Flora of Tasmania online

MYCOBLASTUS [1]

Gintaras Kantvilas [2]

Mycoblastus Norman, *Conat. Praem. Gen. Lich.*: 25 (1852).

Type: *M. sanguinarius* (L.) Norman

Thallus crustose, ecorticate, with or without soredia; prothallus often present, effuse, bluish grey to brownish. Photobiont a unicellular green alga with globose to irregularly subglobose cells 5–16 µm wide (? *Dictyochloropsis*). Ascomata apothecia, superficial, mostly subglobose and basally constricted, soon immarginate. Disc markedly convex, black to brown-black, rarely pale brownish, often ± glossy, epruinose. Proper exciple soon reflexed and excluded, in section annular, composed of radiating, branched and anastomosed, heavily conglutinated hyphae 1–4 µm thick, expanding to 3–5 µm thick at the outer edge. Hypothecium hyaline to variously pigmented, frequently inspersed with granules and droplets. Hymenium hyaline to variously pigmented, amyloid, with the reaction restricted to the asci. Paraphyses 1.5–4 µm thick, richly branched and anastomosed, lax or conglutinated in K, sometimes moniliform in the upper part; apices usually expanded to 3–6(–15) µm, with the ultimate cells coated with pigment and a gelatinous sheath. Asci elongate-clavate, of two distinct types: either *Mycoblastus*-type (single-spored, with a thick amyloid tholus, a small, ± cylindrical ocular chamber and a weakly amyloid *masse axiale* in the form of a pale border, and a prominent amyloid cap composed of compacted gel); or usually 2-spored and approximating the *Biatora*- or *Lecidella*-types (with a well-developed, amyloid tholus, pierced totally or almost so by a barrel-shaped to conical, weakly amyloid *masse axiale* with a usually more intensely amyloid border adjacent to a blunt to beak-like ocular chamber, and lacking any thick, intensely amyloid cap). Ascospores simple or very rarely 1-septate, hyaline, non-halonate, broadly ellipsoid to cylindrical (when 1/ascus) or ovate to broadly ellipsoid (2-spored species); wall double, 1–5(–12) µm thick, with a thin inner wall and a thick, gelatinous outer wall. Conidiomata pycnidia, rarely seen in Tasmanian species. Conidia bacilliform. Chemistry: atranorin, together with fatty acids, characterises the "core" of the genus (the *Mycoblastus sanguinarius* group); perlatolic acid is the most common compound in Southern Hemisphere species, sometimes occurring together with fumarprotocetraric acid-type substances.

Mycoblastus is a visually striking, conspicuous genus of crustose lichens, comprising about 20 species that occur mostly on organic substrata, such as bark, wood, humus or peaty turf. It is widely distributed in cool, moist habitats in both hemispheres, although very few species are shared between the Northern and Southern temperate zones. The genus has had a chequered taxonomic history and is currently accommodated within its own family, Mycoblastaceae, together with *Calvitimela*, *Tephromela* and *Violella* (not recorded for Australasia). The genus appears to be divisible into two distinct groups, the *M. sanguinarius* group and the *M. dissimulans* group, distinguished by their asci, ascopores and thallus chemistry, although this has yet to be explored using molecular methods. Whether any Australasian taxa could be included in the Northern Hemisphere genus *Violella* also needs to be considered.

The genus is rich in colourful apothecial pigments that are critical in recognising the species. The two major ones are: a blue-green pigment (*cinereorufa*-green) that is N+ crimson and olive-green, grey-green or ± unchanged in K; and an intensely violet pigment (*fucatus*-violet) that is K+ vivid turquoise-green, and slowly

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turns orange and gradually fades to colourless in N. These two pigments can occur separately or together. When overlying each other or intermixed, the resulting colour is often a deep indigo-blue. In doubtful cases, confirmation of which pigment is present can be achieved using the two main reagents: even minute quantities of *fucatus*-violet will produce a vivid K+ turquoise-green, whereas any trace of *cinereorufa*-green is N+ crimson. Additional pigments present include yellow-orange hybocarpone, which reacts K+ intense red, and secalonic acid, which gives a K+ orange-yellow reaction in some species; a deep red subapothecial pigment (mysaquinone) is seen in *M. sanguinarioides*.

