

Arthonia cryptica (Arthoniaceae), a new lichen species
from coastal rock in southern New South Wales, Australia

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Abstract

Arthonia cryptica sp. nov. (Arthoniaceae) is described from coastal siliceous rock in southern New South Wales. The dull whitish thallus is effuse and patchy, containing a trentepohlioid photobiont, and it lacks lichen substances. Ascomata are blackish, rounded, immarginate and 0.18–0.52 mm wide; the hypothecium is thin, hyaline and interspersed with granules; paraphysoids anastomosing; asci (6–)8-spored, broadly clavate to obpyriform; ascospores colourless, 3-septate, 12–16 × 4–6.5 µm. Pycnidia are black and minutely punctiform, producing ellipsoid or oblong to oblong-obovoid conidia 2.5–6 × 1–2.5 µm.

Introduction

Arthonia, a cosmopolitan genus of more than 300 species, includes lichenized taxa on all substrata, as well as non-lichenized fungi, lichenicolous parasites and other lichen-associated entities. Thirty-eight lichenized species are included in the most recent Australian checklist (McCarthy 2018). However, many reports are doubtful, most taxa require a thorough re-assessment, with many others awaiting identification among herbarium holdings. Globally, only a small minority of *Arthonia* species are saxicolous, with just one, *A. lapidicola* (Taylor) Branth & Rostrup, having been confirmed from Australia (McCarthy & Elix 2017). In this paper, a second saxicolous species, *A. cryptica*, is described as new from siliceous seashore rocks on the south coast of New South Wales.

Arthonia cryptica P.M. McCarthy & Elix, sp. nov.
Mycobank No.: MB 830074

Figs 1, 2

Thallus crustose, dull whitish, effuse and patchy, to 100(–200) µm thick, with a trentepohlioid photobiont, lacking lichen substances. Ascomata innate to semi-immersed, dull black, ± rounded, with a vestigial excipulum, 0.18–0.52 mm wide; epihymenium dark olive-brown; hypothecium 40–80 µm thick, hyaline, interspersed with granules; paraphysoids anastomosing; asci (6–)8-spored, broadly clavate to obpyriform, 29–42 × 15–21 µm; ascospores colourless, 3-septate, narrowly ellipsoid to oblong, 12–16 × 4–6.5 µm. Pycnidia black above, punctiform, 50–70 µm wide; conidia ellipsoid or oblong to oblong-obovoid, 2.5–6 × 1–2.5 µm.

Type: Australia: New South Wales, South Coast, Ben Boyd National Park, Green Cape Peninsula, Bittangabee Bay, 37°13'00"S, 150°01'04"E, c. 1.5 m alt., on sheltered, vertical, coarse sandstone, south-facing with overhanging trees, adjacent to high-water mark on a sandy beach, P.M. McCarthy 4749, 21.iii.2018 (holotype – CANB).

Thallus crustose, epilithic, effuse and patchy between projecting crystals, dull whitish, to 100(–200) µm thick, ecorticate. *Algal layer* to 50 µm thick, continuous or not beneath the ascomata; cells trentepohlioid, globose to broadly ellipsoid, 6–13 × 6–11 µm, scarcely forming filaments; interstitial hyphae a loose web, short-celled, 2–3 µm wide. *Medulla* loose, impregnated with rock fragments and crystals, I–, not containing calcium oxalate (H₂SO₄–). *Prothallus* not apparent. *Ascomata* numerous, innate to semi-immersed in the thallus, resembling apothecia, outwardly immarginate at all stages of development, usually solitary or in 2s or 3s, rounded,

