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TWO SPECIES OF *FABRONIA* NEW TO INDIA

ДВА НОВЫХ ДЛЯ ИНДИИ ВИДА *FABRONIA*

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Abstract

During investigation of mosses collected from Coonoor – Nilgiri Hills, Tamil Nadu (Western Ghats) and Chamoli – Garhwal Hills, Uttarakhand (Western Himalaya), two interesting mosses have been identified belonging to genus *Fabronia* Raddi (Fabroniaceae). Both taxa, *Fabronia leikipiae* Müll. Hal. and *Fabronia altaica* Ignatova & Ignatov, are recorded for first time from India. So far, these species were reported from Africa and Russia respectively. The present report of both the taxa from Indian territory is the addition to the Indian moss flora in general and for the genus *Fabronia* in particular. It also shows an extended distribution of both the taxa: from African continent to Asian continent (*Fabronia leikipiae*) and within Asian continent: Russia to India (*Fabronia altaica*). Both species are described and illustrated here with the Indian plants.

Резюме

В результате определения коллекций, собранных в окрестностях Кунура и Нилгрийских горах в штате Тамил-Наду (Западные Гаты), а также в горах Гархвал в штате Уттаракханд (Западные Гималаи) были выялены два интересных вида из рода *Fabronia* Raddi (Fabroniaceae). Оба вида – *Fabronia leikipiae* Müll. Hal. и *Fabronia altaica* Ignatova & Ignatov впервые приводятся для Индии. До настоящего времени первый вид был известен только из Африки, а второй – из России. Находки этих видов в Индии представляют собой дополнение к списку мхов страны, а также новые данные о распространении этих видов. *Fabronia leikipiae,* помимо африканского континента, откуда она была описана, теперь известен из Азии, а новые местонахождения *Fabronia altaica* существенно расширяют представление об ареале этого вида в Азии. Для обоих видов даны описания и иллюстрации, сделанные и собранных в Индии образцов.

KEYWORDS: bryophytes, mosses, pleurocarpous, Fabroniaceae, India, new records

INTRODUCTION

The genus *Fabronia* Raddi (Fabroniaceae) is represented by 95 species in tropical and warm temperate regions in the world (Gangulee, 1978-1980; Vohra, 1983). Earlier Chopra (1975) reported 9 species of *Fabronia*, out of which 8 species were reported from India, viz. *F. assamica* Dix., *F. cilliaris* (Brid.) Brid., *F. curvirostris* Doz. & Molk., *F. goughii* Mitt., *F. madurensis* Dix. & P. Vard., *F. minuta* Mitt., *F. schmidii* C. Muell., & *F. secunda* Mont., while single species viz. *F. pusilla* Raddi was reported from Bhutan. Vohra (1983) synonymised *F. assamica* under the species *F. secunda*. Later on *F. pusilla* was reported from Western Himalaya & South India (Tewari & Pant, 2002; Daniels, 2010) and *F. schensiana* Müll. Hal. was reported from Eastern Himalaya and South India (Nair *et al.*, 2005; Bansal & Nath, 2011; Asthana & Yadav, 2013).

Thus 9 species of the genus *Fabronia* are reported from India so far. Among these one species (*F. ciliaris*) is confined to Western Himalaya, 2 species (*F. curvirostris* and *F. schmidii*) are confined to South India, 3 species (*F. goughii, F. madurensis* and *F. pusilla*) are common in Western Himalaya and South India, one species (*F. schensiana*) is common in Eastern Himalaya and South India, one species (*F. minuta*) is common in Western Himalaya and Central India, and single species (*F. secunda*) is common in Western Himalaya, Eastern Himalaya and South India (see Table 1).

During investigation of the mosses collected from Nilgiri Hills, Tamil Nadu, South India, the fertile plants of *Fabronia leikipiae* Müll. Hal. were observed. The species is reported from Africa (S. Rhodesia, Zimbabwe, Mount Meru, Cape Verde, Kenya, Malawi, Nigeria, South Africa, Tanzania, Uganda, Zambia). The presence of this taxon in India (Asia) shows disjunct distribution of the taxon (Sim, 1926; O'Shea, 2006).

