

A new saxicolous species of *Enterographa* (lichenized Ascomycota, Roccellaceae) from Lord Howe Island, Australia

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Abstract

Enterographa reticulata sp. nov. (Roccellaceae) is described from basalt in Lord Howe Island (New South Wales). In addition, *E. ophiolithica* Kantvilas, recently described from Tasmania, is reported for the first time from the south coast of New South Wales.

Introduction

Enterographa Fée sens. lat. (Roccellaceae) includes at least 60 mainly tropical and subtropical species that grow on bark, rock or leaves, or as parasites of other lichens (Sparrius 2004; Lücking 2008; Seavey & Seavey 2014; Cannon *et al.* 2021). Thirteen taxa are currently known from Australia and its oceanic island territories (Sparrius 2004; McCarthy & Elix 2016, 2018; Kantvilas 2021). In this contribution, *E. reticulata* is described as new from basalt in lowland forest in Lord Howe Island, while another saxicolous species, *E. ophiolithica* Kantvilas, is reported for the first time from New South Wales.

Methods

Observations and measurements of photobiont cells, thalline and ascomatal anatomy, asci, ascospores, and conidia were made on hand-cut sections mounted in water. Calcium oxalate was detected by treatment of thallus sections with a 10% aqueous solution of sulfuric acid; it forms colourless, needle-shaped crystals. Asci were observed in Lugol's Iodine (I), with and without pretreatment in K; the former procedure (KI) also yielded abundant crystals of norstictic acid originating from the sectioned excipulum. The specimen was analyzed for lichen substances by high-performance liquid chromatography (HPLC; Elix 2020).

New species

Enterographa reticulata P.M. McCarthy, sp. nov.
Mycobank No.: MB 842303

Figs 1, 2

Characterized by the rather thick cream-white thallus containing calcium oxalate but lacking lichen substances. Ascumata are dark greyish brown to blackish in surface view, almost punctiform and immersed in the thallus, not in pseudostromata; these coalesce as narrow, elongate and anastomosing lirellae. The cupulate excipulum contains norstictic acid, proximal parts of the hymenium and the pale brown hypothecium are interspersed with minute granules, and the narrowly clavate, 8-spored asci contain fascicles of 3(–5)-septate, elongate-fusiform ascospores measuring 32–45 × 2.5–3.5 µm.

Type: Australia, New South Wales, Lord Howe Island, Max Nicholls Track, 31°31'08"S, 159°03'01"E, 100 m alt., on basalt in lowland, subtropical forest on a broad ridge, *J.A. Elix 42399*, 9.ii.1995 (holotype – CANB).

Thallus crustose, epilithic, the type specimen a continuous colony at least 7.5 cm wide, richly but delicately rimose to obscurely areolate, smooth, cream-white, epruinose, 0.1–0.3(–0.5) mm thick. *Cortex* absent. *Algae Trentepohlia*; cells 8–18(–20) × 8–15 µm, not forming a distinct layer in the thallus; interstitial hyphae rather long-celled, 2–3(–4) µm wide. *Medulla* chalky white in section, containing abundant calcium oxalate (H₂SO₄⁺), I–, KI– or patchily KI+ blue near ascumata. *Prothallus* thin, greyish brown, when separating adjacent thalli bounded on both sides by rows of pycnidia. *Ascumata* very numerous, immersed in the thallus, not in distinct pseudostromata, initially grey-brown to blackish (paler when wetted), plane,

