

NEW OR LITTLE KNOWN EPIPHYLLOUS LIVERWORTS, XVII. RECORDS FROM THE CÁT TIÊN NATIONAL PARK, SOUTHERN VIETNAM

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Epiphyllous liverworts from Cát Tiên National Park, Vietnam

Cololejeunea, Colura, conservation, Indochina, Leptolejeunea, lowland
rainforest

Abstract. *The junior author collected 36 epiphyllous samples in the Cát Tiên National Park of South Vietnam and the senior author identified them. Although the lowland rainforest areas at this latitude usually have not a high diversity of epiphyllous liverworts, 21 species were observed, of which Colura ornata proved to be new for the bryoflora of Vietnam.*

Introduction

Trần Ninh collected epiphyllous liverworts in the Cát Tiên National Park of southern Vietnam, 120 km NE of Ho Chi Minh City (see fig. 1), established in 1992. The national park encounters 73,878 ha area between the latitudes of 11°21' and 11°48'N and longitudes 107°10 and 107°34'E. It consists of three sectors: Cat Loc (former Rhinoceros Sanctuary) in Lam Dong Province, on the foothills of Central highlands, and Tay Cat Tien and Nam Cat Tien sectors in Dong Nai Province, mostly on the lowland of the floodplain of Dong Nai River. The collection was carried out in the latter, in lowland rain forests dominated by

Dipterocarpaceae trees, at 100–150m m altitude, in the November of 2002. This dense, humid evergreen forest consists of *Dipterocarpus alatus*, *D. dyeri*, *Anisoptera costata*, *Shorea* and *Hopea* spp. (Trung 1988) with a mean annual rainfall of 2435 mm, with a wet season from May to October and a pronounced dry season between November and April. The mean annual temperature is 25.5°C (Scott 1989).

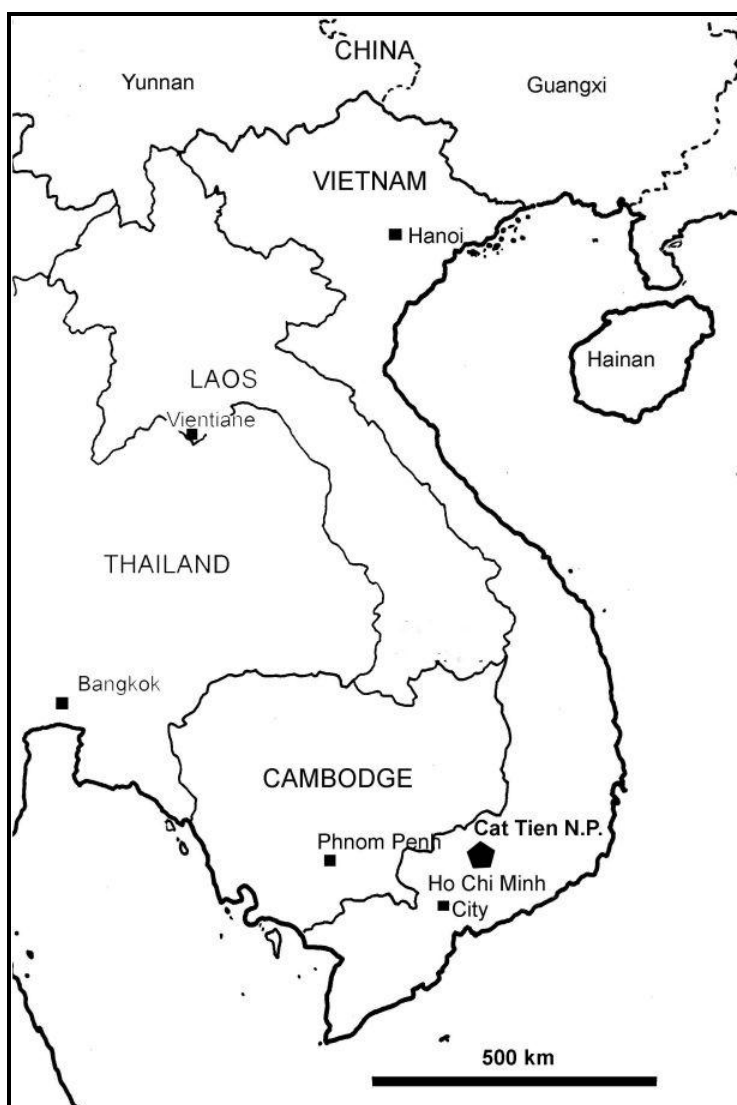


Fig. 1: The collecting site of Trần Ninh in southern Vietnam.

