



PROTOPARMELIA ¹

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Protoparmelia M.Choisy, *Bull. Soc. Bot. France* 76: 523 (1929).

Type: *P. badia* (Hoffm.) Hafellner

Thallus crustose, typically a shade of olive- or grey-brown, with or without isidia, usually with a well-defined cortex of interwoven, short-celled, anticlinal hyphae c. 2 µm thick, overlain by a hyaline epicortex. Photobiont a unicellular green alga with ± globose cells 6–16 µm wide. Ascromata apothecia, lecanorine. Disc dark brown to brown-black, epruinose. Thalline margin persistent, corticate, cupulate, with algal cells extending beneath the hypothecium. Hypothecium hyaline. Hymenium hyaline, amyloid, not interspersed, overlain by an olive-brown epihymenial layer unchanged in K. Asci clavate, 8-spored, approximating the *Lecanora*-type: with a well-developed, amyloid tholus, penetrated entirely by a non-amyloid, cylindrical to barrel-shaped *masse axiale*; ocular chamber mostly absent or short and blunt. Paraphyses robust, sparingly branched, distinctly septate, with the apices expanded and capped with a gelatinous, usually brown hood. Ascospores simple, hyaline, non-halonate, thin-walled, fusiform-ellipsoid. Conidiomata pycnidia, immersed. Conidia bacilliform. Chemistry: depsidones.

A cosmopolitan genus of approximately 25 species found on rock, bark or wood; some taxa are lichenicolous. It is readily distinguished from the superficially similar genus *Lecanora* by the olive-brown thallus. Whereas some authors have included the genus in the family Parmeliaceae, chiefly on account of the ontogeny of its apothecia, DNA sequence data suggest that these relationships are yet to be fully resolved. Using molecular methods, Singh *et al.* (2018) studied some species of *Protoparmelia*, erecting the segregate genus *Neoprotoparmelia*, resurrecting *Maronina* (not found in Tasmania) and subdividing the widespread *P. isidiata* into several, geographically disjunct species. This work is based on limited data and offers no convincing morphological or anatomical support for the taxonomic conclusions, and consequently is not followed here.

Key References: Aptroot *et al.* (1997); Arup *et al.* (2007); Elix (2009a); Elix & Kantvilas (2009); Singh *et al.* (2018).

1	Thallus saxicolous, mostly on high mountains, containing lobaric acid	1 <i>P. badia</i>
	Thallus corticolous in lowland, coastal areas, containing alectoronic acid	2
2(1)	Thallus isidiate	2 <i>P. isidiata</i>
	Thallus not isidiate	3 <i>P. pulchra</i>

1 *Protoparmelia badia* (Hoffm.) Hafellner

Beih. Nova Hedwigia 79: 292 (1984); —*Verrucaria badia* Hoffm., *Flecht. Deutschl.*: 182 (1796).

Thallus rimose-areolate, rugose to bullate, glossy olive-brown, to 2 mm thick, forming irregular patches to 10 cm wide, lacking isidia. Apothecia 0.5–2 mm wide, numerous, often crowded and squashed together,

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

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

slightly basally constricted to adnate; thalline margin glossy olive-brown, entire or sometimes crenulate, abraded and pale greyish; disc glossy red-brown to black-brown, concave, plane or undulate. Hymenium 50–70 µm thick; asci 35–55 × 10–18 µm; paraphyses 2–3.5 µm thick, with apices brown and expanded to 4–7 µm. Ascospores narrowly ellipsoid to fusiform with acute apices, (8–)9–11.8–15 × 3.5–4.5–6 µm. Pycnidia visible as black specks on the thallus surface; conidia 8–10 × 1–1.5 µm.

Chemistry: lobaric acid; cortex N–; medulla K–, KC± fleeting pink, C–, P–, UV+ white.

Widespread on rocks in cold environments on most continents; locally abundant in Tasmania on exposed boulders on the highest mountains and plateaux, especially on dolerite on the Central Plateau and the north-eastern highlands. Occasional occurrences of this species at lower elevations, especially in the east, are interpreted as relict of past colder climates. This is a very distinctive species, easily recognised by its glossy olive thallus and abundant lecanorine apothecia. It is somewhat similar to the minutely foliose to subcrustose *Xanthoparmelia stygiodes*, which has a N+ blue-green cortex and contains fumarprotocetraric acid (medulla P+ red), or to *Ramboldia petraeoides*, which has biatorine apothecia and contains norstictic acid (medulla and microscope squashes K+ yellow→red); all three species can occur together.

