

A new saxicolous species of *Fellhanera* (lichenized Ascomycota, Pilocarpaceae) from eastern New South Wales, Australia

Patrick M. McCarthy

64 Broadsmith St, Scullin, A.C.T. 2614, Australia
e-mail: pmcc2614@hotmail.com

John A. Elix

Research School of Chemistry, Building 137,
Australian National University, Canberra, A.C.T. 2601, Australia
e-mail: John.Elix@anu.edu.au

Abstract

Fellhanera pluviosilvestris sp. nov. (Pilocarpaceae) is described from siliceous rock in cool-temperate rainforest in eastern New South Wales, Australia. It has a thin, continuous, greyish brown thallus that lacks lichen substances, medium-sized, sessile, biatorine apothecia with a dull blackish disc and a paler proper margin, a uniformly pale, paraplectenchymatous and cupulate excipulum, a dark brown, K+ orange-brown hypothecium and epihymenium, and (4–)8-spored, *Byssoloma*-type asci with ellipsoid to oblong, (1–)3-septate ascospores measuring 10–18 × 4.5–7.5 µm.

Introduction

Fellhanera Vězda (Pilocarpaceae), a genus of *c.* 75 species, is most diverse and predominantly foliicolous at tropical and subtropical latitudes (Vězda 1986; Sérusiaux 1996; Lücking 2008). It also occurs in temperate regions, where it is more likely to grow on bark or rock (van den Boom 2004; Aptroot *et al.* 2009; Harris & Lendemer 2009). The thallus is crustose, with a chlorococcoid photobiont, and the variously coloured, mostly sessile, biatorine apothecia have a paraplectenchymatous excipulum, mostly simple to sparingly branched paraphyses, *Byssoloma*-type asci and hyaline and transversely septate to muriform ascospores. Immersed to sessile pycnidia produce minute and usually pyriform to bacilliform conidia. Fifteen species are known from Australia (McCarthy 2018), all but four being obligately foliicolous. In this contribution, a new saxicolous species, *F. pluviosilvestris*, is described from siliceous rock in cool-temperate rainforest in eastern New South Wales.

Fellhanera pluviosilvestris P.M.McCarthy & Elix sp. nov.

Figs 1, 2

Mycobank No.: **MB 830073**

Thallus thin, continuous, greyish brown, lacking lichen substances. Apothecia biatorine, sessile, 0.28–0.70 mm diam., with a dull blackish disc and a paler proper margin; proper excipulum uniformly pale in thin section, cupulate, paraplectenchymatous; hypothecium and epihymenium dark brown, K+ orange-brown; asci (4–)8-spored, *Byssoloma*-type, with ellipsoid to oblong, (1–)3-septate ascospores, 10–18 × 4.5–7.5 µm; pycnidia and conidia not seen.

Type: Australia. New South Wales, Central Tablelands, Jerusalem Creek Falls, Chichester State Forest, 19 km NNE of Dungog, 32°15'S, 151°44'E, 350 m alt., on siliceous rock on the ground in cool-temperate rainforest, *J.A. Elix 25047*, 27.iv.1990 (holotype — CANB).

Thallus crustose, epilithic, continuous to very sparingly rimose, forming discrete colonies to at least 5 cm wide, pale to medium greyish brown, to 80 µm thick, minutely and obscurely rugulose-verruculose, lacking isidia, soredia, blastidia and goniocysts. *Algae* green, globose, 8–13 µm diam., rather thick-walled. *Medulla* poorly delimited, not containing calcium oxalate (H₂SO₄-); hyphae 1.5–2(–3) µm wide, short-celled. *Thallus margin* thin, effuse; prothallus not apparent. *Apothecia* sparse and scattered at maturity (but very numerous as apothecial initials *c.* 50 µm wide), subsessile to sessile and constricted at the base, biatorine, usually

