**Hymenelia ceracea** (Arnold) M.Choisy and Thelenella fernandeziana (Zahlbr.) H. Mayrhofer

**Abstract**

_Hymenelia ceracea_ (Arnold) M.Choisy and _Thelenella fernandeziana_ (Zahlbr.) H. Mayrhofer are reported for the first time from Australia, the former occurring on granite in the Southern Tablelands, New South Wales, while the latter was collected from sandstone in woodland in the Australian Capital Territory.

**Introduction**

Field work and the re-assessment of older herbarium collections continue to improve our understanding of the diversity and distribution of the Australian lichen flora. In this contribution, _Hymenelia ceracea_ (Arnold) M.Choisy and _Thelenella fernandeziana_ (Zahlbr.) H. Mayrhofer, are reported for the first time from Australia, the former from the Southern Tablelands, New South Wales, and the latter from the Australian Capital Territory.

**Hymenelia ceracea** (Arnold) M. Choisy, _Bulletin Mensuel de la Société Linnéenne de Lyon_ 18, 145 (1949)

**Thallus** epilithic, effuse to ± determinate, pale to medium yellowish brown, smooth, continuous and almost membranous to rimose or areolate, thin, to 50–80(–100) µm thick, forming scattered colonies to 5(–10) mm wide, often in a mosaic with other crustose lichen species. _Areoles_ solitary and rounded to contiguous and angular, 0.2–0.5 mm wide. _Cortex_ lacking, but the thallus with an uppermost, amorphous, alga-free layer, 6–15 µm thick. _Algal layer_ 25–70 µm thick, thinner and continuous beneath apothecia; cells green, chlorococcoid, 7–13 µm wide; interstitial _hymenial_ 1.5–2.5(–3) µm wide. _Medulla_ thin and poorly delimited, heavily impregnated with minute rock fragments and crystals, not containing calcium oxalate (H₂SO₄–). _Hypothecium_ hyaline to pale brown, 15–20 µm thick.

**Prothallus and hypothallus**

The _prothallus_ and _hypothallus_ of _Hymenelia ceracea_ is most similar to _H. lacustris_ (B.F. teaching) but lacks a perisporic layer.

**Apothecia**

_Hymenium_ hyaline to pale brown, 15–20 µm thick.

**Excipulum** (in section) 40–70 µm thick at the apex, with an apparent dark brown-black zone, internally pale brown; sides and base _hymenial_ 25–35 µm thick and non-amyloid.

**Prothallus** and _hypothallus_ areolate, medium to dark grey-green, to 0.3(–0.5) mm thick. _Areoles_ moderately to strongly convex, 0.3–1(–1.5) mm wide, smooth, matt, corticate. _Cortex_ hyaline, amorphous or obscurely prosoplectenchymatous, (30–)40–70 µm thick, subtended by a paraplectenchymatous subcortex to 12 µm thick, of rounded, hyaline to grey-brown cells 4–7 µm wide. _Algal layer_ 50–150 µm thick, with abundant anastomoses, 1–1.5 µm wide, containing an apothecium, long-celled, 70–150(–200) µm thick, I–.

**Hymenium**

_Hymenium_ hyaline, 7–10 µm thick, dominated by the _epihymenium_ and covers the outer excipular surface. _Epiphymenium_ consists of thin-walled, elongate perichinal hyphae, K₁– dark blue, K₂– N₁–. _Hymenium_ hyaline, 10–15 µm thick, impregnated with minute granules, K₁– K₂– N₁–, of variously orientated hyphae 1.5–2 µm wide. _Hymenium_ hyaline, 65–85 µm thick, not impregnated with granules or oil droplets; _hymenial_ gel light brown, K₁– blue; _hymenium_, hypothecium and inner _excipulum_ patchily _H₂SO₄_– blue. _Epiphymenium_ hyaline, 7–10 µm thick, K₂– N₁–, dominated by a dense concentration of _epiplectenchymatous_ granules on and between the apices of paraphyses; _granules_ c. 0.5–0.8 µm wide, not dissolving in _K₂SO₄_. _Paraphyses_ rather loosely arranged to tightly conglutinate in water, loosening a little in _K₁_ (except near the apices), simple or with some anastomoses below, more rarely branching in and below the _epihymenium_, longer-celled below, shorter-celled to slightly moniliform distally and more markedly constricted at the septa, 3–5(–3.5) µm wide, containing minute granules and vacuoles; apical cells _hymenial_, not or slightly swollen or moderately swollen and rounded to ellipsoidal, 3–5(–6) µm wide. _Asci_ narrowly to broadly clavate or clavate-cylindrical, (4–)8–spored, 55–75 × 12–17 µm (n = 20), _K₂_–, with an abrupt stalk; apex rounded, with a thick _tholus_ when immature, the _tholus_ much thinner at maturity; _ocular chamber_ lacking. _Ascosporas_ colourless, simple, narrowly to broadly ellipsoid or oblong-ellipsoid, with rounded or subacute ends, thin-walled, lacking a _perisporic_ _overlapping-_ _unicerate_ in the ascus or irregularly _biseriate_ or _unicerate_ below and _biseriate_ distally, (11–)14(–17) × (6–)7.5(–9) µm (n = 70), commonly containing a large vacuole and _granules_. _Pycnidia_ not seen.

**Chemistry**

No substances detected by TLC.

