CONTRIBUTIONS TO THE BRYOFLORA OF AUSTRALIA, III. THE GENUS *NOWELLIA* MITT. (CEPHALOZIACEAE, JUNGERMANNIOPSIDA)

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Nowellia in Australia

Bellenden Ker, Laurasia, Indomalesia, Cardwell Range, conservation, Queensland

Abstract: The liverwort genus *Nowellia* Mitt. was previously unknown from the Australian continent. During a collecting trip by the authors in June of 2001 throughout northern Queensland, two species were found, the Laurasian *Nowellia curvifolia* (Dicks.) Mitt. from the cloud forest of Bellenden Kerr summit and the Malesian-Australasian *Nowellia langii* Pears. from the montane forests of Cardwell Range.

Introduction

The authors, within the framework of Flora of Australia project, visited the mountain ranges of northern Queensland, between 9 and 20 June 2001. The main object of the trip was to collect material for the revision of the Australian species of *Frullania,* but abundant collections were also made of other liverworts and some mosses. The collecting trip was sponsored by the Australian Biological Resources Study Participatory Program and supported by the Natio-

nal Herbarium of New South Wales, Royal Botanic Gardens Sydney (NSW), by the James Cook University, School of Marine and Tropical Biology, Townsville (JCU) and by the Cryptogam section of the Australian National Herbarium, Canberra (CANB).

Results

During the trip two species of *Nowellia* Mitt. were found in two different localities. As the genus is thoroughly revised by Grolle (1968), it was easy to identify them, as

***Nowellia curvifolia* (Dicks.) Mitt.** (Subg. *Nowellia*) Figs 1, 3-4,6

Northern QUEENSLAND: Bellenden Ker Range and National Park. Along trail leading from the telecommunication tower to the main summit.17°15'S, 145°51.4'E., 1580 m alt. Simple microphyll vine-fern thicket with *Dracophyllum sayeri*. On a decaying log. Coll. *T. Pócs 01094/W*, accompanied by *E.A. Brown, A. Cairns & C. Cargill.* (CANB, EGR, BRI, NSW).

Distribution: It is widespread in the more oceanic parts of the northern temperate belt of eastern Canada and USA, in Eurasia from the Azores and Britain to European Russia and the Caucasus Mts, in the milder climactic coastal parts of Siberia , and in Sakhalin, Korea, Japan, China including Taiwan. It is also found as far south as the higher tropical mountains in Mexico, Venezuela, Brazil, Sri Lanka, Indonesia, Malaysia and the Philippines (see maps in Grolle (1968), Gradstein & Váňa 1987, distributional data in Chuah-Petiot (2011), Gradstein & Costa (2003), Gradstein & Váňa (1994), León *et al.* (1998), Piippo (1990), Uribe & Gradstein (1998), Wang *et al.* (2011). *New to Australia.*

Illustrations: Müller & Herzog 1957–58: 1108, fig. 420; Schuster 1974: 818, fig. 465; 825, fig. 466; Inoue 1976: 39, plate 19; Paton 1999: 119, fig. 42.

Maps (after Piippo 1990): Grolle 1968: 45, map 1; Sweykowski 1969: map 213, Schuster 1983: 579, fig. 63:1; Gradstein & Váňa 1987: 406, fig. 21.

***Nowellia langii* Pears.** (Subgen. *Metanowellia* Grolle) Figs 2, 5, 7

(Syn.: *N. caledonica* Steph.)

Northern QUEENSLAND: Cardwell Range. Kirrama State Forest, along Douglas (Curran) Creek, at the N side of Mt. Pershouse. 18°12.7'S, 145°48.5'E, 680-700 m alt. On a decaying log in relatively open rainforest (simple notophyll vine forest). Coll. *E.A. Brown 01/155, accompanied by A. Cairns, C. Cargill and by S. & T. Pócs* (CANB, EGR, BRI, NSW).

Distribution: Hitherto known only from Western Sumatra, Thailand, Malaysia (Perak, Sabah) and from New Caledonia (see map in Grolle 1968, distributional data in Chuah-Petiot 2011, Lai *et al.* 2008.). *New to Australia.*

Illustration: Grolle 1968: 42, fig. 8. Map: Grolle 1968: 46, map 2.

Discussion

Nowellia Mitt. is a peculiar genus within the family Cephaloziaceae Mig. distinguished by the ventral margin of the bilobed leaf modified into a water-sac. Grolle (1968) in his monograph enumerated 7 species; Robinson (1970) described one more (*N. reedii*). Out of the 8 species, *N. curvifolia* is Laurasian, with oceanic boreo-temperate distribution, but penetrating south on tropical mountains. Four of them are Neotropical and three Palaeotropical, with quite restricted Indo-Malesian distributions. None of them were previously known from Australia. It is easy to distinguish the two Australian species from each other, as is demonstrated in the key below (based on Grolle 1968):

1. Well-developed leaves at least 10–15 cells high from the leaf insertion to the sinus between the two acute segments of lobe; lobe margins entire. Water-sac large, 16–20 cells wide, inflated only in the lower half. Stem with 8–12 medullary cells. …….. ***Nowellia curvifolia***
2. Well-developed leaves only 4–6 cells high from the leaf insertion to the sinus between the two acute segments of lobe, lobe margins with long ciliae. Water-sac small, only 6–10 cells wide and fully inflated. Stem with 3–6 medullary cells. ……..... ***Nowellia langii***

It is phytogeographically interesting that the distribution of the two species overlaps at the junction of Laurasia and Gondwana. Gradstein and Váňa (1987) discussed the penetration of Laurasian elements into Gondwana, citing *Nowellia curvifolia* as a typical example. The new Australian locality is one of the southernmost occurrences in the world.