Enumeration of the collected species

Species new to Vietnam are marked by *. The distributional data are based on Asthana & Srivastava (2003), Pócs (1965, 2005, 2011, 2012a), Pócs & Piippo (2011), Tixier (1962, 1969, 1970, 1973, 1974, 1975, 1981, 1984, 1985), Zhu (1995) and on Zhu & So (1999, 2000, 2001). The number after the name of species reflects its frequency, showing in how many of the 36 samples it was found. The epiphyllous liverworts were identified by Tamás Pócs between 2003 and 2012.

Archilejeunea sp. 1 (sterile)

Caudalejeunea reniloba (Gottsche) Spruce 14

Syn.: *Caudalejeunea recurvistipula* (Gottsche) Steph.

Distrib.: Widely distributed Indomalaysian – Pacific species.

Cololejeunea ceatocarpa (Ångstr.) Steph. 1

Distrib.: Hitherto known only from Réunion, Bangladesh, Vietnam, New Caledonia, Fiji, Tonga, Samoa and the Hawaii Islands. It is close to *C. spathulifolia* (Steph.) Tix. from the Solomon Islands and to *C. polyantha* (Steph.) H.A. Mill. from the Pacific.

Cololejeunea cordiflora Steph. 3

Syn.: *Cololejeunea trichomanis* (Gottsche) Steph. subsp. *cordiflora* (Steph.) Pócs

Distrib.: A widespread Indomalaysian – Pacific species.

Cololejeunea floccosa (Lehm. & Lindenb.) Schiffn. cf. var. *aurita* Benedix 8

The specimens from Cát Tiên National Park have the vitta always consisting of only (3-)4 cells in a single row. This character matches *C. floccosa* var. *aurita* Benedix, but also *Cololejeunea subfloccosa* Mizut. As the collected material does not have female gamatoecia and paroicous shoots, which bear the main distinguishing characters, it was not possible to identify this taxon with certainty, although it occurred in eight samples. As *Cololejeunea subfloccosa* was described later (Mizutani 1984) than *C. floccosa* var. *aurita* (Benedix 1953), and also after the review of the *Cololejeunea floccosa* complex by Tixier (1981), it would be necessary to compare the types of the concerned taxa.

Distrib.: *Cololejeunea floccosa* is widespread Palaeotropical taxon while the known distribution of *Cololejeunea subfloccosa* is restricted to southern China and Japan.

Cololejeunea gottschei (Steph.) Mizut. 1

Syn.: *Cololejeunea yunnanensis* (P.C. Chen & P.C. Wu) Pócs

Tixier (1985) melted this species into the *C. longifolia* (Mitt.) Mizut. complex. The two species are closely related, characterized by the elongate lobe cells with several intermediate thickenings on the longitudinal walls, which results in the longitudinal shrivel of the leaves in dry state. But Zhu & So (2001) distinguishes the two species by several well usable characters, as the number of cells in the gemma, the perianth keels and the leaf shape.

Distrib.: Widespread Indomalesian species occurring from India and Sri Lanka through China (Hainan, Taiwan) and Vietnam to the Philippines and New Guinea.

Cololejeunea haskarliana (Lehm. & Lindenb.) Schiffn. 1

Distrib.: Widespread Indomalesian – Pacific species.

Cololejeunea lanciloba Steph. 4

Distrib.: A widespread Palaeotropical species distributed from West Africa to Polynesia. Also reported from Bolivia

Cololejeunea latilobula (Herzog) Tixier 10

Distrib.: Widespread Palaeotropical species occurring from tropical Africa through Indomalesia and Southeast Asia to the Pacific (Fiji).

