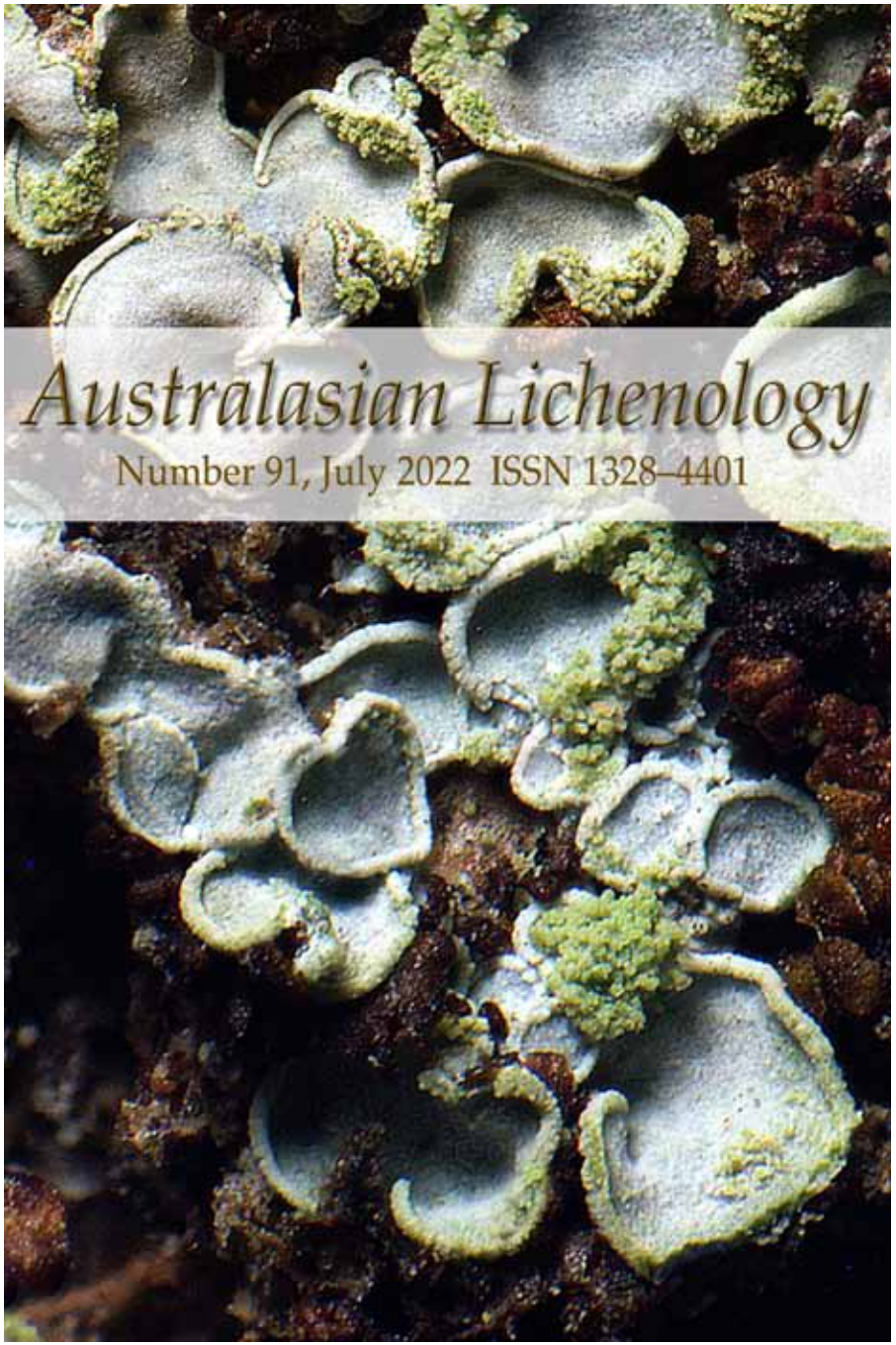

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Normandina pulchella is readily identified by its distinctive blue-green colour and its ear-like squamules, which have raised and strongly in-rolled margins. It colonizes a range of substrata, including rock, tree bark, moist humus, leaves, and even other lichens, and it's moderately tolerant of air pollution. It often produces dense patches of moss-green soredia on the surface and margins of its squamules, but ascomata and conidiomata are unknown. Occasional reports of perithecia have mostly been dismissed as fruiting bodies produced by *Lauderlindsaya borreri* or other lichenicolous Ascomycetes. Often overlooked because of its small size, it's nearly cosmopolitan in its distribution.

