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## THE LICHEN GENUS **LECANACTIS** AND ALLIED GENERA IN PAPUA NEW GUINEA

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**Abstract.**- The material belonging to **Ancistroporella**, **Bactrospora**, **Catarraphia**, **Cresponea**, **Lecanactis** and **Lecanographa** and recently collected in Papua New Guinea has been studied. Two species are described as new for science: **Cresponea apiculata** Egea, Sérusiaux & Torrente, and **Lecanactis olivascens** Egea, Sérusiaux & Torrente. The following species are reported as new for that country: **Catarraphia dictyoplaca**, **Cresponea leprieurii**, **C. leprieurioides**, **Cresponea macrocarpoides**, and **Lecanactis abietina**.

In 1992, A. Aptroot, P. Diederich, E. Sérusiaux and H. Sipman spent five weeks in Papua New Guinea, collecting lichens and lichenicolous fungi from various parts of the country: along the northern coast in the Madang province, in the mountains of the Huon peninsula (Madang province), and in the mountains from

Goroka to the Mt Wilhelm area in the Eastern Highlands and Simbu provinces. Several thousand specimens were gathered, amongst which several belong to *Lecanactis* and allied genera (sensu Egea & Torrente 1994:50-51). The study of that material was entrusted to one of the collectors (ES) and to the world specialists of that group (JME & PT). A few further specimens were also available, collected either by A. Aptroot and H. Sipman during an earlier (1987) field trip to the country, or by other lichenologists (P.W. Lambley and H. Streimann).

A set of representative collections is deposited in UPNG (Herbarium of the University of Papua New Guinea at Port Moresby).

### ***Ancistroporella australiensis* (Thor) Thor**

Eastern Highlands prov., Mount Gahavisuka Provincial Park, 11 km N of Goroka, 145°25'E 6°01'S, 2300 m, on tree in forest remnants, 3.1987, A. Aptroot s.n. (herb. Aptroot). Ibid., mossy mountain forest, 2300-2450 m, on tree, 8.1992, A. Aptroot 31081 (herb. Aptroot) & P. Diederich 10579 (herb. Diederich).

This species, the only one so far described in the genus, is known from Queensland/Australia where it grows at mid-elevation (less than 1000 m) in rain forests, and in Papua New Guinea, where it has been found in a mossy mountain forest at a higher elevation. Its presence in Papua New Guinea was first mentioned by Egea & Torrente (1994:173).

See Thor (1990: 30-32) and Egea & Torrente (1994: 172-173) for a full description and illustrations.

### ***Bactrospora leptoloma* (Müll. Arg.) Egea & Torrente**

Madang prov., Manam island, in plantation near Budua, 145°00'E 4°07'S, 50 m, on tree, 7.1992, A. Aptroot 30472 (herb. Aptroot). Near Bogia, Laing Island in Hansa Bay, 1 m, 144°52'E 4°10'S, epiphyte in coastal forest on coral island, 7.1992, A. Aptroot 30196 (herb. Aptroot), P. Diederich 11602 (herb. Diederich), H. Sipman 34756a (B).

Egea & Torrente (1993a:240) pointed out that the ascospores are of the *Patellarioides* -type when young, becoming of the *Jenikii* -type at maturity, and measure 3-3.5(-4)  $\mu\text{m}$  in width. In the specimens here investigated, the ascospores always belong to the *Jenikii* -type, and reach 4(-4.5)  $\mu\text{m}$  in width. They are nevertheless considered as conspecific with the type, the only other collection available.

Besides these collections from the northern coast of Papua New Guinea, the species is known only from the type locality on Victoria Island, between Singapore and Sarawak (Malaysia). In Papua New Guinea, it was found on trees in little disturbed coastal forests and in plantations, also near the coast. The above collections are already mentioned in Aptroot & al. (1995:25).

See Egea & Torrente (1993a: 240) for a full description and illustrations.

### **Bactrospora metabola** (Nyl.) Egea & Torrente

Madang prov., Laing Island in Hansa Bay, 144°52'E 4°10'S, 1 m, epiphyte in coastal forest on coral island, 7.1992, *E. Sérusiaux* 13090 (LG) and *H. Sipman* 34762 (B). Mouth of the river Boroi, mangrove forest, 7. 1992, *A. Aptroot* 30413 (herb. Aptroot). Tongu, along the road Bogia-Josephstaal, secondary forest near a village, 330 m, on *Intsia*, 7.1992, *A. Aptroot* 30660 (herb. Aptroot).