Cololejeunea longifolia (Mitt.) Mizut. 4

As mentioned under *C. gottschei*, this species is treated here in the strict sense.

Distrib.: Himalaya, India, Bangladesh, Sri Lanka, Andaman Thailand, Cambodia, Laos, Vietnam, Malaya, Borneo, Sulawesi, Philippines, China, Japan, Korea, New Guinea, Solomons, New Caledonia, Caroline Is and Fiji Islands.

Cololejeunea planisssima (Mitt.) Abeyw. 3

Distrib.: Palaeotropical species known from East Africa to Micronesia.

Cololejeunea verrucosa Steph. 3

Distrib.: Java, Laos, Cambodia, Vietnam, S Japan (Ryukyu Is.). Malaya, Sumatra, Borneo, Sulawesi, Moluccas ?Philippines, Solomon Islands, Hainan, Taiwan, ?Caroline Islands, ?Society Islands.

Colura conica (Sande Lac.) K.I. Goebel 2

Distrib.: Widespread Indomalesian – Pacific species distributed from Sri Lanka through China to the Philippines, Australia and to Samoa.

****Colura ornata*** K.I. Goebel 2

Distrib.: Indomalesian species previously known from India, Sri Lanka, Java, Malaysia, Borneo, the Philippines, Moluccas and New Guinea, new to Indochina.

Drepanolejeunea angustifolia (Mitt.) Grolle 1

Distrib.: Widespread Indomalaysian species.

Drepanolejeunea pentadactyla (Mont.) Steph. 1

Distrib.: Widespread Indomalaysian – Pacific species.

Lejeunea anisophylla Mont. 1

Distrib.: Widespread Palaeotropical species..

Leptolejeunea balansae Steph. 1

Distrib.: India, Indochina, Malaysia, southern China, Indonesia.

Leptolejeunea elliptica (Lehm. & Lindenb.) Schiffn. 1

Distrib.: Pantropical species in Africa known only from the Comoro Islands.

Leptolejeunea epiphylla (Mitt.) Steph. 14

Distrib.: Palaeotropical species distributed from West Africa throughout tropical Asia to the Society Islands.

Leptolejeunea maculata (Mitt.) Schiffn. 24

Distrib.: Very widespread Pantropical species.