In another survey of the plants collected from Garhwal hills, Uttarakhand, Western Himalaya, the plants referable to *Fabronia altaica* Ignatova & Ignatov have been recorded. Earlier the taxon was reported from Rus-

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sia (Ignatova *et al*., 2017). The present report of the taxon shows extension in distribution within the continent.

Both the species constitute new record for Indian moss flora and now the genus *Fabronia* is represented by 11 species in India (Table 1).

Taxonomy

1. Fabronia leikipiae Müll. Hal., Flora 73: 487. 1890. Figs. 1: 1–18.

Type Locality: Aberdare (Sim, 1926).

Plants small, pleurocarpous, yellowish green and epiphytic. Main stem prostrate, irregularly branched, (5–) 10–15 mm long and 0.5–0.8 mm wide with leaves. Branches 3–4 mm long. Stem 0.05–0.12 mm in diameter. Stem in cross-section differentiated into 1–2 rows of outer small, slightly thick-walled cortical cells, 4–8×7–12 µm, inner large, thin walled medullary cells, 15–19×8–15 µm, central cells 3–5, small, thin-walled, hyaline. Leaves closely arranged, imbricate, 0.7–0.8 mm long and 0.2–0.3 mm wide, concave, ovate, acuminate, apex narrowed into long subula, margin generally entire, sometimes with minutely projected marginal cells. Costa single, not very strong (weak), short, reaching upto 1/2 of the leaf length. Leaf cells long, narrowly rhomboidal, apical cells (subula) 57–78×3–6 µm, upper and middle cells 30–45×7–11 µm, alar cells quadrate to rectangular, 3–5 cells in width and 12–15 cells in length along the margin, cells 11–15×7–11 µm. Sporophytes present on short lateral branches. Seta erect, 3–5 mm long, smooth. Capsule urn-shaped, small, 0.5–0.7×0.3–0.4 mm. Peristome single, teeth in pairs, papillose. Spores spherical, papillose, 11–15 µm in diameter.

Habitat: Plants are epiphytic, growing on bark surface in association with *Fabronia madurensis*.

Specimen examined: South India: Tamil Nadu, Nilgiri Hills, Coonoor, Hidden forest, alt. ca. 1950 m, P. K. Verma, A. Alam & N. Sahu, 9-IV-2002, 15344/02 (LWU).

Distribution in the World: Africa (Sim, 1926; O'Shea, 2006), India.

Distribution in India: Nilgiri hills in Tamil Nadu, South India (New record for India).

Table 1. Distribution of the genus *Fabronia* in India (Chopra, 1975; Gangulee, 1978-1980; Vohra, 1983; Tewari & Pant, 2002; Lal, 2005; Nair *et al*., 2005; Nath *et al*., 2007; Daniels, 2010; Bansal & Nath, 2011; Asthana & Yadav, 2013; Alam, 2013, 2015; Alam *et al*., 2015).