This species is recorded from Andaman Island (India), New Caledonia, New Zealand, and Papua New Guinea. In the last country, it was found on trees in a mangrove, in a little-disturbed coastal forest and in a secondary forest in low hills. The above collections are already mentioned in Aptroot & al. (1995:25).

See Egea & Torrente (1995: 58) for a full description and photographs.

### **Catarraphia dictyoplaca** (Mont. et v. d. Bosch) Massal.

Central prov., Varirata National Park, path up to Gaires lookout, 147°22'E 9°27'S, 800 m, on *Gnetum*, 9.1987, *P. W. Lambley* (BM). Madang prov., foothills of Finisterre Range, along road Madang-Lae, km 39, 145°34'E 5°25'S, 230 m, rainforest on low hills, 8.1992, *E. Sérusiaux* 14301 (LG).

The ascospores of this species, the only one so far in the genus, are provided with mucilagenous attenuated appendages, 5-10 x 2-4  $\mu\text{m}$ , at both ends. These appendages were described as germinating tubes by Egea & Torrente (1993b:330) but the recently collected material shows that these structures are better interpreted as genuine appendages.

This species is known from Indonesia/Java and the Moluccas Islands, Luzon Island in the Philippines and Fiji. There is also an unpublished record from Malaysia/Sarawak (B. J. Coppins, comm. pers.). It is new for Papua New Guinea, where it has been found on both coasts, in virgin rainforests, at mid and low elevations.

See Egea & Torrente (1993b:329) for a full description and illustrations.

***Cresponea apiculata*** Egea, Sérusiaux & Torrente sp. nov.

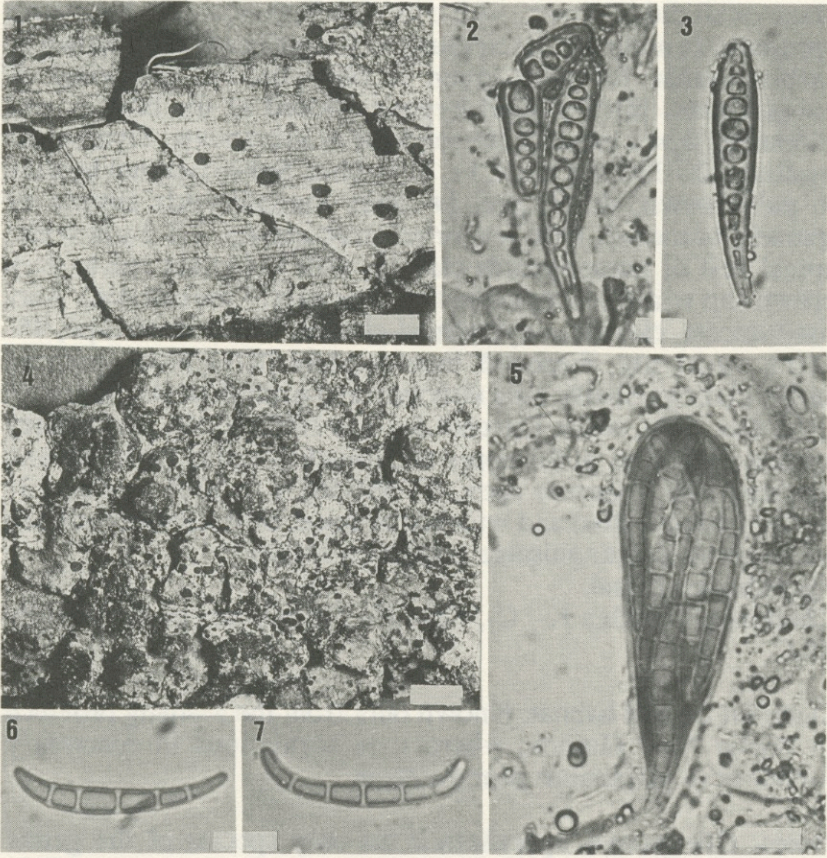
Fig. 1-3.