Previously known from Europe, Macaronesia, Korea and eastern Canada (Poelt & Věžda 1981; Clauzade & Roux 1985; Berger & Prinzenhofer 2008; Aptroot & Moon 2014; Friedy & McCarthy 2018). _H. ceracea_ is the third species of the genus known from Australia, along with the common and mainly pantemperate _H. lacustris_ (With.) M. Choisy and the endemic Tasmanian species _G. gyalectoidea_ Kantvilas (Kantvilas 2014). _Hymenelia lacustris_ is most similar to _H. ceracea_, but is semi-aquatic to almost fully aquatic in fresh water, with paler and often larger apothecia that are sunken in the more robust thallus and have a _hymenium_ that is thicker and non-impersed (e.g. Fletcher et al. 2009, as _Ionaspis_ Kantvilas 2014).

**SPECIMENS EXAMINED**

_New South Wales_.

Captains Flat, 35°51′14″S, 149°23′59″E, 985 m alt., on weathered roadside granite in pasture, J.A. Elix 46493, 5.xi.2017 (CANB).

**Thelenella fernandeziana** (Zahlbr.) H. Mayrhofer, _Bibliotheca Lichenologica_ 26, 33 (1987)

**Figs** 3 & 4

_Thallus_ epilithic on siliceous rocks, areolate, medium to dark grey-green, to 0.3(–0.5) mm thick. _Areoles_ moderately to strongly convex, 0.3–1(–1.5) mm wide, smooth, matt, corticate. _Cortex_ hyaline, amorphous or obscurely prosoplectenchymatous, (30–)40–70 µm thick, subtended by a paraplectenchymatous subcortex to 12 µm thick, of rounded, hyaline to grey-brown cells 4–7 µm wide. _Algal layer_ 50–150 µm thick, with abundant anastomoses, 1–1.5 µm wide, containing an _apothecium_, long-celled, 70–150(–200) µm thick. _Medulla_ 70–150(–200) µm thick, I–.

**Hymenium**

_Hymenium_ hyaline, 7–10 µm thick, dominated by the _epihymenium_ and covers the outer excipular surface. _Epiphymenium_ consists of thin-walled, elongate perichinal hyphae, K₁– dark blue, K₂– N₁–. _Hymenium_ hyaline, 10–15 µm thick, impregnated with minute granules, K₁– K₂– N₁–, of variously orientated hyphae 1.5–2 µm wide. _Hymenium_ hyaline, 65–85 µm thick, not impregnated with granules or oil droplets; _hymenial_ gel light brown, K₁– blue; _hymenium_, hypothecium and inner _excipulum_ patchily _H₂SO₄_– blue. _Epiphymenium_ hyaline, 7–10 µm thick, K₂– N₁–, dominated by a dense concentration of _epiplectenchymatous_ granules on and between the apices of paraphyses; _granules_ c. 0.5–0.8 µm wide, not dissolving in _K₂SO₄_. _Paraphyses_ rather loosely arranged to tightly conglutinate in water, loosening a little in _K₁_ (except near the apices), simple or with some anastomoses below, more rarely branching in and below the _epihymenium_, longer-celled below, shorter-celled to slightly moniliform distally and more markedly constricted at the septa, 3–5(–3.5) µm wide, containing minute granules and vacuoles; apical cells _hymenial_, not or slightly swollen or moderately swollen and rounded to ellipsoidal, 3–5(–6) µm wide. _Asci_ narrowly to broadly clavate or clavate-cylindrical, (4–)8–spored, 55–75 × 12–17 µm (n = 20), _K₂_–, with an abrupt stalk; apex rounded, with a thick _tholus_ when immature, the _tholus_ much thinner at maturity; _ocular chamber_ lacking. _Ascosporas_ colourless, simple, narrowly to broadly ellipsoid or oblong-ellipsoid, with rounded or subacute ends, thin-walled, lacking a _perisporic_ _overlapping-_ _unicerate_ in the ascus or irregularly _biseriate_ or _unicerate_ below and _biseriate_ distally, (11–)14(–17) × (6–)7.5(–9) µm (n = 70), commonly containing a large vacuole and _granules_. _Pycnidia_ not seen.

**Chemistry**

No substances detected by TLC.
First described from basalt in the Juan Fernández Islands, a Chilean territory in the southeastern Pacific Ocean (Zahlbruckner 1924, as Microglaena), this lichen is distinguished from all other Thelenella species by the combination of a comparatively thick greyish thallus, simple, immersed, non-involucellate perithecia and ascospores that become brown early in their ontogeny (Mayrhofer 1987; Morse 2016). The type collection was made by C. and I. Skottsberg on Santa Clara Island in 1917 (Zahlbruckner 1924; Mayrhofer 1987), and the species was recollected there and on nearby Mas a Tierra by H.A. Imshaug in 1965 (Fryday & Coppins 2004). Although there are no further published records of this species, the Museum of New Zealand Te Papa Tongarewa contains material of T. fernandeziana from New Zealand (4 km NW of Pourerere, E of Waipukurau) collected by H. Mayrhofer in 1992. https://collections.tepapa.govt.nz/object/224955

SPECIMEN EXAMINED
Australian Capital Territory: ● NE slopes of Mt Mugga Mugga, Canberra Nature Park, beside Hindmarsh Drive, Woden Valley, Canberra, 35°20'43"S, 149°07'10"E, 660 m alt., on sandstone pebbles embedded in porphyritic soil in area of dry land salinity in open Eucalyptus-Allocausaurus woodland, P.M. McCarthy 4811, 27.xii.2018 (CANB).

References

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Morse, CA (2016): Two new species of *Thelenella* and new reports from the Great Plains of central North America, with a worldwide key to the genus. *Opuscula Philolichenum* 15, 22–36.
Figure 3. Thelenella fernandeziana (P.M. McCarthy 4811, CANB). Scale: 2 mm.

Figure 4. Thelenella fernandeziana (P.M. McCarthy 4811, CANB). A, Sectioned perithecium and adjacent thallus (semi-schematic); B, Mature ascospore. Scales: A = 0.2 mm; B = 20 µm.