Flora of Tasmania online

CARBONEA [1]

Gintaras Kantvilas [2]

Carbonea (Hertel) Hertel, *Mitt. Bot. Staatssamml. München* 19: 441 (1983); —*Lecidea* subgen. *Carbonea* Hertel, *Beih. Nova Hedwigia* 24: 101 (1967).

Type: *C. atronivea* (Arnold) Hertel

Thallus free-living or lichenicolous, crustose, sometimes highly reduced and inconspicuous, ecorticate. Photobiont a unicellular green alga with globose cells 6–16 µm wide (absent in lichenicolous species); cephalodia sometimes present. Ascomata apothecia, lecideine. Disc black to brownish black, glossy, sometimes reddish-pruinose. Proper exciple cupulate, persistent or becoming reflexed and ± excluded, in section usually entirely carbonised, opaque and composed of conglutinated, rather parenchymatous hyphae 5–8 µm thick. Hypothecium hyaline or dilutely pigmented. Hymenium I+ blue, overlain by an intensely blue-green, N+ crimson epihymenial layer, remaining coherent in K. Paraphyses simple to sparsely branched; apices mostly with a swollen, pigmented cap. Asci clavate, 8-spored, of the *Lecanora*-type: tholus well-developed, amyloid, penetrated entirely by a non-amyloid, cylindrical *masse axiale*; ocular chamber not developed. Ascospores simple, hyaline, ellipsoid, non-halonate. Conidiomata pycnidia, immersed. Conidia filiform, curved. Chemistry: variable, with argopsin, atranorin and other substances present in some species, and lichen substances completely lacking in others.

A genus of about 20 species, found mostly on rocks in cool temperate and subpolar environments; several species (but not the Australasian ones) are lichenicolous on other crustose lichens. The combination of a carbonised exciple, bluish green apothecial pigment and *Lecanora*-type asci help to distinguish *Carbonea* from many other superficially similar genera.

Key references: Rambold (1989); Pirogov *et al.* (2014); Cannon *et al.* (2022).

1 Common, mostly on lowland rocks; thallus pale greyish, prominent, containing atranorin and 2′-*O*-methylperlatolic acid (P–); ascospores 10–16 × 5–10 µm — 1 C. latypizodes

Restricted to alpine elevations; thallus inconspicuous and usually poorly developed, sometimes containing argopsin (P+ orange); ascospores 7.5–13 × 3.5–5.5 µm — 2 C. vorticosa

1 Carbonea latypizodes (Nyl.) Knoph & Rambold

In H. Hertel, *Sendtnera* 7: 96 (2001); —*Lecidea latypizodes* Nyl., *Flora* 57: 12 (1874).

Thallus coarsely granular-verruculose to rather nodulose-bullate, greyish white, occasionally discoloured pale brownish grey, smooth or a little mealy, esorediate; individual granules to *c.* 1 mm wide and 1 mm thick, mostly continuous and forming a deeply rimose, diffuse, irregular crust to *c.* 10 cm wide. Apothecia 0.2–1(–1.5) mm wide, broadly adnate, superficial or nestling amongst the thallus granules, roundish or rather deformed and angular when squashed together; disc plane to undulate, becoming convex with age, black, matt to glossy, epruinose; proper exciple black, glossy, entire to markedly flexuose, usually ± excluded with age, in section 20–50 µm thick laterally, becoming massive at the base, opaque red-brown within, unchanged in K, N+ intensifying orange-brown, also infused with additional blue-green, N+ crimson pigment

1 This work can be cited as: Kantvilas G (2024). *Carbonea*, version **2024:1**. 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/lichen-genera/carbonea/**

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

Tasmanian Government

TASMANIAN MUSEUM & ART GALLERY

at the outer edges, composed of radiating, conglutinated hyphae with the terminal cells swollen and parenchymatous. Hypothecium c. 30–60 µm thick, hyaline in the upper part, becoming yellow-brown and poorly differentiated from the exciple below. Hymenium (50–)65–90 µm thick, densely inspersed with minute oil droplets and crystals that do not dissolve in K, in the upper part intensely greenish blue, towards the base mostly hyaline, not overlain by epihymenial granules; paraphyses 1–2 µm thick, simple, straight, with the apices mostly swollen to 3–4 µm, with an external blue-green, N+ crimson cap; asci 40–55 × 14–18 µm. Ascospores broadly ellipsoid, rarely subglobose, (10–)11–*12.7*–15(–16) × (5–)6–*7.1*–8.5(–10) µm. Pycnidia not observed; conidia reported as curved, 10–20 × 0.8–1 µm (Rambold 1989).

Chemistry: atranorin and 2′-*O*-methylperlatolic acid; thallus K+ pale yellow, KC–, C–, P–.