Name of Species	Distribution in India		References
1. ***Fabronia altaica*** Ignatova & Ignatov	**W.H.**	**Uttarakhand: Garhwal hills**	**New to India**
2. *Fabronia ciliaris* (Brid.) Brid.	W.H	Himanchal Pradesh: Manali	Chopra, 1975; Vohra, 1983; Lal 2005; Alam, 2013 & 2015
3. *Fabronia curvirostris* Dozy & Molk.	S.I.	Tamil Nadu: Nilgiri Hills	Chopra, 1975; Lal, 2005; Alam. 2015
4. *Fabronia goughii* Mitt.	W.H. S.I.	Uttarakhand: Kumaon hills Tamil Nadu: Nilgiri hills, Palni hills	Chopra, 1975; Vohra, 1983; Lal, 2005; Daniels, 2010; Alam, 2013 & 2015
5. *Fabronia leikipiae* Müll. Hal.	**S.I**	**Tamil Nadu: Nilgiri hills**	**New to India**
6. *Fabronia madurensis* Dix. ex Vard.	W.H. S.I.	Himanchal Pradesh: Simla Tamil Nadu: Palni hills.	Chopra, 1975; Vohra, 1983 Lal, 2005; Daniels, 2010; Alam, 2013 & 2015
7. *Fabronia minuta* Mitt.	W.H. C.I.	Jammu Kahmir. Himanchal Pradesh: Kullu, Kangra. Uttarakhand: Kumaon hills, Garhwal hills Gujrat: Girnar Hills Rajsthan : Mount Abu	Chopra, 1975; Vohra, 1983; Lal, 2005; Alam, 2013 & 2015; Alam *et al.*, 2015
8. *Fabronia pusilla* Raddi	W.H. S.I.	Uttarakhand: Kumaon Tamil Nadu: Nilgiri hills	Tewari & Pant, 2002; Daniels, 2010
9. *Fabronia schensiana* Müll. Hal.	E.H. S.I.	Sikkim, Nagaland: Mokokchung Kerala: Wayanad district Tamil Nadu: Palini hills	Nair *et al.*, 2005; Bansal & Nath, 2011; Asthana & Yadav, 2013
10. *Fabronia schmidii* C. Muell.	S.I.	Tamil Nadu: Nilgiri hills	Chopra, 1975; Lal, 2005; Daniels, 2010; Alam, 2015
11. *Fabronia secunda* Mont. (Syn.: *Fabronia assamica* Dix.) (Vohra, 1983)	E.H. W.H. S.I.	Meghalaya: Shilong, Khasia Hills, Assam, Nagaland: Mokokchung, Manipur Uttarakhand: Govindgath (Valley of flower) Tamil Nadu: Nilgiri hills, Palni hills	Chopra, 1975; Gangulee, 1978-1980; Vohra, 1983; Lal, 2005; Asthana & Sahu, 2007; Daniels, 2010; Bansal & Nath, 2011; Alam, 2013 & 2015

E.H. = Eastern Himalaya, W.H. = Western Himalaya, S.I. = South India, C.I. = Central India,