Key references: James & Watson (2009); Kantvilas (2009).

1	Thallus not sorediate	2
	Thallus sorediate	5
2(1)	Asci 1-spored; ascospores ellipsoid to oblong, usually >60 µm long; apothecia frequently with small patches of reddish pigment beneath; thallus containing atranorin	7 M. sanguinarioides
	Asci at least 2-spored; ascospores ellipsoid to ovate, usually <60 µm long; red pigments not present beneath the apothecia; thallus lacking atranorin but containing perlatolic acid	3
3(2)	Thallus P+ orange-red (containing additional physodalic acid)	4 M. disporus
	Thallus P– (physodalic acid lacking)	4
4(3)	Upper part of hymenium containing *cinereorufa*-green and/or *fucatus*-violet pigments; hypothecium hyaline to pale yellow, usually K+ yellowish or yellow-orange; containing perlatolic acid ± fatty acids	5 M. dissimulans
	Upper part of hymenium with *cinereorufa*-green pigment only; hypothecium vivid yellow, K+ intense blood-red; containing hybocarpone in addition to perlatolic and fatty acids	6 M. kalioruber
5(1)	Soralia P+ orange-red (containing virensic acid in addition to perlatolic acid); soredia farinose	2 M. campbellianus
	Soralia P– (containing perlatolic acid, ± fatty acids); soredia granular	6
6(5)	Soredia usually whitish or at least paler than the thallus, occurring in discrete soralia, becoming diffuse and confluent only in later stages of development; upper part of hymenium containing both *cinereorufa*-green and/or *fucatus*-violet pigments; rare and typically growing on soil or turf	1 M. bryophilus
	Soredia concolorous with the thallus, not in discrete soralia, arising from cracks and soon becoming scattered and confluent, sometimes forming a granular crust; hymenium containing *cinereorufa*-green only; very common and widespread on wood and bark, rarely also on rocks	3 M. coniophorus

1 Mycoblastus bryophilus Imshaug ex Kantvilas

Lichenologist 41: 157 (2009).

Thallus whitish cream, rarely greenish or brownish grey, matt, composed of scattered, crowded or contiguous granules, areoles or nodules mostly 0.2–1.5 mm wide, smooth or abraded, becoming sorediate; soralia concolorous with the thallus or paler, rather erumpent, usually ± discrete, c. 0.5–2.5 mm wide; soredia very coarsely granular, sometimes fusing in irregular patches to 10 mm wide but not forming a continuous sorediate crust. Apothecia rare, 0.3–1.5 mm diam. Hypothecium 140–250 µm thick, hyaline to pale yellow-brown, dilute yellowish in K, inspersed with oil droplets 2–12 µm wide, subtended by a hyaline to pale yellowish subhypothecium, intensifying yellow in K, and a band of *cinereorufa*-green pigment. Hymenium to c. 150 µm thick, hyaline to pale yellowish, likewise inspersed with oil droplets, pigmented in the upper part with a thick layer of *cinereorufa*-green pigment that overlies additional *fucatus*-violet pigment; asci 2-spored, approximating the *Biatora*- or *Lecidella*-types, 130–150 × 40–50 µm. Ascospores ovate to broadly ellipsoid, 50–*58.7*–66 × 26–*34.5*–40 µm. Pycnidia not seen.

Chemistry: perlatolic acid, rangiformic acid (± trace), norrangiformic acid (± trace) and norcaperatic acid (± trace); thallus K–, KC–, C–, P–, UV± whitish.

Uncommon, mainly on bryophyte turfs, peaty soil, litter, soft tree bark or the rotting bases of plant tussocks in cold, windswept, treeless habitats; also recorded from Campbell Island where it seems to be abundant.

This species is very similar to *M. dissimulans* with respect to thallus chemistry and apothecial pigments, but it is distinguished by the presence of soredia. Terricolous thalli with discrete, prominent, erumpent soralia can resemble sterile *Dibaeis arcuata* (Stirt.) Kalb & Gierl that sometimes grows in similar habitats.