broadly ellipsoid or more irregular in outline, (0.18–)0.37(–0.52) mm in maximum extent [*n* = 30]; disc dull black, plane to slightly or moderately convex, smooth to slightly uneven, epruinose. *Proper excipulum* vestigial, narrowly annular, 8–12 µm thick laterally and greenish brown to dark brown, of elongate-periclinal hyphae 1–2 µm wide, hyaline to dark brown below and 10–15 µm thick, K+ greenish grey, N+ orange-brown. *Hypothecium* hyaline, interspersed with minute granules, 40–80 µm thick in the centre of the ascoma, consisting of downwardly directed, anastomosing hyphae 1–1.5 µm thick, K–, N–. *Hymenium* hyaline or very pale greenish, 40–50 µm thick, not interspersed with granules or oil globules; hymenial gel KI+ blue. *Epihymenium* dark olive-brown, 10–15 µm thick, K+ greenish grey, N+ orange-brown. *Paraphysoids* with abundant anastomoses, forming a compact reticulum about the asci, 0.7–1.2 µm wide, short-celled; apices not or only very slightly swollen. *Asci* (6–)8-spored, broadly clavate to obpyriform, 29–42 × 15–21 µm [*n* = 10]; stalk with an abruptly swollen base 4–5 µm wide; apex rounded, with a thick, weakly amyloid tholus when submature (usually scarcely apparent at maturity) and a bluntly conical ocular chamber. *Ascospores* colourless, 3-septate, massed in the ascus, narrowly ellipsoid to oblong, then sometimes with a broader distal end, not or slightly constricted at the septa (especially the primary septum), with rounded ends, or the proximal end subacute, thin-walled, lacking a perispore, (12–)14(–16) × (4–)5.5(–6.5) µm [*n* = 50]; locules similar in size; contents commonly guttulate (guttules clearing in K). *Pycnidia* sparse, solitary, immersed in the thallus, greenish black, punctiform and 50–70 µm wide above, hyaline below; conidiophores simple or furcate, 10–17 × 1.5–2 µm; conidia narrowly to broadly ellipsoid or oblong to oblong-obovoid, 2.5–5(–6) × 1–2(–2.5) µm. *Chemistry*: No substances detected by TLC.

Etymology: From the Greek *kryptos* (hidden, secret), in reference to the effuse thallus and ascomata that are almost completely obscured by minute rock fragments and crystals.

Remarks

The type specimen of the very inconspicuous *Arthonia cryptica* was collected purely by chance. Other saxicolous species include *A. atlantica* P. James, known from coastal siliceous rocks in north-western Europe. It has a similar thallus and broadly similar ascomata to those of *A. cryptica* (although the latter are usually elongate or stellate), but the ascospores are 16–24 × 6–7 µm, the upper cell enlarged and old ascospores becoming brown, while two chemosyndromes contain either confluent acid or stictic acid (Coppins & Aptroot 2009). *Arthonia phaeobaea* (Norman) Norman, occurs on coastal siliceous rocks in western Europe and North America. It has a brownish thallus with a chlorococcoid photobiont and 3–5-septate spores of 17–30 × 5–7 µm (Coppins & Aptroot 2009). *Arthonia arthonioides* (Ach.) A.L. Sm., from siliceous rock and bark in Europe and North America, has a rather thick, whitish thallus, rounded, convex ascomata and ascospores rather similar to those of *A. cryptica*. Critically, however, the hypothecium is dark brown and 100–300 µm (Coppins & Aptroot 2009).

Arthonia madreana Egea & Torrente, known from coastal rocks in southern California, has a similarly effuse, white thallus, but it is thicker than *A. cryptica* and contains confluent acid. The ascomata are immersed and up to 1.2 mm wide, and while the ascospores are rather similar to those of the new Australian species in terms of size and septation, the conidia are very different, being filiform and 14–20 × 1 µm (Egea & Torrente 1995; Grube 2007). Another New World species, the Brazilian *A. saxistellata* Aptroot & M. Cáceres, has a pale ochraceous to pale orange thallus, apothecia in confluent groups, and clavate, 3-septate spores 12–13 × 3–4.5 µm (Aptroot & Cáceres 2018).

One other saxicolous species, *A. lapidicola* (Taylor) Branth & Rostrup, is known from Australia. While it usually grows on limestone or at least on base-rich rocks, mainly in the northern temperate to boreal latitudes, it was also found on shale on a sheltered seashore cliff in southern New South Wales (McCarthy & Elix 2017). It has a chlorococcoid photobiont, small, blackish apothecia on a thin and rather nondescript thallus, a thick, dark brown hypothecium, mostly soleiform, 1-septate ascospores and bacilliform conidia.

The new species is known only from sheltered, coarse-grained, siliceous seashore rocks in Ben Boyd National Park, southern New South Wales, Australia. Associated lichens in-

clude *Bacidia* sp., *Bapalmuia rotatilis* P.M.McCarthy & Elix (previously known only as a corticole), *Caloplaca* sp., *Ochrolechia apiculata* Verseghy, *Opegrapha* aff. *spodopolia* Nyl., several species each of Caliciaceae, Parmeliaceae and Physciaceae, *Porina heterocarpa* P.M.McCarthy, *P. raphidiophora* (Nyl.) Müll.Arg. and *Pseudocyphellaria* sp.