solitary, rounded to irregular, sometimes with undulate or shallowly lobate margins, (0.28–) 0.51(–0.70) mm diam. [$n = 31$], occasionally proliferating as irregular, convex clusters up to 1.3 mm wide, consisting of 5–10(–15) apothecia that are distorted by mutual pressure; proper margin \pm concolorous with or a little darker than the thallus, smooth, dull to slightly glossy, entire or unevenly flexuose, 30–60 μm thick in surface view, persistent, slightly prominent; disc dull brownish or greyish black, smooth, usually plane, otherwise slightly convex, epruinose. *Thalline margin* absent. *Proper excipulum* well-developed, uniformly colourless to pale yellowish brown in thin section, cupulate, paraplectenchymatous, K–, N–, I– or I+ pale lilac, not containing calcium oxalate crystals (H_2SO_4 –), 25–50(–60) μm thick laterally, 40–70 μm thick at the base; cells of the lateral excipulum \pm uniform, rounded and comparatively thick-walled, 4–8 μm wide; cells of the excipular base, thinner-walled, rectangular and vertically elongate, 7–13 \times 5–10 μm . *Epihymenium* 5–8(–10) μm thick, dark brown, not interspersed, K+ orange-brown, N+ deep rust-brown. *Hypothecium* dark brown, 45–60 μm thick, \pm paraplectenchymatous, the cells 2–3 μm wide, K+ orange-brown, I–, N+ deep rust-brown; base sharply delimited from the excipulum, merging more gradually with the hymenium above. *Hymenium* 50–65 μm thick, uniformly pale greenish brown or with darker vertical streaks extending from the epihymenium or hypothecium, not interspersed with granules or oil globules, KI+ blue. *Paraphyses* tightly conglutinate in water, loosening in K, mostly unbranched, although sparingly branched and with sparse anastomoses below the apices, long-celled, 1–2 μm thick; apices not or scarcely swollen, not pigmented or pale brown. *Asci* narrowly to broadly clavate or cylindroclavate, 44–60 \times 10–14 μm , 8-spored or with 4 spores aborting early, *Byssoloma*-type (Hafellner 1984). *Ascospores* colourless, irregularly biseriolate or overlapping-uniseriate in the ascus, (1–)3-septate at maturity, narrowly or broadly ellipsoid to oblong-ellipsoid or narrowly ovoid, usually straight, occasionally a little bent, often slightly constricted at the septa, occasionally markedly constricted at the primary septum, (10–)14(–18) \times (4.5–)6(–7.5) μm [$n = 35$], thin- to rather-thick-walled, often with a perispore $c. 1 \mu\text{m}$ when 1-septate, perispore not or scarcely apparent when 3-septate; apices rounded to subacute; contents clear. *Pycnidia* absent.

Chemistry: No lichen substances detected by TLC.

Etymology: From the Latin *pluvius* (rainy) and *silvestris* (of the forest), in reference to the habitat of the new species.

Remarks

Other exclusively or predominantly saxicolous species of *Fellhanera* with transversely 3-septate ascospores include *F. nashii* van den Boom from northern Mexico (van den Boom 2004) and *F. granulosa* R.C.Harris & Lendemer from eastern U.S.A. (Harris & Lendemer 2009). Both taxa have blastidiate thalli; the former contains atranorin and probably divaricatic acid (van den Boom 2004), and the hypothecium is yellowish brown to reddish brown and up to 30 μm thick, while *F. granulosa* lacks lichen substances but produces smaller apothecia than those of *F. pluviosilvestris*, with blackish discs and more-or-less concolorous margins (Harris & Lendemer 2009). Apothecia of similar size and external colour are also seen in the eastern North American *F. silicis* R.C.Harris & Ladd and *F. fallax* R.C.Harris & Lendemer, both of which, like the new Australian species, lack asexual propagules. However, the hypothecium and epihymenium of *F. silicis* are K+ purple, while these tissues are K– in *F. fallax* and K+ orange-brown in *F. pluviosilvestris*. The two American species have comparatively narrow, fusiform ascospores mostly 4–5 μm wide.