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Plate I. Fig. 1: Nowellia curvifolia (Dicks.) Mitt. from Australia, Queensland, Bellenden Ker summit, 1580 m, T. Pócs 01094/W. Fig. 2: Nowellia langii Pears. From Australia, Queensland, Cardwell Range, Douglas Creek at the N side of Mt. Pershouse, 680 m, E.A. Brown 01/155. (Scale bars 200 µm, microphotos made by A.Cairns).

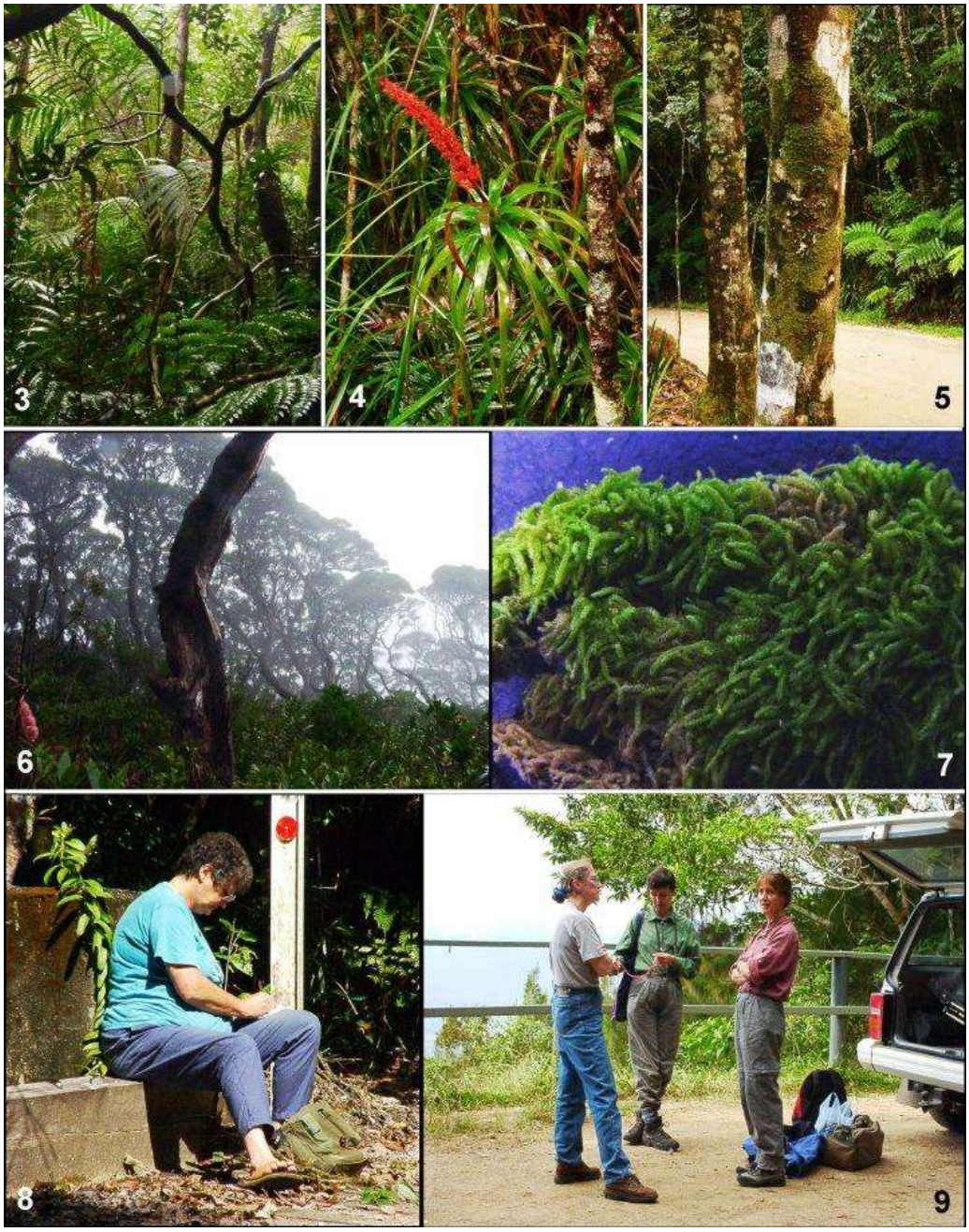

Plate II. Fig. 3: Inside of the simple microphyll vine forest (cloud forest) of Bellenden Ker summit, at 1580 m. 4: Dracophyllum sayeri K. Muell. (Ericaceae), common in the microphyll vine forest. 6: The cloud forest of Bellenden Ker summit from outside. 5: Simple notophyll vine forest (montane rainforest) along Douglas Creek, Cardwell Range. 7: Nowellia langii at Douglas Creek. Figs.8–9: Participants of the collecting trip in Queensland. 8: Sarolta Pócs at Douglas Creek. 9: Christine Cargill, Elisabeth Brown and Andi Cairns on the Tucker Lookout, Cardwell Range. (Photos made by T. Pócs).

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