King William Saddle, 42°13′S 146°06′E, 840 m, 1984, *G. Kantvilas 177/84 & P.W. James* (BM, HO); c. 2 km SE of Lake Emmett, 42°38′S 146°33′E, 980 m, 1990, *G. Kantvilas 151/90* (HO); Mt Wedge Track, 42°51′S 146°17′E, 1000 m, 2002, *G. Kantvilas 622/02* (HO).

2 Mycoblastus campbellianus (Nyl.) Zahlbr.

Cat. Lich. Univ. 4: 3 (1926); —*Lecidea campbelliana* Nyl., *Compt. Rend. Hebd. Séances. Acad. Sci.* 83: 90 (1876).

Thallus whitish, cream, grey-brown or dull greyish, sometimes patchily blue-grey due to the underlying prothallus, matt, ± continuous, smooth or a little uneven, generally deeply cracked, 40–180 µm thick, sorediate; soralia white, 0.2–0.5(–1.2) mm wide, initially discrete, speck-like or sometimes tuberculate, soon becoming diffuse or confluent and spreading unevenly across the thallus; soredia farinose to granular. Apothecia 0.3–0.5(–0.8) mm diam. Hypothecium 85–200 µm thick, hyaline to pale yellowish, intensifying in K and N, sometimes yellow-orange, inspersed with minute crystals that mostly dissolve in K, occasionally with a subhypothecial band of *cinereorufa*-green pigment. Hymenium 80–140 µm thick, inspersed with oil droplets and minute granules that mostly dissolve in K, entirely or in the upper part bright *cinereorufa*-green pigmented; asci 2(–4)-spored, approximating the *Biatora*- or *Lecidella*-types, 70–98 × 24–47 µm. Ascospores ovate to broadly ellipsoid, 27–*38.7*–51(–56) × 17–*22.4*–29(–32) µm. Pycnidia not seen.

Chemistry: perlatolic acid, hyperperlatolic acid, virensic acid and protocetraric acid (±); very rarely with additional caperatic or norcaperatic acids; thallus and soralia K–, C–, KC–, P+ orange-red, UV+ white.

Widely distributed in cool to cold climates across the Southern Hemisphere, including New Zealand, Campbell Island, Macquarie Island, the highlands of south-eastern Australia, Staten Island, Tierra del Fuego and southern Chile. It is common in Tasmania and found on bark and wood in a wide range of vegetation types from coastal to highland elevations, including rainforest, wet eucalypt forest, wet scrub, subalpine heathland and alpine communities. The farinose soredia and chemical composition, readily confirmed by the P+ orange-red reaction of the soralia, are diagnostic.

King William Saddle, 42°13′S 146°06′E, 840 m, 1984, *G. Kantvilas 173/84 & P. James* (BM, HO); Boyd Lookout, 42°49′S 146°21′E, 2006, *G. Kantvilas 282/06* (HO); Mt Young, 41°22′S 147°57′E, 850 m, 2008, *G. Kantvilas 233/08* (HO).

3 Mycoblastus coniophorus (Elix & A.W.Archer) Kantvilas & Elix

In G. Kantvilas, *Lichenologist* 41: 163 (2009); —*Pertusaria coniophora* Elix & A.W.Archer, *in* J.A. Elix, A. Aptroot & A.W. Archer, *Mycotaxon* 64: 20 (1997).

Thallus whitish cream to pale yellowish, occasionally tinged a little greyish green, 40–350 µm thick, continuous, smooth to deeply cracked to rather scurfy-areolate, sometimes rather verruculose-lumpy, sorediate; soredia concolorous with the thallus, usually coarsely granular, more rarely farinose, arising from cracks in the thallus or at the edges of areoles, at length spreading across the thallus and sometimes forming a sorediate crust to c. 1 mm thick. Apothecia 0.5–1.5(–2) mm diam. Hypothecium 140–200 µm thick, hyaline to pale yellow brown, ± unchanged or intensifying yellow in K and N, densely inspersed with oil droplets 3–20 µm wide and minute granules mostly insoluble in K, subtended by a pale yellow-brown subhypothecium, intensifying yellowish in N, K+ intense yellow to orange-yellow, occasionally with a band of *cinereorufa*-green pigment beneath. Hymenium 110–170 µm thick, hyaline to pale yellow-brown, intensifying yellowish in K, inspersed with granules and oil droplets as in the hypothecium, in the upper part densely *cinereorufa*-green pigmented, sometimes with the pigment diffusing into the whole hymenium; asci 2-spored, approximating the *Biatora*- or *Lecidella*-types, 90–125 × 30–44 µm. Ascospores broadly ellipsoid to ovate, (27–)29–*43.1*–60 × 17–*24.2*–34(–38) µm. Pycnidia not seen.