1 mm

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Gyrographa fecunda (Roccellaceae), a new saxicolous lichen from New South Wales, Australia

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Abstract

Gyrographa fecunda sp. nov. (Roccellaceae) is described from rhyolite in eastern New South Wales. It has a pale to medium greyish brown, minutely areolate thallus containing gyrophoric acid, very small adnate to subsessile ascomata with a lirelliform to contorted-gyrose disc, a blackish lateral excipulum, a dark hypothecium and 3-septate ascospores.

Introduction

Gyrographa Ertz & Tehler was described for two species previously included in *Opegrapha* (Opegraphaceae), but found by Ertz *et al.* (2014) to be strongly supported within the Roccellaceae, although separated from the rest of that family. *Gyrographa gyrocarpa* (Flotow) Ertz & Tehler and *G. saxigena* (Taylor) Ertz & Tehler occur on siliceous rocks in western Europe and Macaronesia; the former also in North America, while the latter is known from Turkey. Both have a greyish or pale to dark brown thallus, gyrose-contorted to lirelliform ascomata with a lateral proper excipulum bordering a thick, blackish hypothecium, and ascospores lacking a perispore (Ertz *et al.* 2014; Cannon *et al.* 2021). A third species, *G. nigrofusca* Jagad.Ram, was subsequently described from India (Jagadeesh Ram 2016).

Here, a new saxicolous species from eastern New South Wales is confidently attributed to *Gyrographa* based on chemistry and morphology.

Gyrographa fecunda P.M.McCarthy sp. nov. Figs 1 & 2
MycoBank No.: **MB 843188**

Characterized by the pale to medium greyish brown, minutely areolate thallus containing gyrophoric acid, bounded and dissected by blackish prothalline lines; ascomata very numerous, small, adnate to subsessile, 0.22–0.58 mm in maximum extent, with a slit-like to contorted-gyrose disc and a blackish, lateral excipulum; hypothecium thick, dark brown to brown-black; hymenium hyaline, 60–80 µm thick; epihymenium medium to dark brown; asci (4–)8-spored, 48–67 × 13–18 µm, with a small, conical to tuberculate ocular chamber within a KI+ medium blue ring; ascospores 3-septate, 14–27 × 4.5–7 µm, lacking a perispore; and pycnidia minute and blackish above, with bacilliform to filiform conidia 6–9 × 0.5–0.8 µm.

Type: Australia, New South Wales, Mid-North Coast, Bulahdelah, Mt Alum, 32°25'S, 152°12'E, 100 m alt., on large rhyolite rock face in dry sclerophyll forest, *H. Streimann 44173*, 24.iv.1990 (holotype – CANB; according to the herbarium label a duplicate in B, *n.v.*).