Thallus crustaceus, tenuis, effusus, pro maxima parte endophloeodes. Ascومات sessilia ad basin constricta, rotundata vel leviter irregularia, 0.5-1.3 mm in diam. Margo niger, crassiusculus, prominulus, plus minusve crenulatus. Discus primum rufescenti-pruinosis, demum nudatus et niger. Excipulum integrum carbonaceum. Paraphysoides simplices vel leviter ramosae, 1.5-2  $\mu\text{m}$  crassae. Asci fissitunicati, 95-110 x 19-21  $\mu\text{m}$ , octospori. Endoascus structura annulari amyloidea instructus. Ascosporae hyalinae, fusiformes, altera extremitate rotundata, altera attenuata, 45-56(-58) x (6-)7-9  $\mu\text{m}$ , 10-13-septatae, non halonatae.

Typus: Papua New Guinea, Madang prov., Manam island, near Bogia, in gardens near Budua, 145°00'E 4°07'S, 50 m, 7.1992, *E. Sérusiaux* 13250 (LG- holotypus; MUB, UPNG-isotypi).

Thallus crustose, thin, mostly endophloeodal, greenish, effuse, without prothallus.

Ascومات apothecioid, sessile, with a constricted base, 0.5-1.3 mm in diameter, scattered or crowded, roundish or slightly contorted through mutual pressure. Margin lecideoid, prominent, smooth or crenulate, persistent, glossy black, epruinose. Disc



***Cresponea apiculata*** Egea, Sérusiaux & Torrente (holotype). Figs 1-3. 1: General habit, scale = 3 mm; 2-3: Ascospores, scale = 10  $\mu$ m. ***Lecanactis olivascens*** Egea, Sérusiaux & Torrente (holotype). Figs 4-7. 4: General habit, scale = 3 mm; 5: Mature ascus with spores (after K/I treatment), scale = 10  $\mu$ m; 6-7: Ascospores, scale = 10  $\mu$ m.

plane or slightly convex, with a reddish brown pruina, becoming epruinose at maturity. Excipulum well developed, dark brown to carbonaceous, K+ dark green or olive brown, composed of conglomerate, thick-walled hyphae, closed at the bottom and extending down towards the medulla or substratum. Hymenium hyaline, 120-130  $\mu\text{m}$  thick, I+, K/I+ blue. Subhymenium hyaline to pale brown, 40-60  $\mu\text{m}$ , I+ blue. Paraphysoids simple or sparsely branched, with few or no anastomoses, 1.5-2  $\mu\text{m}$  wide; apical cell of paraphysoids clavate, with a distinct red to dark brown cap which is formed in the outer part of the cell wall. Asci fissitunicate, clavate to cylindrical-clavate, with a short stipe, 95-110 x 19-21  $\mu\text{m}$ , 8-spored, hemiamyloid (K/I+ blue), with an easily distinguishable ring structure and a small ocular chambre (*Abietina*-type, sensu Torrente & Egea 1989:31-32). Ascospores hyaline, fusiform, at the upper end roundish and at the lower end tapering into a narrow apex, 45-56(-58) x (6-)7-9  $\mu\text{m}$ , 10-13-septate, thick-walled and widened at septa, with a smooth surface and without a distinguishable gelatinous sheath.

Pycnidia not found.

Chemistry: Thallus K-, C-, KC-, P-. No substances detected by TLC.

Distribution and habitat: Known only from the Madang province in Papua New Guinea, where it is corticolous in secondary forests or in plantations near the coast.

Notes: ***Cresponea apiculata*** is the only species of the genus with ascospores tapering towards one end in a narrow apex. This character, together with the size and the widened septa of the ascospores, distinguish it from the closely related ***C. plurilocularis*** (Nyl.) Egea & Torrente which has shorter ascospores, and ***C. leprieurii*** (Mont.) Egea & Torrente which has ascospores with not or slightly widened septa (Egea & Torrente 1993c).

Additional specimens examined: Madang prov., Manam island, in plantation near Budua, 145°00'E 4°07'S, 50 m, on tree, 7.1992, A. Aptroot 30470, 30471 (herb. Aptroot). Big Pig island near Madang, 145°50'E 5°10'S, secondary forest on coral island, 1 m, on *Cocos*, 8.1992, A. Aptroot 31887 (herb. Aptroot) and *H. Sipman* 36188 (B).