Chemistry: perlatolic acid, frequently accompanied by either or both of caperatic acid and norcaperatic acid, often only in trace concentrations; secalonic acid sometimes detectable by TLC; thallus (particularly sorediate areas) K–, C–, KC–, P± weak orange, UV+ white.

Very common and widespread, mainly at lower elevations, and especially in the eastern parts of the island; also recorded from southern Chile, Juan Fernandez, Auckland Island, Macquarie Island and south-eastern Australia. It is found mostly in rainforest, sclerophyll forest and wet scrub, growing on smooth, papery or rough bark; a particularly favoured habitat is rotting logs. It rarely also colonises damp sheltered rocks. This species is characterised by the sorediate thallus containing perlatolic acid, the 2-spored asci and by the presence of *cinereorufa*-green pigment in the apothecia. Although typically coarsely granular sorediate, occasional specimens are ± entirely farinose sorediate and may well represent a distinct taxon.

Cox Bight, West Beach, 43°29′S 146°13′E, sea-level, 1985, *G. Kantvilas 97/85* (BG, BM, HO, MSC); Flinders Island, Mt Killiecrankie, 39°49′S 147°52′E, 310 m, 2006, *G. Kantvilas* 37/06 (HO); Crayfish Creek, 40°51′S 145°24′E, 5 m, *G. Kantvilas 408/21* (HO).

4 Mycoblastus disporus (C.Knight) Kantvilas

Lichenologist 41: 157 (2009); —*Megalospora dispora* C.Knight, *Trans. New Zealand Inst.* 12: 378 (1880).

Thallus whitish, matt, rather waxy, ± continuous, smooth or more commonly unevenly lumpy and verruculose, cracked, to 300 µm thick, not sorediate. Apothecia 0.5–1.5 mm diam. Hypothecium 100–160 µm thick, hyaline, unchanged in K and N, usually inspersed with oil droplets 2–10 µm diam., subtended by a hyaline to pale straw-coloured subhypothecial band likewise inspersed, unchanged or intensifying yellowish in K. Hymenium 150–180 µm thick, inspersed with oil droplets, in the upper part with a thick band of *cinereorufa*-green pigment, with or without additional *fucatus*-violet pigment, with the pigments diffusing down between the asci; asci (1–)2(–4)-spored, approximating the *Biatora*- or *Lecidella*-types, 100–150 × 36–50 µm. Ascospores ovate to broadly ellipsoid, 40–*61.5*–66(–70) × 18–*34.3*–38 µm. Pycnidia not seen.

Chemistry: perlatolic acid, physodalic acid, with traces of protocetraric acid; thallus K–, KC–, C–, P+ orange-red, UV+ faint whitish.

Rare in Tasmania, where it has been collected as an epiphyte at high elevations; also known from New Zealand. Its chemical composition, namely the presence of additional physodalic and protocetraric acids, is diagnostic.

Mt Wedge, 42°51′S 146°18′E, 1140 m, 1981, *G. Kantvilas 880/81* (HO); unnamed lake, 1.5 km W of Chalice Lake, 41°53′S 146°08′E, 1180 m, 1999, *G. Kantvilas 66/99* (HO).

5 Mycoblastus dissimulans (Nyl.) Zahlbr.

Cat. Lich. Univ. 4: 3 (1926); —*Lecidea dissimulans* Nyl., *Ann. Sci. Nat. Bot.*, sér. 4, 3: 167 (1855).