Common and widespread in drier, eastern and coastal areas where it occurs on sunny, exposed rocks in rough, stony pasture or open sclerophyll woodland; similarly common in south-eastern mainland Australia and also recorded from South America. Rambold (1989) included this taxon [as *C. montevidensis* (Müll.Arg.) Rambold & Knoph] in *Carbonea* on account of the *Lecanora*-type asci and blue-green epihymenium. However, it differs from most other *Carbonea* species by the structure of the exciple (typically ± entirely carbonised, opaque and parenchymatous) and the paraphyses (typically richly branched and anstomosed). The chemistry of *C. latypizodes* is also unique for the genus. This species is more likely to be confused with a species of *Lecidella*, several of which have essentially identical apothecial pigmentation but differ chiefly by the their lax hymenium (in water and K), *Lecidella*-type asci and different chemistry.

Lower Marshes Road, c. 1 km SW of Northumbria Hill, 42°23′S 147°15′E, 450 m, 2004, *J.A. Elix 28772 & G. Kantvilas* (CANB, HO); Cherry Tree Hill, 41°58′S 148°08′E, 180 m, 2012, *G. Kantvilas 329/12* (HO); c. 1 km NW of Tinderbox, 43°03′S 147°19′E, 160 m, 2015, *G. Kantvilas 162/15* (HO, MSC).

2 **Carbonea vorticosa** (Flörke) Hertel

Mitt. Bot. Staatssamml. München 19: 442 (1983); —*Lecidea sabuletorum* [var.] *vorticosa* Flörke, *Mag. Neusesten Entdeck. Gesammten Naturk. Ges. Naturf. Freunde Berlin* 2: 311 (1808).

Thallus extremely reduced to ± absent, more rarely rather gnarled-areolate and greyish, forming tiny, irregular, diffuse "islands" amongst other crustose lichens; cephalodia absent. Apothecia to 0.9 mm wide, sessile, basally constricted, scattered and roundish, or crowded together and distorted; disc plane to concave, glossy, black, epruinose; proper exciple likewise black and glossy, persistent and elevated above the level of the disc, sometimes flexuose, in section 30–60 µm thick laterally, to c. 100 µm thick at the base, opaque black-brown to reddish brown. Hypothecium 12–40 µm thick, hyaline to dilutely blue-green. Hymenium 45–60 µm thick, brilliant blue-green intensifying in K, not inspersed; epihymenium dark blue-green, 10–20 µm thick; paraphyses (1–)1.5–2 µm thick, wavy, branched and anstomosed mainly in the upper part, with apices occasionally expanded to 2.5(–3) µm; asci 32–40 × 12–20 µm. Ascospores ellipsoid to ± oblong, (7.5–)8.5–*10.3*–12(–13) × (3.5–)4–*4.6*–5(–5.5) µm. Pycnidia not observed.

Chemistry: argopsin (K–, KC–, C–, P+ orange) in well-developed thalli; no substances detected in reduced thalli.

A bipolar species, also known from high-alpine mainland Australia. It is rarely collected in Tasmania but is likely to have been overlooked. It occurs on exposed boulders, mostly as tiny islands of just a few millimetres across amongst other saxicolous crustose lichens. The tiny, glossy black apothecia with a distinct, persistent margin make it rather distinctive amongst the superficially similar species of lecideoid, crustose lichens with which it occurs. One collection, with a well-developed thallus containing argopsin, remains unidentified; it matches *C. vorticosa* in most respects but has consistently larger ascospores, 12–18 × 4–5 µm, frequently with 1–3, rather spurious septa.

Mt Wellington, 42°54′S 147°14′E, 1260 m, 1984, *G. Kantvilas 301/84a & P. James* (HO); Mt Montagu, 42°55′S 147°10′E, 1060 m, 2017, *G. Kantvilas 44/17* (HO); Ben Lomond, Stonjeks Lookout, 41°32′S 147°40′E, 1535 m, 2022, *G. Kantvilas 178/22* (HO).

REFERENCES

Cannon P, Maliček J, Ivanovich C, Printzen C, Aptroot A, Coppins B, Sanderson N, Simkin J, Yahr R (2022) Lecanorales: Lecanoraceae, including the genera *Ameliella*, *Bryonora*, *Carbonea*, *Claurouxia*, *Clauzadeana*, *Glaucomaria*, *Japewia*, *Japewiella*, *Lecanora*, *Lecidella*, *Miriquidica*, *Myriolecis*, *Palicella*, *Protoparmeliopsis*, *Pyrrhospora* and *Traponora*. *Revisions of British and Irish Lichens* **25** 1–83.

Pirogov M, Chepelevska N, Vondrák J (2014) *Carbonea* in Ukraine. *Studia Biologica* **8** 137–148.

Rambold G (1989) A monograph of the saxicolous lecideoid lichens of Australia (excl. Tasmania). *Bibliotheca Lichenologica* **34** 1–345.

INDEX

C

Carbonea....**1,** 2
Carbonea atronivea....1
Carbonea latypizodes....**1,** 2
Carbonea montevidensis....2
Carbonea vorticosa....**2**

L

Lecanora....1, 2
Lecidea latypizodes....1
Lecidea sabuletorum var. *vorticosa*....2
Lecidea subgen. *Carbonea*....1
Lecidella....2