rounded or ellipsoid in outline, dull to slightly glossy, the surface smooth or becoming faintly canalliculate in more elongate ascumata, epruinose, 70–100(–120) µm wide, coalescing to form lirelliform aggregations 0.4–3(–5) mm long [*n* = 30], the lirellae branching and anastomosing to form ascumatal reticula 5–10(–20) mm wide. *Proper excipulum* visible only in thin section, cupulate, with hyaline to pale brown apices, the vertical side-walls medium brown and 20–35 µm thick, the excipulum base dark brown and 30–50 µm thick. *Epihymenial layer* absent. *Hypothecium* pale brown, 30–40 µm thick, with granular inclusions. *Hymenium* 90–120 µm thick, not interspersed with granules or oil globules above; basal levels with or without granules; hymenial gel I+ dark bluish green, KI+ pale to medium blue. *Paraphysoids* strongly conglutinate in water, loosening in K, branched and anastomosing above, simple or sparingly branched below, long-celled, 0.8–1.2 µm wide; apical cells not swollen or up to 2.5(–3) µm thick, not pigmented. *Asci* narrowly clavate, 8-spored, 65–82 × 12–15 µm [*n* = 15], with a non-amyloid wall and a narrow tholus (2–3 µm thick) that lacks an ocular chamber but has a thin amyloid cap at maturity; ascoplasm and ascospores I+ dark orange-brown. *Ascospores* colourless, usually forming two overlapping fascicles in the ascus, 3(–5)-septate at maturity, elongate-fusiform, straight or slightly curved, not constricted at the septa, (32–) 38(–45) × (2.5–)3(–3.5) µm [*n* = 25]; perispore to 0.5 µm thick around immature spores, not apparent at maturity; apices rounded or subacute; contents clear. *Pycnidia* very numerous, immersed in the thallus, plane and dark greyish brown above, hyaline below, 50–80 µm wide, solitary or forming loose clusters of 20–50(–100). *Conidia* hyaline, simple, filiform, usually curved or arcuate, 10–15(–18) × *c.* 0.5 µm.

Chemistry: No lichen substances detected in the thallus by HPLC (Elix 2020); norstictic acid produced in the proper excipulum (K+ crystals).

Etymology: The epithet *reticulata* refers to the net-like arrangement of the anastomosing lirellae.

Remarks

Enterographa reticulata is characterized by the thallus lacking lichen substances but with ascumata that contain norstictic acid, the latter initially ± punctiform but developing into extensive, reticulate lirellae, as well as narrowly fusiform and predominantly 3-septate ascospores. Similar disjunct chemistry has been reported from several other *Enterographa* species, although none is saxicolous or exhibits comparable thallus and ascumatal morphology and anatomy (Seavey & Seavey 2014).

Comparison with other saxicolous Australian species of *Enterographa* further confirms the distinctiveness of the new lichen. Thus, *E. cretacea* P.M. McCarthy & Elix, from coastal rocks in south-eastern mainland Australia and Tasmania, has a thallus containing dehydroconstipatic acid (major) and 7-septate ascospores of 18–30 × 4–5.5 µm (McCarthy & Elix 2016; Kantvilas 2021), while *E. ophiolithica* Kantvilas, previously a Tasmanian endemic (Kantvilas 2021, and see below), lacks thalline substances and ascumatal norstictic acid and produces ascospores that are (3–)5–7(–8)-septate and 20–30 × 4–6 µm. Finally, *E. subgelatinosa* (Stirt.) Redinger, which occurs in similar habitats in northern New Zealand, Lord Howe Island, Tasmania and Western Australia, has a thallus containing gyrophoric and psoromic acids, and its mainly 6–7-septate ascospores are 18–30 × 3.5–5 µm (Sparrius 2004; Kantvilas 2021).

This species is known only from the type locality in Lord Howe Island where it grows on sheltered basalt in lowland forest.

New record

Enterographa ophiolithica Kantvilas, *Muelleria* 40, 36 (2021)

This species was previously known from a single locality on the west coast of Tasmania where it grows on serpentinite boulders and outcrops on the seashore at Trial Harbour (Kantvilas 2021).

SPECIMENS EXAMINED

New South Wales: • South Coast, Green Cape Peninsula, below lighthouse, 37°15'34"S, 150°02'52"E, c. 3 m alt., on hard, deeply shaded sandstone, *P.M. McCarthy 4762*, 21.iii.2018 (CANB); • South Coast, Jervis Bay, Vincentia, c. 1 km S of Plantation Point, 35°04'22"S, 150°41'41"E, c. 2–3 m alt., on sheltered sandstone, *P.M. McCarthy 4594 p.p.*, 23.v.2017 (CANB).