Three other species of *Fellhanera* are known from siliceous rocks in Australia. The almost cosmopolitan *F. bouteillei* (Desm.) Vězda, which usually grows on leaves, has a bluish grey or bluish green, granulose thallus containing usnic and isousnic acids, pale yellowish to orange-brown or pale brown apothecia 0.1–0.4 mm diam. and 1-septate ascospores (van den Boom 2004; Lücking 2008; Aptroot *et al.* 2009), while the recently described *F. robusta* P.M.McCarthy & Elix, from coastal rock in southern New South Wales, also has 1-septate ascospores; it is characterized by its thick, variously verrucose, bullate or contorted, whitish thallus containing atranorin and norgangaleoidin and concolorous apothecia that are heavily

impregnated with calcium oxalate (McCarthy & Elix 2017). The third Australian taxon, the endemic *F. tropica* Elix from the Northern Territory, has a pale green, granulose thallus containing 4,5-dichlorolichexanthone (major) and zeorin (major), pale to dark brown apothecia and 3–5-septate ascospores, 15–20 \times 4–6 μm (Elix 2008).

Fellhanera pluviosilvestris is known only from the type locality in eastern New South Wales, where it grows on siliceous rock in cool-temperate rainforest. Associated species include *Chiodecton leptosporum* Müll.Arg., *Cladia aggregata* (Sm.) Nyl., *Heterodermia koyana* (Kurok.) Elix, *Parapropidia* sp., *Parmeliella* sp. and *Trapelia coarctata* (Sm.) M.Choisy.

References

- Aptroot, A; Sérusiaux, E; Edwards, B; Coppins, BJ (2009): *Fellhanera* Vězda (1986). In Smith, CW; Aptroot, A; Coppins, BJ; Fletcher, A; Gilbert, OL; James, PW; Wolseley, PA (eds), *The Lichens of Great Britain and Ireland*: 398–401. British Lichen Society, London.
- Elix, JA (2008): Four new lichens from tropical and subtropical Australia. *Australasian Lichenology* **62**, 35–39.
- Hafellner, J (1984): Studien in Richtung einer natürlicheren Gliederung der Sammelfamilien Lecanoraceae und Lecideaceae. *Beihefte zur Nova Hedwigia* **79**, 241–371.
- Harris, RC; Lendemer, JC (2009): The *Fellhanera silicis* group in eastern North America. *Opuscula Philolichenum* **6**, 157–174.
- Lücking, R (2008): Foliicolous lichenized fungi. *Flora Neotropica Monograph* **103**, 1–867.
- 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). ABRIS, 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.
- Sérusiaux, E (1996): Foliicolous lichens from Madeira, with the description of a new genus and two new species and a world-wide key to foliicolous *Fellhanera*. *Lichenologist* **28**, 197–227.
- van den Boom, PPG (2004): *Fellhanera*. In Nash, III TH; Ryan, BD; Diederich, P; Gries, C; Bungartz, F (eds), *Lichen Flora of the Greater Sonoran Desert Region* **2**, 107–108. Lichen Unlimited, Arizona State University, Tempe.
- Vězda, A (1986): Neue Gattungen der Familie Lecideaceae s. lat. (Lichenes). *Folia Geobotanica et Phytotaxonomica* **21**, 199–219.