Mount Arrowsmith, 42°13'S 146°04'E, 960 m, 1964, G.C. Bratt & J.A. Cashin 1780 (HO); Table Mountain, 42°14'S 147°08'E, 1095 m, 2001, G. Kantvilas 928/01 (HO); Halls Buttress, 41°50'S 146°18'E, 1470 m, 2002, G. Kantvilas 90/02 (HO).

2 *Protoparmelia isidiata* Diederich, Aptroot & Sérus.

In A. Aptroot et al., *Biblioth. Lichenol.* 64: 146 (1997); *Neoprotoparmelia isidiata* (Diederich, Aptroot & Sérus.) GarimaSingh, Lumbsch & I.Schmitt in G. Singh et al., *MycoKeys* 44: 39 (2018).

Pertusaria alectoronica var. *thiophanica* Kantvilas, Elix & A.W.Archer, in A.W. Archer & J.A. Elix, *Australas. Lichenol.* 65: 31 (2009). Type: Tasmania, Flinders Island, summit of Mt Killiecrankie, 39°49'S 147°52'E, 310 m, on *Banksia marginata* in sheltered scrub among large boulders, 22 January 2006, G. Kantvilas 28/06 (holo—HO!).

Thallus olive-brown, slightly glossy, isidiate. Isidia very numerous, dominating the entire thallus, densely crowded together in irregular cushions 1–3 mm wide, separated by deep cracks, simple and cylindrical, becoming densely coralloid-branched, with the apices ± swollen and becoming dark brown to black-tipped, 0.2–2.0 mm tall, 0.08–0.18 mm wide. Apothecia and pycnidia not seen.

Chemistry: alectoronic acid (major), thiophanic acid (minor), methyl-pseudoalectoronate (trace), and beta-alectoronic acid (trace); medulla K–, KC+ fleeting red, C–, P–, UV+ whitish.

Known in Tasmania from a single collection from dry sclerophyll scrub over granite. First described from New Guinea, the name *P. isidiata* was widely applied in Australia (with records from the Northern Territory and New South Wales), until it was subdivided into several, essentially geographically disjunct taxa and included in the genus *Neoprotoparmelia* by Singh et al. (2018). The reasons for the split are considered unconvincing, hence a conservative application of *P. isidiata* is maintained here.

3 *Protoparmelia pulchra* Diederich, Aptroot & Sérus.

In A. Aptroot, P. Diederich, E. Sérusiaux & H.J.M. Sipman, *Biblioth. Lichenol.* 64: 147 (1997); *Neoprotoparmelia pulchra* (Diederich, Aptroot & Sérus.) GarimaSingh, Lumbsch & I.Schmitt, in G. Singh et al., *MycoKeys* 44: 45 (2018).

Thallus very thin, inconspicuous, composed of dispersed areoles to 0.5 mm wide and 100 µm thick, olive-brown when moist, pale greyish when dry, forming irregular, undelimited patches to 10 mm wide; isidia lacking; cortex poorly developed. Apothecia 0.5–1.2 mm wide, scattered, basally constricted; thalline margin glossy olive-brown, entire; disc glossy red-brown, plane to undulate. Hymenium 40–50 µm thick; asci 30–45 × 11–15 µm; paraphyses 2–3.5 µm thick, with apices expanded to 3–5 µm but not pigmented. Ascospores narrowly ellipsoid with rounded or acute apices, (9–)10–11.3–13.5 × 3–3.6–4 µm. Pycnidia scattered; conidia 7–9 × 0.8 µm.

Chemical composition: alectoronic acid; the thallus is too thin for reliable spot tests.

Widely scattered on the Australian mainland and in the high mountains of New Guinea. It is rare in Tasmania, occurring on the bark of small trees and shrubs in coastal scrub. This distinctive species is recognised by the olive-brown, lecanorine apothecia. Somewhat similar, and occurring in the same habitats, are *Maronea constans*, which has polyspored asci of the *Teloschistes*-type, and *Ramboldia brunneocarpa*, which has biatorine apothecia and contains norstictic acid (detectable by the K⁺ yellow→red reaction of microscope squashes).

Freycinet Peninsula, Sleepy Bay, 42°08'S 148°19'E, 5 m, 1999, G. Kantvilas 31/99 (HO); Mt Parsons, 42°09'S 148°19'E, 335 m, 2020, G. Kantvilas 158/20 (HO); Cape Huay, 43°08'S 148°00'E, 110 m, 2021, G. Kantvilas 465/21 (HO).

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