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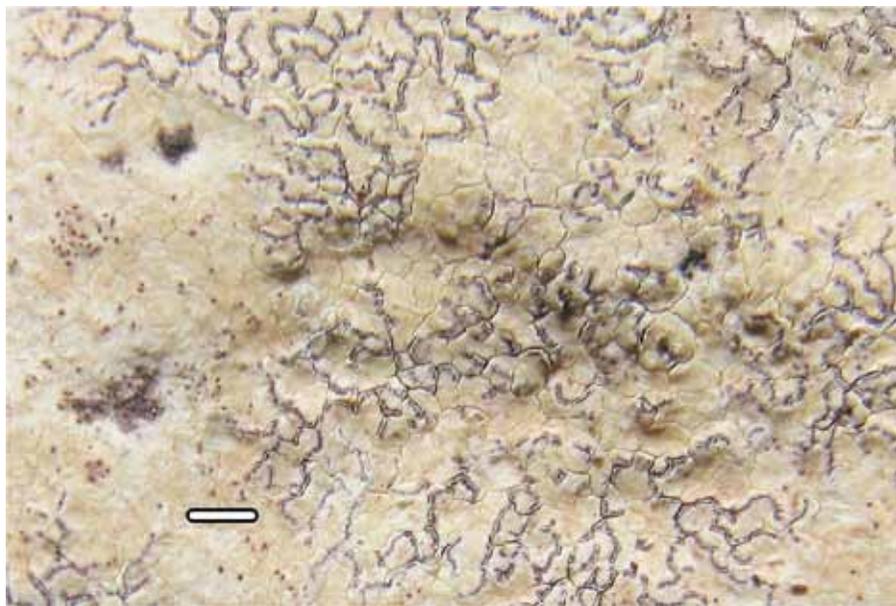


Figure 1. *Enterographa reticulata* (holotype). Scale = 1 mm.

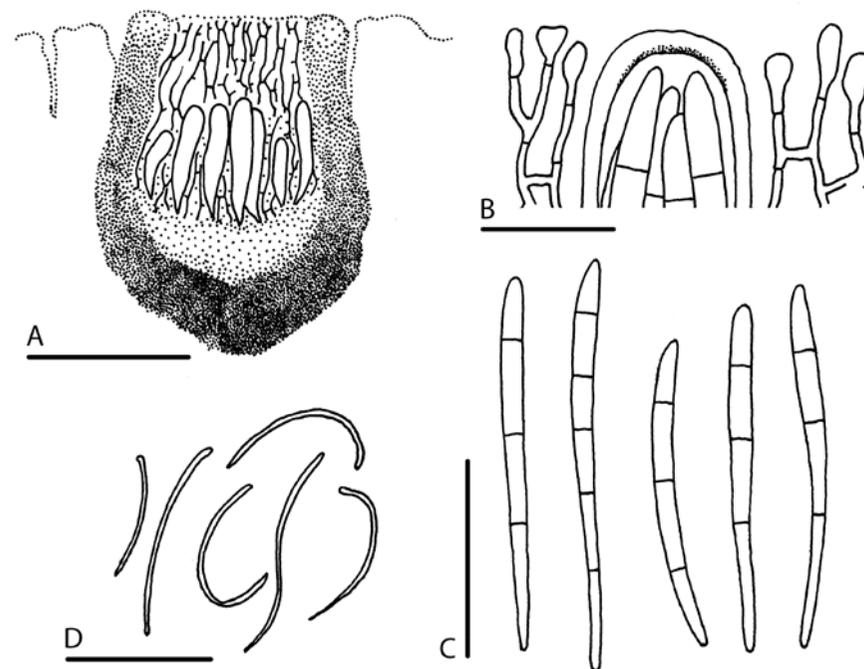


Figure 2. *Enterographa reticulata* (holotype). A, Vertical section through an ascoma (semi-schematic); B, Apices of an ascus and several paraphysoids; C, Ascospores; D, Conidia. Scales: A = 0.1 mm; B, D = 10 μ m; C = 20 μ m.