Thallus whitish, cream or dull olive-grey, in part blue-grey due to the underlying prothallus, or sometimes very thin and ± inapparent, 25–250(–500) µm thick, matt to rather waxy and glossy, ± continuous and smooth to rather deeply cracked and areolate, at times rather warty-papillate, sometimes becoming abraded and scurfy but never sorediate. Apothecia 0.3–1.5(–1.8) mm diam. Hypothecium 90–200(–350) µm thick, hyaline to pale yellowish brown, intensifying yellowish in K and N, inspersed with crystals, granules and oil droplets 3–10 µm wide that partly dissolve in K or N, subtended by a yellowish to orange subhypothecium, usually K+ yellow to yellow-orange, N+ deep yellow, typically also with a *cinereorufa*-green band. Hymenium 100–150(–180) µm thick, likewise densely inspersed with crystals, granules and oil droplets to 20 µm diam., hyaline to pale yellowish brown, in the upper part usually continuously or patchily pigmented with *cinereorufa*-green and/or *fucatus*-violet, with the pigments sometimes diffusing down between the asci; asci 2-spored, approximating the *Biatora*- or *Lecidella*-types, 86–120(–147) × (29–)34–50 µm. Ascospores ovate to broadly ellipsoid, 36–*43.1*–56(–61) × 19–*24.5*–34(–36) µm. Conidia bacilliform 5–6.5 × 1 µm.

Chemistry: perlatolic acid, hyperperlatolic acid (±), caperatic acid (±), norcaperatic acid (±), rangiformic acid (±), norrangiformic acid (±) and/or roccellic acid (±); thallus K–, C–, KC–, P–, UV+ whitish

One of the most common epiphytic crustose lichens in higher rainfall areas in rainforest, scrub and heathland, especially in western parts of the island, where it colonises canopy branches and young limbs on a wide range of host species. It is likewise widespread across the cool temperate Southern Hemisphere and has been recorded from Juan Fernandez, southern Chile, New Zealand, Auckland Island, Campbell Island, the Falkland Islands and Staten Island. *Mycoblastus dissimulans* is an extremely variable species, both with respect to the morphology of the thallus (thick or thin; smooth or variously uneven) and the intensity and nature of the pigmentation of its apothecia. It is characterised by the combination of an esorediate thallus that invariably contains perlatolic acid, the presence of either or both *cinereorufa*-green and *fucatus*-violet pigments in the apothecia, and by the 2-spored asci. Although *fucatus*-violet is almost invariably present in Tasmanian specimens, this is not always the case across its entire geographical and ecological range.

Boyd Lookout, 42°49′S 146°21′E, 550 m, 1981, *G. Kantvilas 562/81* & *P. James* (BM, HO); Mt Victoria Track, 41°20′S 147°50′E, 950 m, 1981, *G. Kantvilas 1086/81* (HO); c. 1.5 km NE of Mt Pillinger, 41°48′S 146°08′E, 1000 m, 2015, *G. Kantvilas 13/15* (HO).

6 Mycoblastus kalioruber Kantvilas

Lichenologist 41: 170 (2009). Type: Tasmania, Pine Lake, 41°45′S 146°42′E, 1200 m, on *Athrotaxis cupressoides* in open montane rainforest, 4 June 1989, *G. Kantvilas 191/89* (holo—HO!; iso—BM!).

Thallus dull olive-grey to olive-brown, rather waxy when well-developed, somewhat patchy to continuous, smooth to uneven to verruculose, becoming deeply cracked and areolate, sometimes rather flaky, rarely scurfy-abraded but never sorediate, mostly 80–500 µm thick, rarely very thin, bluish grey to inapparent. Apothecia 0.5–1.6 mm diam. Hypothecium 120–250 µm thick, vivid yellow, K+ intense blood-red, N+ yellow-orange (hybocarpone), very densely inspersed with minute granules that mostly dissolve in K and golden oil droplets to 18 µm diam. Hymenium 90–160 µm thick, not or only sparsely inspersed with granules and oil droplets, in the uppermost part thickly to diffusely *cinereorufa*-green pigmented, in the lower part hyaline to pale yellow, K+ fleetingly golden-yellow, colourless in N; asci 2-spored, approximating the *Biatora*- or *Lecidella*-types, 80–110 × 30–50 µm. Ascospores ovate to broadly ellipsoid, (36–)40–*49.5*–60(–68) × (18–)20–*28.1*–36 µm. Pycnidia not seen.

