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Indopottia zanderi (Bryophyta, Pottiaceae) gen. et sp. nov. from the Western Ghats of India

A. E. D. DANIELS¹, R. D. A. RAJA¹ and P. DANIEL²

¹Scott Christian College (Autonomous), Nagercoil, Tamil Nadu, India and ²Nagercoil, Tamil Nadu, India

SUMMARY

Indopottia zanderi, a new genus and species of the Pottiaceae, is described from the Silent Valley National Park in the Western Ghats in Peninsular India. The distinctive features of Indopottia are the leaf cells being weakly convex on both surfaces, costal stereid-band semicircular in cross-section, guide cells rounded-ovate or semicircular, seta short and operculum very long. The affinities of the allied genera, Gangukea, Tortula and Weisiopsis, are discussed. The new genus Indopottia may be placed in the tribe Hyophileae.

KEYWORDS: Pottiaceae, Indopottia, Silent Valley, Western Ghats

INTRODUCTION

The Pottiaceae is the largest family in the Bryophyta in number of genera, 76, and over 1400 species worldwide (Zander, 1993). There are 31 genera and 130 species in the family in India (Aziz & Vohra, 2008).

The Silent Valley National Park in the Western Ghats (Kerala, Peninsular India) is a floristically rich area. It has been fairly well-explored for angiosperms and a number of new species have been described. Nair et al. (1982) described a new grass genus from this region, while Srivastava & Asthana (1986) described a new hornwort, Folioceros udarii S.C. Srivast. & A.K. Asthana. During their preliminary survey, Vohra et al. (1982) collected fertile material of the moss Handeliohryum setschwanicum Broth. for the first time from the Silent Valley, although this species is well-distributed in the Sichuan Province of China and Arunachal Pradesh, Darjeeling and Sikkim in India. However, the Silent Valley National Park still remains almost unexplored for cryptogams especially bryophytes (Srivastava & Sharma, 2000). Material of a species of the Pottiaceae collected while exploring the Silent Valley National Park in a study of the bryoflora could not be identified to any known genus of the family and is described here as new.

DESCRIPTION

Indopottia A.E.D. Daniels, R.D.A. Raja & P. Daniel gen. nov. (Fig. 1)

Plantae acrocarpae. Caules simplices, raro ramosi, decumbentes, squamo-foliis obtecti: cortex 2-4-stratus, a medulla differentiatm. Folii cellulae in superficiebus ambabus leniter convexae; taenia stereidarum costali in sectione transversali semicirculari et cellulae ducum rotundato-ovatae non lenticulares. Sporophyta terminalia, bina vel raro unicum: setae brevissimae; capsulae vulgo declinate: peristomium carens: operculum longissimum, rostratum. 

Type species: Indopottia zanderi A.E.D. Daniels, R.D.A. Raja & P. Daniel

Plantae acrocarpae. Stems simple, rarely branched, decumbent, covered with scale leaves and rhizoids in lower half; cortex 2-4-layered, differentiated from medulla. Leaf lamina cells weakly convex on both surfaces; costal stereid-band semicircular in cross-section and guide cells rounded-ovate or semicircular. Sporophytes terminal, in pairs, rarely single; setae very short; capsules mostly declinate; peristome absent; operculum very long, rostrate.

Indopottia zanderi A.E.D. Daniels, R.D.A. Raja & P. Daniel sp. nov.

Plantae tegetes formantes. Non nitidue. Aureofruneae ad brunneae. Caules decumbentes, simplices, raro ramosi, atrobrunnei. In sectione transversali ovati, 0.4-0.5 mm diametro, sclerodermide et hyalodermide nullo, 5-15 mm longi, in parte inferior squamo-foliis et rhizoides obtecti; cortex 2-4-stratus, a medulla differentiatissimus; cellularae irregulariter hexagonales, 4-20 X 2-6 pm, paretibus crassius; cellularae medullaeae irregulariter hexagonales, 4-32 X 4-24 pm, filo centrali praesenti, paretibus tenuibus. Folia densa, in

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THE OVERLOOKED AND RARE LIVERWORT
FRULLANIA RAMULIGERA (NEES) MONT.
(FRULLANIACEAE) REDISCOVERED IN THE WESTERN
GHATS OF INDIA


'Bryology Laboratory, Department of Botany and Research Centre, Scott Christian College
(Autonomous), Nagercoil – 629 003, Tamil Nadu, India; E-mail: dulipdaniels@yahoo.co.uk

36, Arulnagar, Nagercoil – 629 001, Tamil Nadu, India

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Frullania ramuligera, an overlooked, rare and long-lost liverwort, has been rediscovered in the southern Western Ghats in India after nearly two centuries. Till now the collection made by Perrottet during 1834–1839 in the Nilgiri Hills is the only representative of this species.