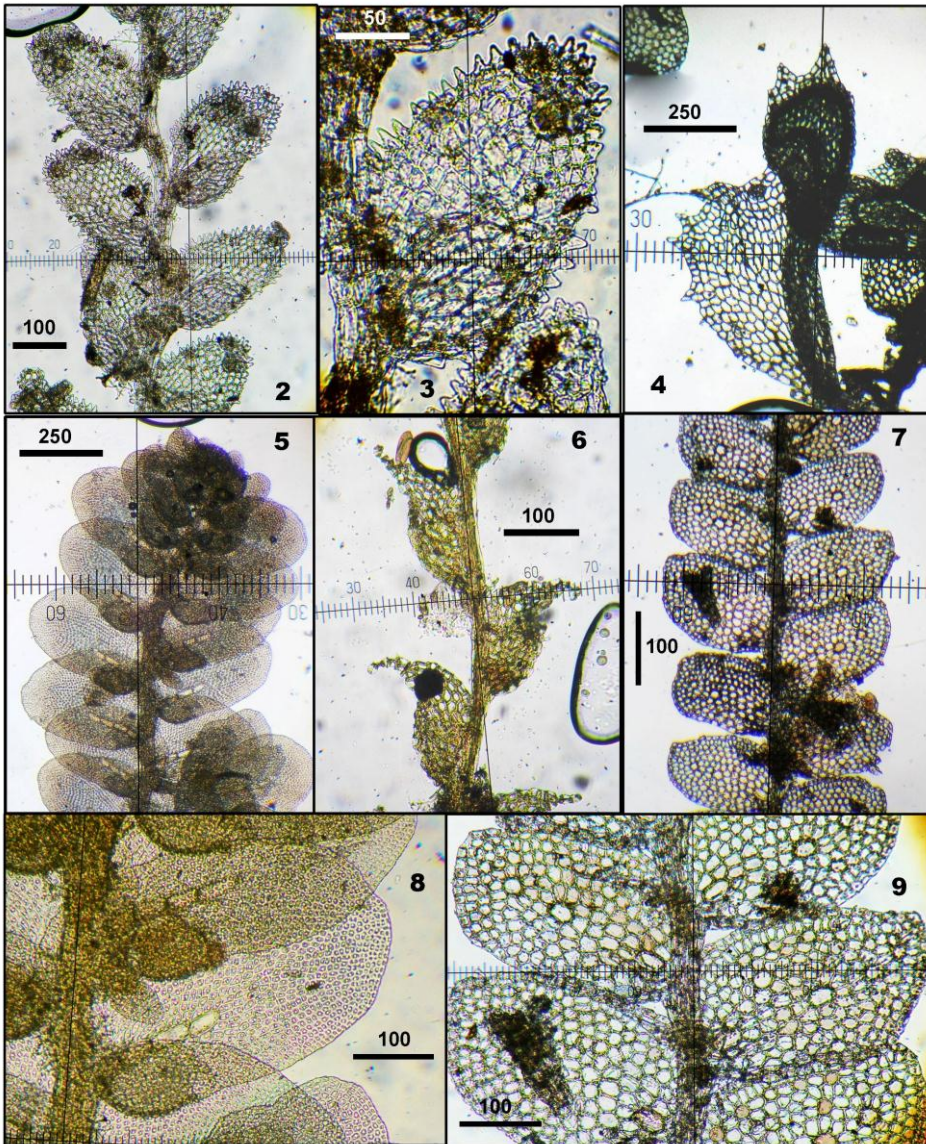


Fig. 2–3: *Cololejeunea haskarliana* (Lehm. & Lindenb.) Schiffn. Fig. 4: *Colura ornata* K.I. Goebel. Fig. 5, 8: *Cololejeunea floccosa* (Lehm. & Lindenb.) Schiffn. cf. var. *aurita* Benedix. Fig. 6: *Drepanolejeunea angustifolia* (Mitt.) Grolle. Fig. 7, 9: *Leptolejeunea epiphylla* (Mitt.) Steph. All from Trần Ninh, collected in Cát Tiên National Park. Scale bars in μm .

Discussion

The epiphyllous flora is typical for lowland rainforest habitat with the dominance of *Leptolejeunea* species. It is relatively rich with its 21 species compared to epiphyllous floras of similar latitude and altitude. For example the swamp and lowland rainforest remnants of Singapore (Piippo *et al.* 2002) had only 8 epiphyllous Lejeuneaceae species of which 2–3 have already disappeared.

As the distributional elements are concerned, there are no endemics in the area and the overwhelming majority, 12 species, belongs to the Indomalasian group and of which 5 species extends to the Pacific. Seven species are of Palaeotropic distribution while only 2 are Pantropical and 1 unknown. It is noticeable to compare the proportion of geoelements in this lowland rainforest area with that of the montane rainforests of Laos (Pócs 2012b), where 3 species out of 14 are subendemic to the South China – Indochina – South Japan realm.

The conservation value of this national park is high as it has relatively intact lowland rain forests, most of which were destroyed in southern Vietnam during the Vietnam War by the defoliating chemicals used. This forest area also harbours a rich flora of more than 1300 species of vascular plants, among which 34 species are listed in the Red Data Book of Vietnam (Sourcebook of Existing and Proposed Protected Areas of Vietnam), among others the endemic *Dipterocarpus bandii* and *Dracontomelon schmidii* (Trung 1986, 1988). The Cát Tiên National Park is also a nationally important site of primate conservation. Among the protected animals are the black gibbon, elephant, tiger, leopard, clouded leopard, gaur, banteng and the Indian muntjak and a very rich avifauna. (Sourcebook 2001). Sorry, probably the last specimen of the local variety of Javan rhinoceros was shot dead in the area (pers. comm. of Lars Söderström).

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