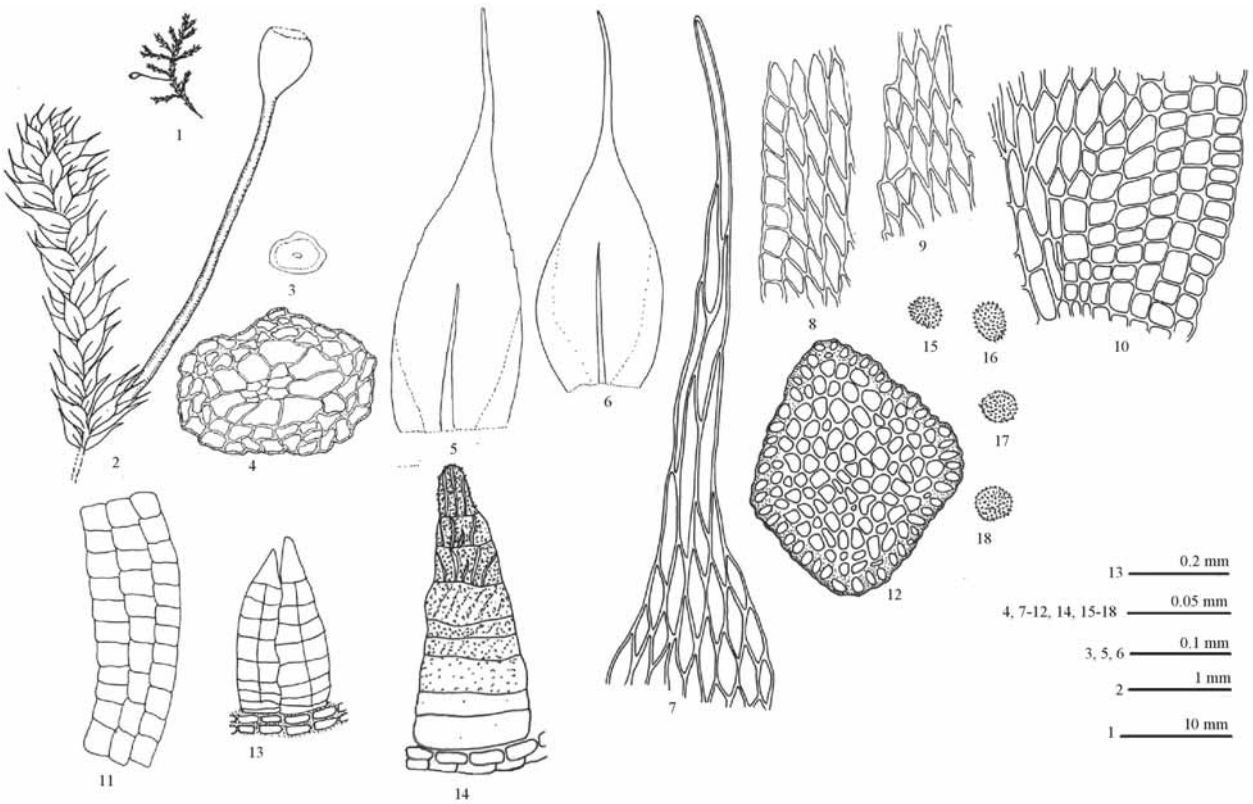

Fig. 1. *Fabronia leikipiae* Müll. Hal. 1. Habit of plants. 2. A portion of plant enlarged. 3. Cross-section of stem (Diagrammatic). 4. Cross-section of stem (Cellular). 5,6. Leaves. 7. Apical leaf cells. 8,9. Median leaf cells near margin. 10. Basal leaf cells. 11. Alar cells. 12. Cross-section of seta. 13,14. Peristome. 15-18. Spores. All figures drawn from 15344/02 (LWU).

2. Fabronia altaica Ignatova & Ignatov, Arctoa 26(1): 25. 2017. Fig. 2: 1–13.

Type Locality: Russia, Altai Republic (Ignatova *et al.*, 2017)

Plants pleurocarpous, light green to dark green in colour. Main stem creeping, irregularly branched, 4–6 mm long and 0.68–0.84 mm wide with leaves. Branches 2–5 mm long. Stem 0.10–0.14 mm in diameter. Stem in cross-section differentiated in to 2–3 rows of outer small thick-walled cortical cells, 4–12×4–8 µm, inner large, thin walled medullary cells, 7–12×15–20 µm, central cells 3–5, small, thin-walled, hyaline. Leaves densely arranged throughout the stem, appressed to spreading, 0.53–0.77 mm long and 0.18–0.21 mm wide, ovate to lanceolate, apex forming a long, narrow subula, margin dentate, dentitions prominent, large, unicellular, 15–31×3–8 µm. Costa single, not much strong (weak), short, reaching up to 1/2–2/3 the leaf length. Leaf cells long, rhomboidal, apical cells (subula) 78–98×3–8 µm, upper and middle cells 31–43×4–8 µm, alar cells quadrate to rectangular, 2–3(–4) cells in width and 7–8(–10) cells in length along margin, cells 7–12×4–11 µm. Sporophytes not seen.

Habitat: Plants are growing on rock in association with *Lindbergia koelzii*.

Specimen examined: Western Himalaya, Uttarakhand, Garhwal hill, Chamoli, Pandukeshwar, alt. ca. 1905 m, Lat. 30° 37' 70''N, Lon. 79° 33' 09''E, G. Asthana & party, 05-X-2012, 22523/12(LWU).

Distribution in the World: Russia (Ignatova *et al.*, 2017), India.

Distribution in India: Garhwal hill in Uttarakhand, Western Himalaya (New Record for India).

DISCUSSION

The Indian plants of *Fabronia leikipiae* show overall similarity with African plants except minute variation in the leaf shape. The leaves are basically ovate-lanceolate and concave in both populations but in African plants, the leaves are comparatively broadly ovate and very concave (Sim, 1926, Fig. 548: B) while they are comparatively narrowly ovate in Indian population and less concave (Fig. 1: 4 & 5).

Fabronia leikipiae also approaches to *F. gueinzii* (South African species) in having leaf with entire margins but distinctly differs in rhomboidal and short leaf cells in *F. leikipiae* vs. vermicular & long leaf cells in *F. gueinzii*. Besides leaves are comparatively small (0.7–0.8 mm) in former while long (1 mm) in later.

