 mm wide with rounded heads and truncate mouth, more or less acute (beaked); underleaves 0.75-1.10 mm long and 1.18-1.63 mm wide, entire, sinuate, insertion. With this considerable range of variations *F. rotundistipula* approaches to *F. yunnanensis* Steph., *F. retusa* Mitt., *F. duthiana* Steph. and *F. physantha* Mitt. However, *F. rotundistipula* is quite distinct with *F. yunnanensis* in not possessing underleaf plicae, decurrent gibbous appendaged base and obtuse apex which is a common feature in *F. yunnanensis*. *F. retusa* having smaller leaf lobes (0.5-1.5 mm long and 0.5-1.0 mm wide); leaf lobules small, erect, cucullate, vertex rotundate, mouth wide, triangular beak prominent, apex acute, when explanate or canaliculate to lanceolate with acuminate to acute apex; underleaves large, or less as broad as long, vary with *F. rotundistipula*. However, *F. duthiana* is quite distinct from *F. rotundistipula* in having number of stem across cells (5-7 cells); stems in diameter (0.15-0.18 mm); leaf lobes (0.5-1.0 mm long and wide), apex rounded; leaf lobules mostly cucullate, mouth horizontally truncate, distal edge acute forming a short beak; underleaf incurved along margin, base cordate with rounded appendages, which is uncommon in *F. rotundistipula*. Moreover, *F. physantha* is more apart taxonomically with *F. rotundistipula* in having number of stem across cells (10-12 cells); leaf lobes divergent, ovate, apex rounded to subrotund, margin involuted; leaf lobules galeate, about twice as wide as long, vertex widely rotundate, rostrum short, acute, slightly recurved; underleaf slightly emarginate, lateral margin sometimes undulate, which is not commonly remarked in *F. rotundistipula*. The taxon is entirely distinctive from other species in possessing unlobed underleaves, rounded headed lobules with less acute beak and leaf lobes dorsal margin appendaged.

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