### **Cresponea flava** (Vain.) Egea & Torrente

Madang prov., Karkar island, NW side, in gardens near the Karkar District School, 145°57'E 4°34'S, 10 m, on trunks of *Cocos* palms in garden, 2.1987, *H. Sipman* 24198 (B). Madang city, 145°45'E 5°15'S, 1 m, on trunks of trees in park, 7. 1992, *P. Diederich* 11756 (herb. Diederich). Big Pig island near Madang, 145°50'E 5° 10'S, 1 m, secondary forest on coral island, on *Cocos*, 8.1992, *A. Aptroot* 31880 (herb. Aptroot). Foothills of the Finisterre Range, along road Madang-Lae, km 39, 145° 34'E 5°25'S, 230 m, rainforest on low hills, 8. 1992, *P. Diederich* 12120 (herb. Diederich).

This species has a pantropical distribution, and was previously recorded from Papua New Guinea, in Karkar island (Madang prov., on the northern coast) and near Port Moresby (Central prov., on the southern coast).

See Egea & Torrente (1993c: 314) for a full description.

### **Cresponea leprieurii** (Mont.) Egea & Torrente

Eastern Highlands prov., Mount Gahavisuka Provincial park, 11 km N of Goroka, along trail to lookout, 2300-2450 m, 145°25'E 6°01'S, little disturbed mossy mountain forest, 8.1992, *H. Sipman* 35500 (B).

This species has a mainly Neotropical distribution, but is also recorded from Queensland (Australia). It is new for Papua New Guinea, where it was collected in a mossy mountain forest in the central cordillera.

See Egea & Torrente (1993c: 317) for a full description.

### **Cresponea leprieurioides** (Nyl.) Egea & Torrente

Madang prov., mouth of Boroi river near Borgia, N-point of island, 144°47'E 4°04'S, 1 m, mangrove forest, on *Rhizophora* or on unidentified tree, 7.1992, *A. Aptroot* 30422 (herb. Aptroot), *P. Diederich* 11671 (herb. Diederich), *E. Sérusiaux* 13203 (LG) and *H. Sipman* 34852 (B).

This species is easily identified by its leprarioid, C+ reddish thallus. It was only known from the type locality in Malacca (Malaysia/Malaya peninsula); it is therefore new for Papua New Guinea.

See Egea & Torrente (1993c: 319) for a full description.

**Cresponea macrocarpoides** (Zahlbr.) Egea & Torrente

Madang prov., Huon Peninsula, Finisterre range, Teptep village, 2500 m, 7.1992, *P. Diederich* 10972 (herb. Diederich).

Taxon characterized by its narrow ascospores with 7-10(-11) septa. It was only known from the type locality in Taiwan (Mt Arisan) and therefore is new for Papua New Guinea.

See Egea & Torrente (1993c: 320) for a full description and illustrations.

**Cresponea proximata** (Nyl.) Egea & Torrente

All specimens from the Madang prov. Near Bogia, 3 km on road from Nubia to Bunapas, 144°49'E 4°11'S, 10 m, swampland with medium forest, on tree, 7.1992, *A. Aptroot* 30278 (herb. Aptroot). Ibid., 5 km on road from Nubia to Bunapas, 144°48'E 4°11'S, 10 m, on fallen forest tree along the road, 7.1992, *H. Sipman* 34837 & 34838 (B). Near Bogia, coastal forest E of Boroi river mouth, 144°48'E 4°06'S, 1 m, rainforest c. 50-500 m from the beach, 7.1992, *P. Diederich* 11828 (herb. Diederich), *E. Sérusiaux* 13350 (LG) and *H. Sipman* 34948, 35017 (B). Ibid., mouth of Boroi river near Bogia, N-point of island, 144°47'E 4°04'S, 1 m, mangrove forest, on *Rhizophora* or on unidentified trees, 7.1992, *A. Aptroot* 30403, 30419 (herb. Aptroot), *P. Diederich* 11669, 11670, 11736 (herb. Diederich), *E. Sérusiaux* 13201 (LG) and *H. Sipman* 34870 (B). Laing Island in Hansa Bay, 144°52'E 4°10'S, 1 m, epiphytic in coastal forest on coral island, 7.1992, *E. Sérusiaux* 13089 (LG) and *H. Sipman* 34765 (B). Along road Bogia-Josephstal, near Tongu church, 144°56'E 4°27'S, 330 m, on trunk and in canopy of a felled tree in gardens, 7. 1992, *Diederich* 11468 (herb. Diederich). Manam island, on trail along riverbed 500 m W of Dugulaba, 145° 01'E 4°06'S, in clearing on lower border of mountain forest, 450 m, 7.1992, *A. Aptroot* 30498 (herb. Aptroot). Burbura logging site, c. 35 km NNW of Madang, 145°38'E 4°48'S, 50 m, virgin rainforest on low hills, 7.1992, on tree, *P. Diederich* 11944 & 11945 (herb. Diederich). Krangket island near Madang, 145°49'E 5°12'S, coastal forest on coral island, 1 m, on tree, 8. 1992, *A. Aptroot* 31850 (herb. Aptroot). Foothills of Finisterre Range, along road Madang-Lae, km 44, 145°33'E 5°26'S, 150 m, virgin floodplain forest along Nuru river, on sapling, 8.1992, *A. Aptroot* 31791 (herb. Aptroot) and *H. Sipman* 36108, 36150 (B). Gogol valley, Tgubi logging site, 30 km W of Madang, 145°28'E 5°08'S, 125 m, virgin