References

- Aptroot, A; Cáceres, MES (2018): New lichen species from Chapada Diamantina, Bahia, Brazil. *Bryologist* **121**, 67–79.
- Coppins, BJ; Aptroot, A (2009): *Arthonia* Ach. (1806). In Smith, CW; Aptroot, A; Coppins, BJ; Fletcher, A; Gilbert, OL; James, PW; Wolseley, PA (eds), *The Lichens of Great Britain and Ireland*: 153–171. British Lichen Society, London.
- Egea, JM; Torrente, P (1995): Especies saxícolas del género *Arthonia* (Arthoniaceae) en áreas costeras de California y Baja California (Estados Unidos y México). In: Daniëls, FJA; Schulz, M; Peine, J (eds): *Flechten Follmann. Contributions to lichenology in Honour of Gerhard Follmann*: 193–204. Geobotanical and Phytotaxonomical Study Group, Botanical Institute, University of Cologne, Cologne.
- Grube, M (2007): *Arthonia*. In Nash, III TH; Gries, C; Bungartz, F (eds), *Lichen Flora of the Greater Sonoran Desert Region* **3**, 39–61. Lichens Unlimited, Arizona State University, Tempe.
- McCarthy, PM (2018): *Checklist of the Lichens of Australia and its Island Territories*. <http://www.anbg.gov.au/abrs/lichenlist/introduction.html> (Version 17 May 2018). ABRs, Canberra.
- McCarthy, PM; Elix, JA (2017): Five new lichen species (Ascomycota) and a new record from southern New South Wales, Australia. *Telopea* **20**, 335–353.



Figure 1. *Arthonia cryptica* (holotype). Scale: 2 mm.

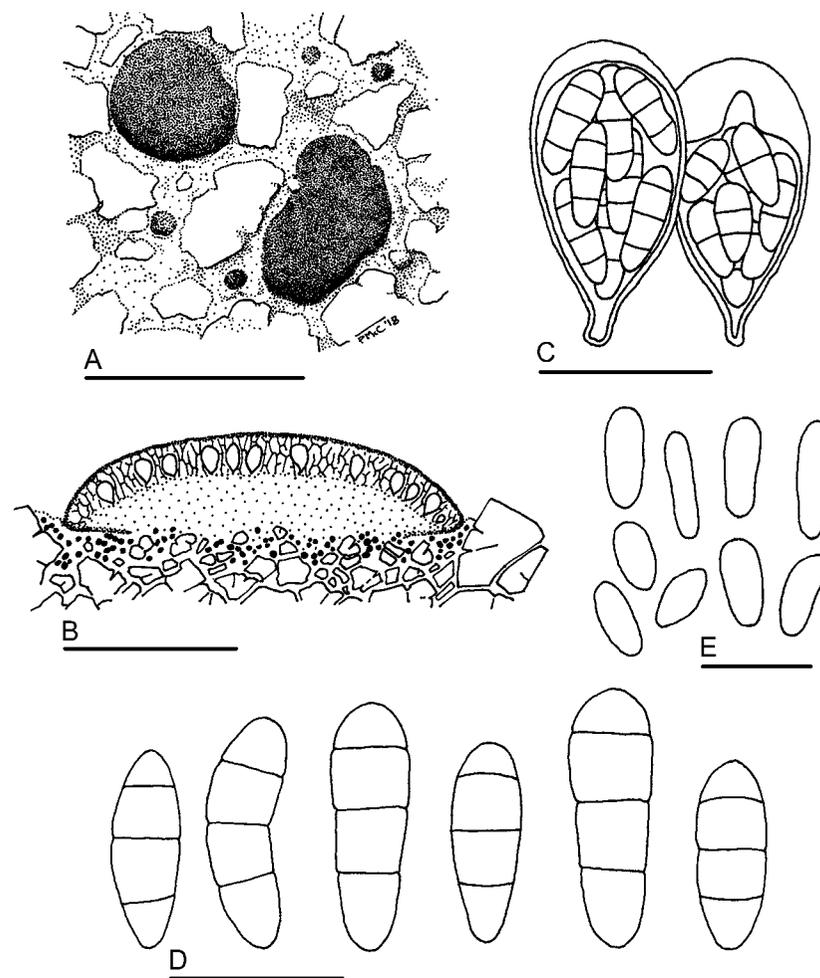


Figure 2. *Arthonia cryptica* (holotype). A, Habit of thallus, two ascomata and four pycnidia; B, Vertical section of an ascoma (semi-schematic); C, Mature (left) and submature asci; D, Ascospores; E, Conidia. Scales: A = 0.5 mm; B = 0.2 mm; C = 20 μ m; D = 10 μ m; E = 5 μ m.