Chemistry: perlatolic acid, hyperperlatolic acid (minor) and roccellic acid; thallus K–, KC–, C–, P± very faint orange, UV+ white.

Widespread in higher rainfall areas of the island, including on the coastal peaks of the East Coast and Bass Strait islands, but most abundant and conspicuous in subalpine and alpine vegetation, especially on the bark and wood of *Athrotaxis cupressoides*. It is also known from Victoria and New Zealand. The orange-yellow, K+ red hypothecial pigment (hybocarpone) is diagnostic. So strong is the reaction that in microscope sections, the red coloration 'bleeds' into the entire preparation.

Mt Freycinet, 42°13′S 148°18′E, 600 m, 1995, *G. Kantvilas 146/95* (HO); Lonely Tarns, 42°58′S 146°27′E, 910 m, 2000, *G. Kantvilas 479/00* (HO); Lake Mackenzie, 41°41′S 146°23′E, 1100 m, 2005, *G. Kantvilas 354/05* (HO).

7 Mycoblastus sanguinarioides Kantvilas

Lichenologist 41:172 (2009). Type: Tasmania: Pelion Plains, 1 km W of Pelion Hut, 41°50′S 146°02′E, 890 m, on eucalypt stump in *Eucalyptus delegatensis* open forest, 11 March 1992, *G. Kantvilas 267/92* (holo—HO!; iso—BM!).

Thallus whitish, continuous, rather waxy, smooth to verruculose, often becoming cracked and areolate, 120–250 µm thick, not sorediate; medulla white, occasionally with discrete specks of a red pigment beneath the apothecia, K+ intensifying orange-red, N+ orange-yellow and slowly dissolving. Apothecia 0.5–2 mm diam. Hypothecium 60–160 µm thick, hyaline, sparsely inspersed with scattered oil droplets 6–18(–50) µm diam. and minute granules that fluoresce bluish white in polarised light and dissolve in K, subtended by a pale straw-coloured subhypothecium intensifying yellowish in K, unchanged in N, sometimes with dilute patches of *cinereorufa*-green pigment. Hymenium 110–160 µm thick, hyaline in the lower part, very heavily pigmented *cinereorufa*-green in the upper part, sparsely inspersed as the hypothecium; asci single-spored,

of the *Mycoblastus*-type, 110–130 × 40–52 µm. Ascospores broadly ellipsoid to ± oblong, (60–)64–*93.1*–104 × 28–*46.1*–52(–55) µm. Conidia bacilliform, 6–8 × 1 µm.

Chemistry: atranorin and caperatic acid; thallus K+ faint yellow, KC–, C–, P–, UV–; the red pigment (mysaquinone) that is occasionally found beneath some apothecia fades to a reddish brown in herbarium specimens.

Common and widespread from lowland to alpine elevations, mainly in the eastern half of the island, where it typically occurs in open situations, especially on logs and stumps in wet forests, wet heathlands and grassy woodlands; also recorded from Victoria and widespread in the temperate Northern Hemisphere. This species is readily recognisable in the field by its whitish thallus and glossy, black, rather adnate apothecia. The occurrence of the reddish pigment beneath the apothecia is sporadic and relatively few specimens studied display this character.

Three Thumbs, 42°36'S 147°52'E, 480 m, 1989, *G. Kantvilas 203/89* (HO); Long Tarns, 41°47'S 146°21'E, 1270 m, 2010, *G. Kantvilas 39/10* (HO); Mt Henry, SW of summit, 41°50'S 148°00'E, 670 m, 2019, *G. Kantvilas* 305/19 (HO).

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Kantvilas G (2009) The genus *Mycoblastus* in the cool temperate Southern Hemisphere, with special reference to Tasmania. *Lichenologist* **41** 151–178.

INDEX