Thallus crustose, epilithic, pale to medium greyish brown, well-delimited and forming colonies up to at least 50 mm wide, to 100(–150) µm thick, minutely areolate; areoles angular or irregular and often slightly rounded, 0.1–0.2(–0.25) mm wide, separated by pale, very delicate and shallow cracks, thallus not containing calcium oxalate (H_2SO_4–), I–; cortex lacking, but the thallus with an amorphous, uppermost layer that is brownish orange and 12–20 µm thick, the pigment dissolving in K. *Algae Trentepohlia*, solitary or in short filaments; cells narrowly to broadly ellipsoid or subglobose to globose, (10–)15–25(–28) × 10–18(–20) µm; interstitial hyphae long-celled, 2–3.5 µm thick, ± vertically orientated between columns/erect filaments of algal cells. *Prothallus* blackish, broad and marginal, or much narrower and forming a reticulum within the colony which delimits individuals in a mosaic of small thalli. *Ascomata* very numerous, adnate to subsessile, mostly solitary, or in small, non-overlapping clusters of up to 4, dull black, epruinose, ± isodiametric to slightly elongate, (0.22–)0.42 (–0.58) mm in maximum extent [*n* = 75], unbranched, initially lirelliform, with blunt ends and a slit-like disc, the surface soon becoming grossly distorted or gyrose; margin irregularly fissured, or raised around an uneven, concave disc, not or scarcely overgrown by the thallus. *Proper excipulum* lateral only, not closed below the hymenium, brown-black, K+ greenish black, 35–60 µm thick, the apices convergent (with slit-like discs) or erect (with open discs). *Hypothecium* 60–120 µm thick, patchily dark brown to brown-black, not inspersed, K–, KI–. *Hymenium* 60–80 µm thick, hyaline, not inspersed with granules or oil globules, KI+ uniformly pale to medium blue (colour soon fading), I+ brownish orange or reddish. *Epihymenium* 10–20 µm thick, medium to dark brown, K+ blackish brown. *Paraphysoids* tightly conglutinate in water, loosening in K, richly branched and anastomosing throughout, short-celled to moderately long-celled, 1–1.5(–2) µm thick; apical cells often swollen, to 2.5 µm wide. *Asci* mostly 8-spored, rarely 4-spored, fissitunicate, narrowly clavate, cylindroclavate or cylindrical, laterally thin-walled, 48–67 × 13–18 µm [*n* = 15]; apex rounded, with a tholus 2–3 µm thick; ocular chamber usually small but distinct, conical to tuberculate, within a KI+ medium blue ring (the only amyloid part of the ascus wall); ascoplasma KI+ orange-brown. *Ascospores* 3-septate, irregularly biseriate or more massed in the distal half of the ascus, persistently colourless, narrowly ellipsoid to fusiform or slightly clavate, occasionally oblong-fusiform, with rounded or subacute apices, straight or slightly bent, rarely constricted at the middle septum, (14–)19(–27) × (4.5–)5.5(–7) µm [*n* = 54]; perispore absent at maturity; cells of ± equal size; contents clear. *Pycnidia* numerous, semi-immersed to almost completely immersed in the thallus, blackish above, 50–70(–80) µm wide. *Conidia* hyaline, simple, straight, bacilliform to almost filiform, 6–9 × 0.5–0.8 µm.
Chemistry: thallus containing gyrophoric acid (major, by TLC, *fide* K.Kalb).

Etymology: The epithet "*fecunda*" refers to the abundantly fertile holotype, in marked contrast to what is probably the most closely related species, the predominantly soraliate *G. gyrocarpa*.

Remarks

The new lichen can be readily distinguished from previously recognized species of *Gyrographa*. Thus, *G. gyrocarpa*, in some ways the most similar species, has a continuous to rimose-areolate, pale to dark brown thallus that also contains gyrophoric acid but is dominated by scattered to confluent, yellowish or orange-brown soralia 0.4–1.5(–2.5) mm wide. Uncommon ascomata are larger than those of the Australian species, 0.7–1.6(–2) mm long, with a hymenium 80–120 µm tall (60–80 µm in *G. fecunda*) and 3-septate ascospores 12–30 × 3–6 µm (Cannon *et al.* 2021). *Gyrographa saxigena* has a thin, continuous, dark, smooth or partially rimose-areolate thallus without lichen substances. Ascomata are 0.5–1.2(–1.4) long, (0.15–)0.2–0.35(–0.45) mm wide, the hymenium is 80–120 µm tall, and the 3-septate ascospores are 15–22 × 4–6 µm (Cannon *et al.* 2021). Lastly, *G. nigrofusca* has elongate, simple to substellate, lirelliform ascomata, 7-septate ascospores, and it lacks lichen substances (Jagadeesh Ram 2016).

