



## NEOPHYLLIS <sup>1</sup>

Gintaras Kantvilas <sup>2</sup>

*Neophyllis* F.Wilson, *J. Linn. Soc., Bot.* 28:372 (1891).

Type: *N. melacarpa* (F.Wilson) F.Wilson

Thallus small-squamulose to minutely coralloid-fruticose. Photobiont a unicellular green alga with globose cells 7–11 µm diam. Ascomata apothecia, black, glossy, globose, immarginate, subsessile to shortly stipitate. Proper exciple hyaline within, composed of radiating, branched and anastomosed hyphae in a gel matrix, soon reflexed and excluded. Hypothecium massive, diffusely dark brown to hyaline. Hymenium hyaline, not interspersed, overlain by a dark chocolate-brown, K-, N+ reddish epithecium. Asci cylindrical, 8-spored, of the *Neophyllis*-type: outer wall intensely amyloid; tholus well developed, amyloid, penetrated by a darker-staining tube structure, lacking an ocular chamber. Paraphyses robust, mainly simple and with only occasional branches and anastomoses, sometimes capitate. Ascospores simple, hyaline, non-halonate, thin-walled, ellipsoid. Conidiomata pycnidia, laminal, subglobose; conidia bacilliform. Chemistry: dominated by the dibenzofuranes grayanic and/or melacarpic acids.

A genus of two, characteristically Australasian species, initially included in the family Cladoniaceae but now, on the basis of DNA sequence data and the ontogeny of the fruiting body, classified in the family Sphaerophoraceae. Like the related *Austropeltum*, *Neophyllis* differs from other members of this family by not producing mazaedia, with the developing ascospores retained in asci that are arranged within a hymenium. Chemical data are essential for distinguishing the species. Grayanic acid appears about half-way up TLC plates as a UV+ pale blue spot before heating, and as a pale pinkish brown, UV+ purple spot after acid spray and heating. Melacarpic acid appears on TLC plates as a faster UV+ pale blue spot before heating, and as a pale blue-grey, UV+ purple spot after heating.

Key references: Döring *et al.* (1999); Wedin & Döring (1999); Döring & Wedin (2000); Kantvilas (2022).

- 1 Grayanic acid present, frequently with additional melacarpic and/or fumarprotocetraric acids; thallus forming dense swards or cushions, composed of apically divided squamules with the ultimate segments terete and coralloid, or with the thallus consisting entirely of terete lobes; common on wood, but also found on moist peaty or sandy soil

**1 *N. melacarpa***

- Melacarpic acid present as the sole major compound; thallus composed of usually rather dispersed, ascending squamules with slightly thickened, rounded apices; terete projections often present but not dominating the thallus; rare on coarse, sandy or gravelly soil over granite, or directly on rock

**2 *N. pachyphylla***

### **1 *Neophyllis melacarpa*** (F.Wilson) F.Wilson

*J. Linn. Soc., Bot.* 28: 372 (1891); —*Phyllis melacarpa* F.Wilson, *Victorian Nat.* 6: 68 (1891); *Phyllopsora melano-carpa* Müll.Arg., *Hedwigia* 34: 28 (1895); *Gymnoderma melacarpum* (F.Wilson) Yoshim., *J. Jap. Bot.* 48: 287 (1973).

Thallus squamulose to diminutively coralloid-fruticose, forming extensively spreading colonies or contiguous tufts, swards or cushions 5–40 mm wide. Squamules bright green to olive when fresh and moist,

1 This work can be cited as: Kantvilas G (2023). *Neophyllis*, **version 2023:1**. In MF de Salas (Ed.) *Flora of Tasmania Online*. 3 pp. (Tasmanian Herbarium, Tasmanian Museum and Art Gallery: Hobart). <http://flora.tmag.tas.gov.au/lichen-genera/neophyllis/>

2 Tasmanian Herbarium, Tasmanian Museum & Art Gallery, PO Box 5058, UTAS LPO, Sandy Bay, TAS 7005, Australia.

drying to a yellowish green to brownish olive, glossy, commonly dorsiventrally flattened at the base, with a pale lower surface, ascending or decumbent, to 15 mm long, 0.3–0.6(–1) mm wide, pinnately or digitately branched, with the ultimate segments terete, very fragile and brittle, to c. 0.15 mm wide, sometimes segmented by slight constrictions, or with the terete segments arising directly from the upper surface of the squamules, less frequently with all parts entirely coralloid-terete, erect, 5–10 mm tall, to 0.3(–0.5) mm wide, sparsely branched and entangled in mats or cushions. Apothecia to 1(–1.4) mm wide, subsessile and nestling amongst the squamules or elevated above the thallus on terete stalks to c. 3 mm tall. Hymenium 50–70  $\mu\text{m}$  thick; asci 40–50  $\times$  10–15  $\mu\text{m}$ ; paraphyses 2–3  $\mu\text{m}$  thick. Ascospores (8–)9–10.9–12.5(–13)  $\times$  4–4.8–6  $\mu\text{m}$ . Conidiomata not seen.