Fabronia altaica is characteristic in having long and narrow subula, prominent and large, one celled dentitions on the margin. It is very close to *F. major* De Not. in overall appearance but it was separated due to larger apical cells (175 µm), upper & middle leaf cells (36–

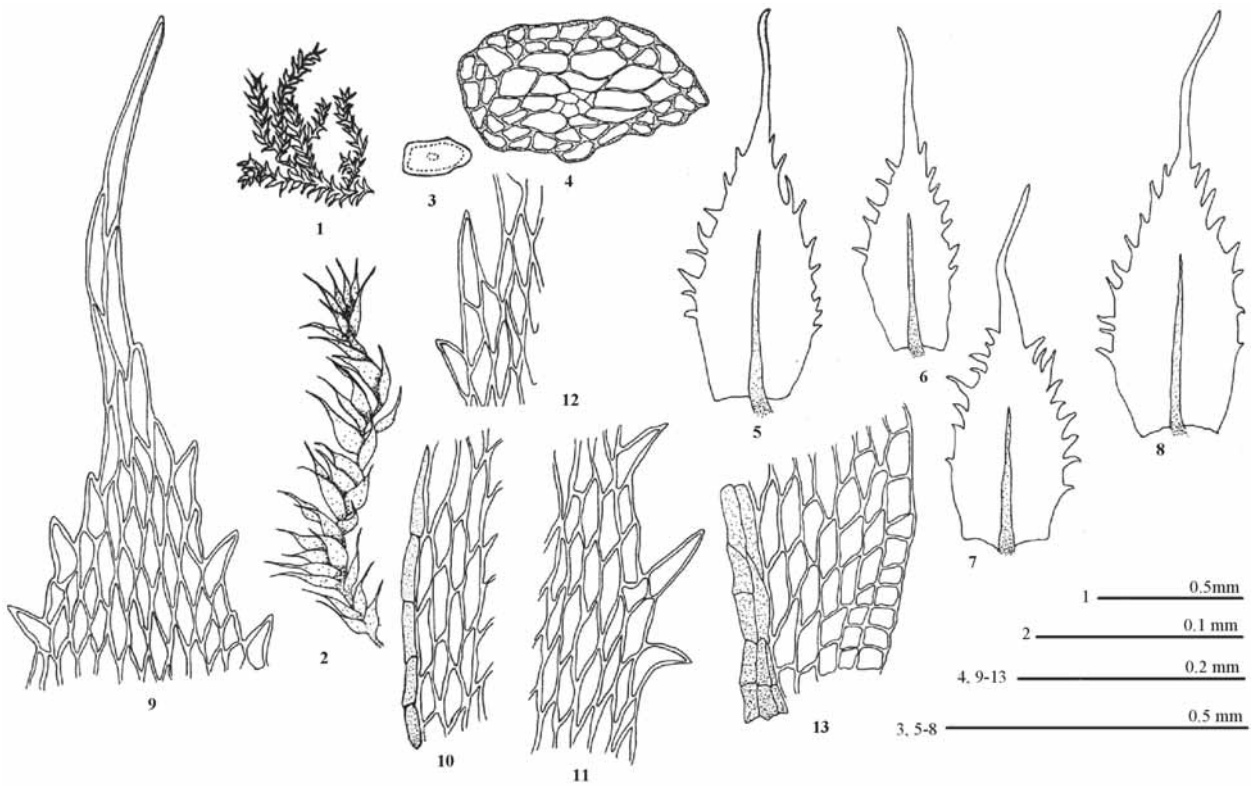

Fig. 2. *Fabronia altaica* Ignatova & Ignatov. 1. Habit of plant. 2. A portion of plant enlarged. 3. Cross-section of stem (Diagrammatic). 4. Cross-section of stem (Cellular). 5-8. Leaves. 9. Apical leaf cells. 10. Median leaf cells near costa. 11,12. Median leaf cells near margin. 13. Basal leaf cells. All Figures drawn from 22523/12 (LWU).

50–70(–85) µm) in *F. major* and smaller apical cells (98 µm), upper & middle leaf cells (31–43 µm) in *F. altaica* (Ignatova *et al.*, 2017). Besides the dentitions are large (25–35(–50) µm)) in *F. major* and small (15–31 µm) in *F. altaica* (Fig. 2).

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