This lichen and the type specimens of *Catillaria laevigata* P.M.McCarthy & Elix and *Porina aluniticola* P.M.McCarthy were collected from rhyolite rock faces, outcrops and boulders at Mount Alum following the Ninth Australasian Lichenological Meeting based at Booral, New South Wales, in April 1990. Associated species include *Canoparmelia texana* (Tuck.) Elix & Hale, *Chrysothrix xanthina* (Vain.) Kalb, *Diplotomma venustum* Körb., *Dirinaria flava* (Mull. Arg.) C.W.Dodge, *Heterodermia reagens* (Kurok.) Elix, *Lepra subventosa* (Malme) I.Schmitt & Lumbsch, *Notoparmelia erumpens* (Kurok.) A.Crespo, Ferencova & Divakar, *Parmelinopsis neodamaziana* (Elix & J.Johnst.) Elix & Hale, *Pertusaria xanthoplaca* Mull.Arg., *Relicina sydneyensis* (Gyeln.) Hale, *Tephromela atra* (Huds.) Hafellner, *Xanthoparmelia mongaensis* (Elix) Elix and *X. mougeotina* (Nyl.) D.J.Galloway.

Acknowledgements

I am grateful to Klaus Kalb for chemical analysis (TLC) of the specimen, and to Judith Curnow (CANB) for information on associated lichens at Mount Alum.

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Figure 1. *Gyrographa fecunda* (holotype). Scales: 1 mm.

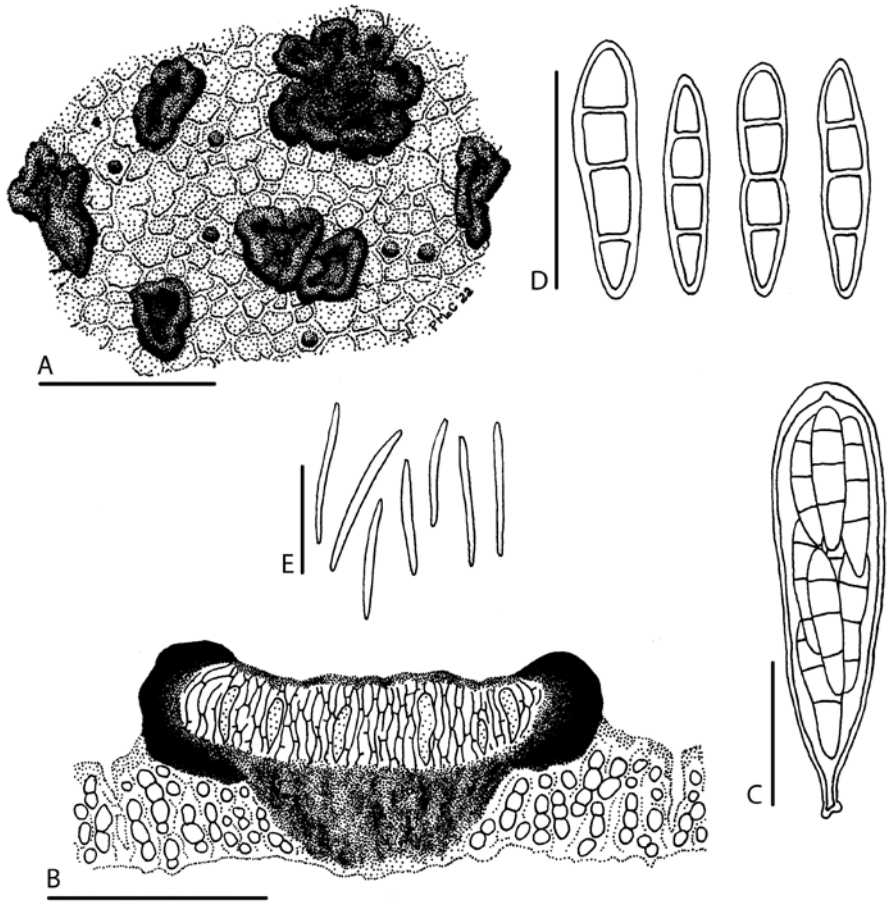

Figure 2. *Gyrographa fecunda* (holotype). A, Habit of ascomata, pycnidia and thallus; B, Vertical section of an ascoma and adjacent thallus (semi-schematic); C, Mature ascus; D, Ascospores; E, Conidia. Scales: A = 0.5 mm; B = 0.2 mm; C, D = 20 µm; E = 5 µm.