Chemistry: grayanic acid, melacarpic acid ( $\pm$ ), fumarprotocetraric acid ( $\pm$ ), plus biosynthetically related compounds such as congryanic acid or 4-O-demethylgrayanic acid in trace amounts only; medulla K–, KC–, C–, P– or + yellowish to orange-red, UV+ white.

Common and widespread across a wide range of rainforest, sclerophyll forest, woodland and heathland vegetation; also common in south-eastern Australia and New Zealand. In shaded forest situations, this species is mostly found on wood, especially on rotting logs, buttresses and stumps of old eucalypts. The thallus is usually bright green (when fresh), composed of ascending or decumbent, dorsiventral,  $\pm$  pinnately branched squamules, and forms extensive, spreading swards, potentially covering up to several square metres. The coralloid extensions of the squamules can be scattered or very abundant to the extent of dominating the entire thallus. In more exposed, sunny situations, the species is found mainly on soil. Here the thallus tends to be more olive-coloured and comprises a dense cushion of erect, terete, coralloid lobes. This form is particularly common in high rainfall area of the west and south-west, where it is found on soil in crevices of quartzitic boulders, or on the ground in buttongrass moorland or in alpine or subalpine heathland.

Mt Wellington, 42°53'S 147°15'E, 1963, *P.W. James s.n.* (BM, HO); St Columba Falls, 41°20'S 147°55'E, 300 m, 1968, *G.C. Bratt 68/1307* (HO); Strathgordon Road, near Boyd River, 400 m, 1984, *G. Kantvilas 493/84* (distributed as *A. Vězda: Lich. Sel. Exsicc.:2020*) (HO).

## 2 *Neophyllis pachyphylla* (Müll.Arg.) Gotth. Schneid.

*Biblioth. Lichenol.* 13: 168 (1980) [1979]; —*Psora pachyphylla* Müll.Arg., *Flora* 70: 319 (1887); *Lecidea pachyphylla* (Müll.Arg.) Zahlbr., *Cat. Lich. Univ.* 3: 888 (1925).

Thallus small-squamulose, forming spreading colonies. Squamules olive-green to brownish, glossy, 1–4 mm long, 0.2–0.6 mm wide, dorsiventrally flattened, with a pale lower surface, ascending or, more rarely, decumbent, simple or sparsely branched, with the apices remaining entire, rather rounded and flattened, a little thickened and tongue-like, occasionally developing terete,  $\pm$  erect segments 0.2–0.3(–0.5) mm wide, dispersed or forming mats. Apothecia to 1.5(–1.7) mm wide, subsessile and nestling amongst the squamules. Hymenium 55–65  $\mu\text{m}$  thick; asci 35–55  $\times$  12–15  $\mu\text{m}$ ; paraphyses 2–3  $\mu\text{m}$  thick. Ascospores 9–11.2–13.5(–14)  $\times$  4.5–5.2–6(–6.5)  $\mu\text{m}$ . Conidiomata not seen.

Chemistry: melacarpic acid; medulla K–, KC–, C–, P–, UV $\pm$  whitish.

Rare and found exclusively directly on rock or on coarse sandy or gravelly soil in drainage channels on large rock outcrops of granite in open sclerophyll woodland. Similarly rare in Victoria and New South Wales. New Zealand specimens under this name may represent a distinct taxon. The critical feature that distinguishes this species from *N. melacarpa* is the presence of melacarpic acid as the sole major metabolite. When well developed, *N. pachyphylla* is rather easy to recognise, being a more robust species, with thicker squamules that do not form caespitose clumps. The ascending squamules sometimes resemble tiny tongues, with their slightly thickened, rounded apices. Terete projections are sometimes formed on the squamules, but they do not dominate the thallus, nor are they as brittle as in *N. melacarpa*.

Mt Cameron, 40°59'S 147°56'E, 550 m, 1995, G. Kantvilas 41/95 (HO); The Hazards, near Wineglass Bay Lookout, 42°09'S 148°17'E, 180 m, 2005, G. Kantvilas 188/05 & J. Jarman (HO); northern ridge of Mt Stronach, 41°10'S 147°34'E, 400 m, 2021, G. Kantvilas 360/21 (HO).

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