Key words: Frullania ramuligera, Nilgiri Hills, rediscovered, Western Ghats

INTRODUCTION

Nees von Esenbeck (1830) described Jungermannia ramuligera as a new species, the type of which came from Java (Indonesia). Montagne (1842) having studied a Perrottet material from the Nilgiri Hills in the Western Ghats in Peninsular India placed it in the genus Frullania. Material of F. ramuligera was collected by us initially in the Silent Valley in Kerala, which is not far away from the Nilgiri Hills in Tamil Nadu, and later in the Agasthyamalai Biosphere Reserve in the southernmost Western Ghats of Tamil Nadu and Kerala, which is about 200 km away as the crow flies. Though this species is reported to be distributed from South Asia to New Zealand through Southeast Asia there is no mention of its frequency of occurrence in literature pertaining to other regions/countries. In all the three areas now collected plants were found to grow in a single patch of 7 to 15 cm across indicating that this species is extremely rare. And rarity appears to be the single major factor that has made this species elusive. Now that this species has been re-collected in a nearby as well as far away places from the earlier known region of the Nilgiri Hills its oc-

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The New Guinean *Thysananthus appendiculatus* (Lejeuneaceae) discovered in the Western Ghats of India

A. E. D. Daniels and R. D. A. Raja

The genus *Thysananthus* Lindenb. of *Lejeuneaceae* has about 10 species in the world (Gradstein 1992). However, only *T. gottschei* (J.B. Jack & Steph.) Steph. and *T. spatulifolius* (Reinw. et al.) Lindenb. have so far been reported in India (Parihar et al. 1994, Bapna and Kachroo 2000).

While exploring the bryoflora in the Silent Valley National Park in the Western Ghats in southern India, material of this species was collected. Earlier Daniels and Daniel (2009) reported the distribution of the Australian liverwort *Spruceanthus thozetianus* in the Agasthyamalai Biosphere Reserve in the Western Ghats. In this paper we report the discovery of the New Guinean *Thysananthus appendiculatus* Steph. in the Silent Valley National Park also in the Western Ghats. The species is described in detail, illustrated and its distribution mapped.


Type: Papua New Guinea, Western Province, Fly River Branch, Bäuerlein 85 (G, lectotype, *vide* Verdoorn 1934) (Fig. 1).

Plants dioecious, corticolous, pendant, 3–7 cm long, yellowish brown. Stems branched. Leaves convex, falcate, 1.5–1.8 × 0.4–0.8 mm, oblong-obovate, dorsally arched and ventrally almost straight at margin, acute and toothed at apex; cells quadrate-hexagonal to elongate-hexagonal, thick-walled, with trigones and intermediate thickenings; apical and marginal cells 12–24 × 10–16 μm; median ones 20–32 × 8–16 μm; basal ones 28–48 × 12–20 μm; lobules ca 2/5 as long as leaves, narrow, rectangular, 2-toothed at apex; teeth distinct, 2- to 4-celled. Underleaves transversely inserted, spatulate, thrice as broad as stem, 0.5–0.8 × 0.3–0.6 mm, appendiculately, roughly cuneate, slightly auriculate at base, recurved at lateral margin, irregularly denticulate at apex. Sporophyte not seen.

**Habitat.** Corticolous in evergreen forests, ca 1100 m.

**Distribution.** Papua New Guinea and India: Western Ghats of Kerala (Fig. 2).

**Specimens examined.** Western Ghats, Kerala, Palakkad Dist., Silent Valley, Inspection Bungalow Road, ca 1100 m, 19.1.2009, R.D.A. Raja, 174 p.p.

**Discussion**

*Thysananthus appendiculatus* was so far known to occur only in Papua New Guinea (west Irian and Huon Peninsula) and was thought to be endemic. It appears to be somewhat common in Papua New Guinea as may be evident from the 29 collections represented by 18 specimens on logs or branches of fallen trees, five on trunks, four on twigs, one on a stump and one on a bush in rain and moss forests ranging from 1500 to 2300 m (Gradstein et al. 2002). The present collection is from evergreen forests on bark at an altitude of ca 1100 m and is rare. It is not surprising to find a New Guinean species in the Western Ghats of India because Daniels and Daniel (2009) reported the Australian *Spruceanthus thozetianus* from the Western Ghats.