floodplain forest along Gogol river, on tree, 8.1992, A. Aptroot 32900, 32942 (herb. Aptroot), P. Diederich 12081 (herb. Diederich) and E. Sérusiaux 14250 (LG), and H. Sipman 36007 (B). Ramu valley Brahman, along road to Bundi, 145°21'E 5°46'S, 200 m, virgin lowland rainforest, on *Dipterocarpus* trees, 8.1992, A. Aptroot 31688 (herb. Aptroot).

This taxon has a pantropical distribution and is the most commonly encountered species in lowland virgin and secondary forests along the northern coast of Papua New Guinea. It was reported for the first time from this country by Aptroot & al. (1995:27).

See Egea & Torrente (1993c: 328) for a full description and illustrations.

### **Lecanactis abietina** (Ach.) Körber

Madang prov., Huon Peninsula, Finisterre range, Yupna valley, Teptep village, 146°33'E 5°57'S, 2300-2650 m, disturbed mountain forest with scattered old trees, 30.7.1992, E. Sérusiaux 13621 (LG).

Our specimen matches quite well the northern populations of this well-known species; however, the pruina of the pycnidia is C-, a character also found in specimens from the Pacific coast of North America.

This species is quite common in northern and central Europe, as well as along both coasts of North America. In the southern hemisphere, it is recorded from Tasmania and New Zealand. This is the first report for tropical areas.

See Egea & Torrente (1994: 56) and Tehler (1990: 2477) for a full description.

### **Lecanactis olivascens** Egea, Sérusiaux & Torrente sp. nov. Fig. 4-7.

Thallus crustaceus, griseoalbus, effusus, pro maxima parte epiphloeodes. Ascomata sessilia ad basin constricta, rotundata vel leviter irregularia, 0.4-0.6 mm lata, olivaceus. Paraphysoides ramosae et anastomosantes, usque ad 2  $\mu$ m crassae. Asci fissitunicati, 60-75 x 18-20  $\mu$ m, octospori. Endoascus structura

annulari amyloidea instructus. Ascosporae hyalinae, fusiformes, 32-36 x 3.5-5  $\mu\text{m}$ , 5-septatae, non halonatae.

Type: Papua New Guinea, Eastern Highlands prov., Mount Gahavisuka Provincial park, 11 km N of Goroka, 2300-2450 m, 145°25'E 6°01'S, 2300-2450 m, mountain forest, on tree, 8.1992, *A. Aptroot* 32433 (B-holotypus; LG, UPNG, herb. Aptroot-isotypi).

Thallus crustose, greyish white, effuse, continuous to slightly cracked, with smooth surface, surrounded by a thin, brown prothallus. In section up to c. 100  $\mu\text{m}$  thick, composed of a plectenchyma with a cretaceous medulla; hyphae 3-4  $\mu\text{m}$  in width, with numerous crystals on their outer walls.