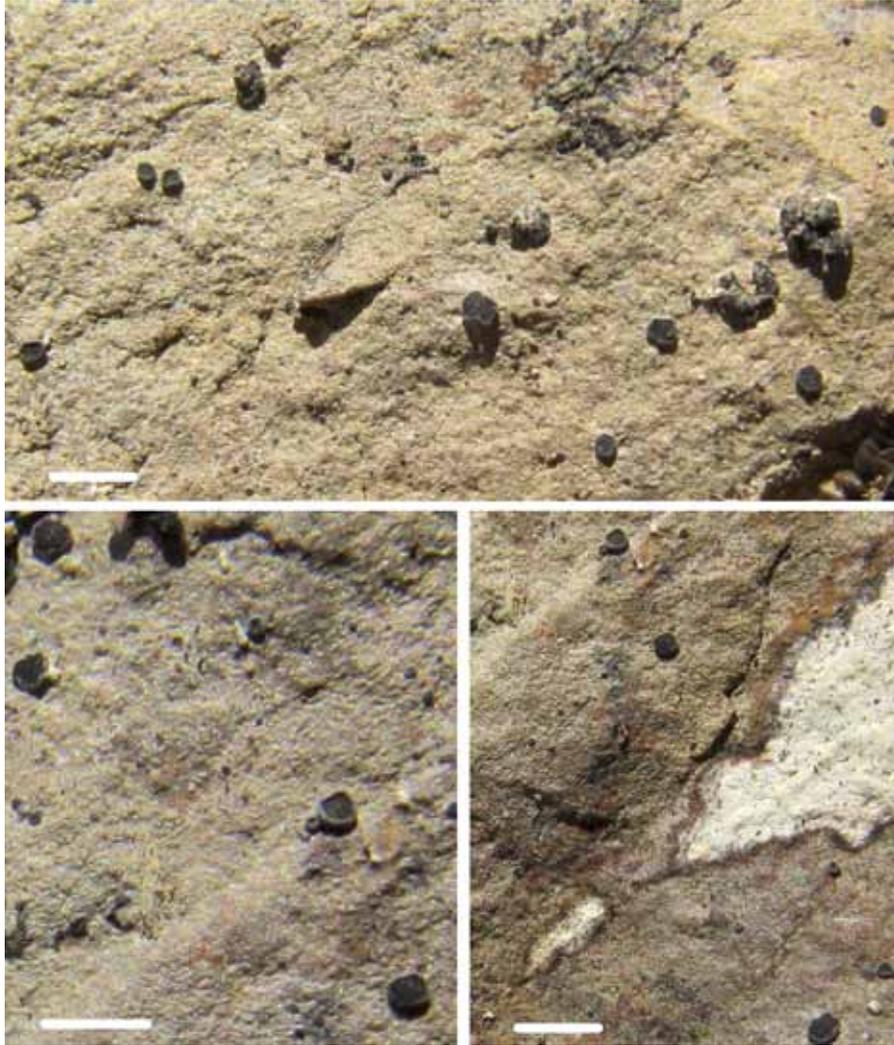


Figure 1. *Fellhanera pluviosilvestris* (holotype). Scales: 2 mm.

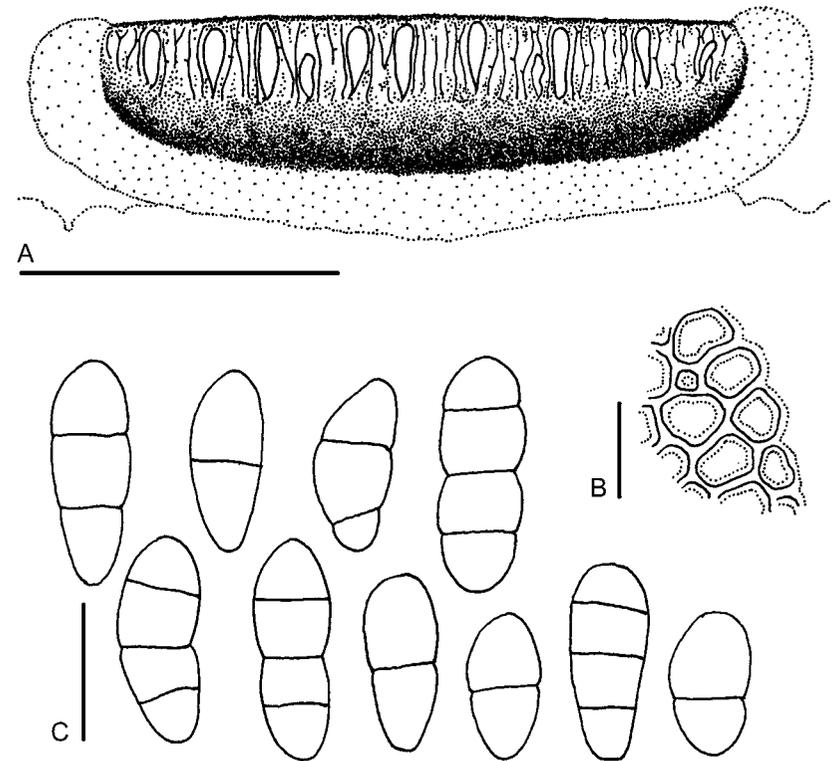


Figure 2. *Fellhanera pluviosilvestris* (holotype). A, Vertical section of an apothecium (semi-schematic); B, Outer cells of the lateral excipulum; C, Ascospores. Scales: A = 0.2 mm; B, C = 10 μ m.