According to Wegener's continental drift hypothesis, during the Upper Carboniferous period, Australia and India shared the lone land mass the 'Pangaea'. In the early Jurassic period this land mass split into two to form the northern Laurasia and the southern Gondwanaland. In the early Cretaceous period the Gondwanaland split into
Response to “The response to ‘the New Guinean Thysananthus appendiculatus (Lejeuneaceae) discovered in the Western Ghats of India’ by A. E. D. Daniels and R. D. A. Raja”

A. E. D. Daniels and R. D. A. Raja

The recent discovery of the liverwort Thysananthus appendiculatus Steph. by Daniels and Raja (2011) in the Western Ghats of India has caused doubt in P. Sukkharak and S. R. Gradstein, the monographers of the genus Thysananthus (in litt.) on the identity of the material. The reasons cited by them are that Daniels and Raja (2011) did not provide certain key characters such as the branching type, stem anatomy, the presence of the characteristic and consistent appendage which is usually found on the keel of the lateral leaf lobes and the shape of the leaf laminal cells which were described as quadrilateral-hexagonal to elongate-hexagonal and not elongate-hexagonal and stated that the material might have been wrongly identified as T. appendiculatus. Based on the figures and the description provided therein they further concluded that the material is the common Spruceanthus semirepandus (Nees) Verd. Gradstein et al. (Acta Bot. Fenn. 174: 70. 2002), in the generic concept of Thysananthus Lindernb. categorically stated that the genus is characterized by purely Lejeunea-type branches. However, material of T. spathulifolius from the Western Ghats determined by us and later confirmed by R. L. Zhu (HSNU) shows Frullania-type branching (Daniels et al. 2011). Similarly, material of the recently reported T. appendiculatus also shows Frullania-type branching which once again contradicts Gradstein et al.’s (in litt.) generic concept of some of the Lejeuneaceae members from the Western Ghats and their statement that the appendages are found on the keel of the leaves and inserted partially on the stems (p. 309, line two from above) may now prove that our material is T. appendiculatus only (vide Fig. 1, 4). We do hope that the information and figures provided now would convince the monographers.

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THE LIVERWORT *RADULA MULTIFLORA* GOTTSCHKE EX SCHIFFN. (RADULACEAE) ADDED TO THE BRYOFLORA OF INDIA

R.D.A. Raja and A.E.D. Daniels

**Botany Department**, Sreenikt Christian College, Nagercoil - 629 003, Tamil Nadu

**Abstract**: The liverwort *Radula multiflora*, so far known to be distributed in Oceania, is recorded for India from the Silent Valley National Park in the Western Ghats. It is described in detail and illustrated.

**INTRODUCTION**

The genus *Radula* Dumort. has ca 350 species in the world and they are mostly distributed in the tropics (Yamada, 1979; Bapna and Kachroo, 2000). Yamada (1979) included 60 species for Asia. In India so far 27 species have been reported (Bapna and Kachroo, 2000). Of these, 16 are from the Western Ghatss. Daniels and Daniel (2003) and Nair et al. (2005) added *R. madagascariensis* Gottschke and *R. japonica* Gottsche ex. Steph. respectively raising the number to 18. Now, *Radula multiflora* Gottschke ex. Schiffn. is added from the Silent Valley National Park in the Western Ghats of Kerala. The species is described in detail and illustrated.


**Type**: Bismarck Is., New Hannover, 1875, F.C. Naumann n. (FH). *R. unduliflora* Castle, Rev. Bryol. Lichenol. 33: 387. 1965 (Fig. 1).

Plants dioecious, 1.5 - 5 cm long, olive green. Stems 100 - 135 x 90 - 110 μm, 8 - 11-celled across; cortical cells 4 - 8 x 4 - 6 μm, quadrate-hexagonal, with trigones, pale brown; medullary ones 8 - 14 x 8 - 10 μm, quadrate-hexagonal, with trigones; branches irregularly pinnate, obliquely spreading. Leaves moderately imbricate, widely spreading, 0.8 - 1.1 x 0.6 - 0.9 mm, ovate, somewhat falcate, dorsal base extending slightly beyond farther edge of stem, rounded, often narrowly incurved

at apex; cells with trigones and intermediate thickenings; apical cells 8-12 x 6-10 μm; median ones 12-18 x 10-14 μm; basal ones 16-24 x 10-14 μm, with minute trigones; lobules ca 1/2 as long as leaf, contiguous, obliquely spreading, usually recurved at base, arched at adaxial margin, obtuse at apex; rhizoids few; rhizoidal initials usually convex. Male inflorescences terminal on branches, with 10-14 pairs of bracts. Sporophyte not seen.

Habitat: Terricolous in evergreen forests, ca 1180 m.

Distribution: BISMARCK ISL., INDONESIA, NEW CALEDONIA, NEW GUINEA, NEW HEBRIDES, THE PHILIPPINES, SAMOA, SOLOMON ISL., TAHITI ISL. (Yamada, 1979) and INDIA: Western Ghats (Kerala).


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REFERENCES