Ascomata apothecoid, circular or slightly irregular in outline, 0.4-0.6 mm in diam., scattered or in groups of 4-5, sessile but with a constricted base, with a typically olivaceous disc, with a fluffy surface at high magnification (40 x). Margin thin, not raised above the level of the disc. Excipulum well developed, dark brown, K+ green-olive, especially at its outer margins, mainly composed of branched and interwoven hyphae, easily seen when mounted in a KOH solution. Hymenium 100-130  $\mu\text{m}$  high, I+ pale blue at the base, K/I+ blue. Subhymenium 20-30  $\mu\text{m}$  high, pale brown, K + slightly paler. Paraphysoids branched and anastomosing, 1.5-2  $\mu\text{m}$  wide in the hymenium; apical cells of paraphysoids slightly widened and richly branched, wrapped in a dark brown amorphous mass, K + olive-brown or greenish-olive, and irregularly protruding out of the disc surface and thus forming the fluffy surface seen at high magnification. Asci cylindrical-claviform, belonging to the *Abietina*-type (sensu Egea & Torrente 1994:21), 60-75 x 18-20  $\mu\text{m}$ , fissitunicate, 8-spored. Ascospores hyaline, fusiform, tapering towards one end, 32-36 x 3.5-5  $\mu\text{m}$ , 5-septate, slightly curved, thin-walled and without a distinct gelatinous sheath.

Pycnidia immersed or semi-immersed in the thallus, punctiform, 120-190  $\mu\text{m}$  high and 90-165  $\mu\text{m}$  wide; pycnidial wall brown in the upper parts, colourless at the base, 20-22  $\mu\text{m}$ . Conidia euseptate, 9-14 x 0.8-1  $\mu\text{m}$ , curved.

Chemistry: Thallus K-, C-, KC-, P-. No substances detected by TLC.

Distribution and habitat: **Lecanactis olivascens** has been found twice on trees, in the mountain forest, at 2300-2800 m in the central mountains of Papua New Guinea.

Notes: **Lecanactis olivascens** is easily distinguished by its typically olivaceous apothecial discs. Closely related species with 5-septate spores (**L. platygraphoides** and **L. spermato-spora** Egea & Torrente) never have such a colour. Moreover, there are slight but nevertheless significant differences in spores size: in **L. platygraphoides**, the spores measure 25-40(-45) x 3.5-5.5(-6)  $\mu\text{m}$  whereas in **L. spermato-spora**, they are 40-56 x 4-5(-5.5)  $\mu\text{m}$ .

Additional specimen examined: Simbu prov., Mount Wilhelm area, Bundi Gap, on road Keglsugl-Bundi, 145°09'E 5°48'S, 2800 m, subalpine forest remnants, 8.1992, *H. Sipman* 35585 (B).

### **Lecanactis platygraphoides** (Müll. Arg.) Zahlbr.

Madang prov., mouth of Boroi river near Bogia, E-side of island, 144°47'E 4°05'S, 1 m, mangrove forest, on *Rhizophora*, 7.1992, *A. Aptroot* 30451 (herb. Aptroot), *P. Diederich* 10723 (herb. Diederich) and *E. Sérusiaux* 13202 (LG). Madang prov., near Bogia, coastal forest E of Boroi river mouth, 144°48'E 4°06'S, 1 m, along the beach, epiphytic, 7.1992, *H. Sipman* (B). Madang prov., Huon Peninsula, Finisterre range, Yupna valley, Teptep village, 146°33'E 5°57'S, 2300-2650 m, disturbed mountain forest with scattered old trees, 7.1992, *P. Diederich* 10707, 10966, 10975 & 10978 (herb. Diederich), *E. Sérusiaux* 13601 (LG) and *H. Sipman* 35309 (B). Morobe prov., Gumi Divide, Head of Gumi Creek 35 km W of Bulolo 146°25'E 7°13'S, 1700 m, *Castanopsis*-Lauraceae dominated forest on side of ridge, crown of *Lithocarpus*, 10.1982, *H. Streimann* (CBG).

This species is known from the eastern coast of Australia and from Papua New Guinea. In the latter country, it is a rather rare epiphytic species, found from mangroves up to 2300-2650 m in mountain forest.

See Egea & Torrente (1994: 94) for a full description and photographs.

**Lecanographa laingiana** Diederich, Egea & Sipman

Madang prov., Laing Island in Hansa Bay, epiphytic in coastal forest on coral island, 7.1992, *H. Sipman* 34757 (B-holotype; UPNG-isotype), and *P. Diederich* 11652 (herb. Diederich). Madang prov., Krangket island near Madang, 145°49'E 5°12'S, coastal forest on coral island, on tree, 1 m, 8.1992, *A. Aptroot* 31858 (herb. Aptroot).

This species has just been described (Aptroot & al. 1995:32-34) from Laing Island, and has eventually been found in a further collection, also made in a coastal forest on a coral island near Madang.

See Aptroot & al. (1995:32-34 and fig. 2 d & d' and 6) for a full description and illustrations.

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