

A new species of *Micarea* (Pilocarpaceae) from soil in New Zealand

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Abstract

Micarea rubiformis P.M. McCarthy & Elix sp. nov. (lichenized Ascomycota, Pilocarpaceae) is described from consolidated, siliceous soil in *Nothofagus* forest in southern New Zealand.

Introduction

The genus *Micarea* Fr. (Pilocarpaceae) is poorly understood in New Zealand and its offshore islands, with only nine species reliably reported (Coppins & Kantvilas 1990; Fryday 2004; Galloway 2007; Kantvilas & Coppins 2019). However, given that investigations carried out over many years have yielded 35 species in Tasmania (Kantvilas & Coppins 2019), the range of available substrata and habitats in New Zealand suggests that actual diversity is possibly in excess of 50 taxa. In this contribution, a new species, *M. rubiformis*, is described and illustrated from forest soil in the South Island.

Micarea rubiformis P.M. McCarthy & Elix, sp. nov.

Figs 1 & 2

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Thallus terricolous, pale greyish green, continuous to rimose, 50–100 µm thick, containing 2'-*O*-methylsuperlatic acid. Apothecia adnate to sessile, jet-black, immarginate, strongly convex to subglobose, 0.15–0.74 mm diam., markedly tuberculate; hypothecium deep red-brown (± Laurocerasi-brown), 80–210 µm thick; hymenium hyaline to pale yellowish, 48–70 µm thick, not interspersed. Asci 46–68 × 11–15 µm; ascospores 0(–1)-septate, mostly narrowly ellipsoid to oblong, 10–20 × 4.5–7 µm.

Type: New Zealand. South Island, Canterbury, track to Cass Saddle from Field Station, Sugarloaf Bush, 43°02'S, 171°47'E, c. 800 m alt., on consolidated, siliceous soil in *Nothofagus* forest, J.A. Elix 26213, 18.ii.1991 (holotype – CANB).

Thallus crustose, superficial on consolidated, siliceous soil, determinate and forming well-delimited colonies to c. 30 mm wide, smooth and continuous to granular-scurfy and rimose or densely and irregularly verruculose, uniformly pale greyish green, dull, 50–80(–100) µm thick, non-amyloid (I–), not containing calcium oxalate (H₂SO₄–), ecorticate; soredia and isidia absent. *Algae* dominating the thallus, not forming gonocysts; cells micareoid, greyish green, ± globose to broadly ellipsoidal, thin-walled, 4–6(–7) µm wide; interstitial hyphae 1.5–2.5 µm wide. *Medulla* poorly delimited; hyphae 2.5–3.5(–4) µm wide, short-celled, thin-walled. *Prothallus* not apparent. *Apothecia* very numerous, adnate to sessile, dull jet-black, rounded, ellipsoid or rounded-irregular (often due to mutual pressure among clustered apothecia), solitary or proliferating in groups of up to 20, and usually appearing tuberculate, (0.15–)0.42(–0.74) mm diam. [*n* = 80]; solitary apothecia up to 0.5 mm wide, but most structures greater than 0.35 mm wide are actually proliferating-tuberculate compound apothecia; occasional tuberculate clusters, 0.8–1.6 mm wide, usually the result of merging smaller clusters rather than apothecial proliferation; apothecia immarginate from very early in their development (even when less than 50 µm wide); disc dull, smooth, epruinose, moderately to strongly convex or subglobose. *Proper excipulum* not apparent at maturity, ± vestigial in very small, immature apothecia, red-brown, K+ paler, N–, C–. *Hypothecium* deep-red-brown [± Laurocerasi-brown of Meyer & Printzen (2000)], 80–160(–210) µm thick, paraplectenchymatous below, distally with short-celled, deeply pigmented, anticlinal hyphae 2.5–3.5 µm wide, not interspersed with granules or oil globules, K+ dark dirty brown, N–, C+ darker red-brown,

with hints of brown-black. *Hymenium* hyaline to pale yellowish, with or without pale to medium red-brownish vertical streaks, 48–65(–70) µm thick, not interspersed, K+ paler, N–, C–; subhymenium not apparent. *Epihymenium* pale red-brown, or indistinct and not clearly delimited from the hymenium, K+ paler, N–, C–. *Paraphyses* uniform, tightly conglutinate in water, loosening only slightly in K, simple to sparingly furcate-branched towards the apices, long-celled, 1–1.5(–2) µm wide, not constricted at the septa; apices not pigmented, not or only very slightly swollen. *Asci* narrowly clavate to clavate-cylindrical, 46–68 × 11–15 µm [*n* = 15], 8-spored, *Byssoloma*-type, i.e. with an amyloid outer coat, the tholus well-developed, predominantly amyloid, with or usually without a minute, conical ocular chamber subtending a paler, apical cushion bounded by a more darkly amyloid tube structure. *Ascospores* colourless, 0(–1)-septate, narrowly ellipsoid to oblong, occasionally broadly ellipsoid or oblong-fusiform, the distal end commonly broader and more rounded than the proximal, usually straight, irregularly massed or overlapping-biseriate in the ascus, not constricted at the septum, (10–)14(–20) × (4.5–)5.5(–7) µm [*n* = 90], thin-walled, lacking a perispore; apices rounded; contents clear or finely granulose. *Pycnidia* not seen.

Chemistry: Thallus K–, P–, C–, UV–; containing 2'-*O*-methylsuperlatic acid (major) by TLC (Elix 2014).

Etymology: The specific epithet, from the blackberry genus *Rubus* and *-formis* (having the shape of), alludes to the mature, tuberculate apothecial clusters that resemble blackberries.

Remarks

Micarea rubiformis is characterized by its pale and continuous to verruculose, terricolous thallus, with prominent, jet-black tuberculate apothecia that have a non-pigmented or pale yellowish hymenium (lacking Sedifolia-grey), a thick, dark hypothecium with ± Laurocerasi-brown, comparatively large 0(–1)-septate ascospores and, especially, by its thallus chemistry. In *Micarea*, the orcinol depside 2'-*O*-methylsuperlatic acid is only known from *M. tubaeformis* Kantvilas & Coppins, a common epiphyte of Tasmanian rainforest (Kantvilas & Coppins 2019). However, the latter has large pycnidia that resemble the stalked ascomata of *Calicium* species, as well as a globose-areolate and cephalodiate thallus and ascospores that are 3–7-septate, filiform and 45–100 × 1–2 µm (Kantvilas & Coppins 2019). *Micarea melaenida* (Nyl.) Coppins, a terricolous species from Europe, South Africa and southern Australia (Tasmania and South Australia), has a rather similar thallus to *M. rubiformis*, along with blackish apothecia and a reddish brown to purple-brown hypothecium (Coppins 1983; Kantvilas & Coppins 2019). However, the apothecia are convex to hemispherical but not tuberculate, the epihymenium is dark purple-brown, the ascospores are predominantly 1-septate and noticeably narrower (3–5 µm wide), and the thallus lacks lichen substances.

The new species is known only from bare, consolidated, siliceous soil in *Nothofagus* forest in southern New Zealand. Associated species include various *Cladonia* spp., *Peltigera tereziana* Gyeln., *Pseudocyphellaria maculata* D.J. Galloway, *Trapeliopsis congregans* (Zahlbr.) Brako and *T. granulosa* (Hoffm.) Lumbsch.

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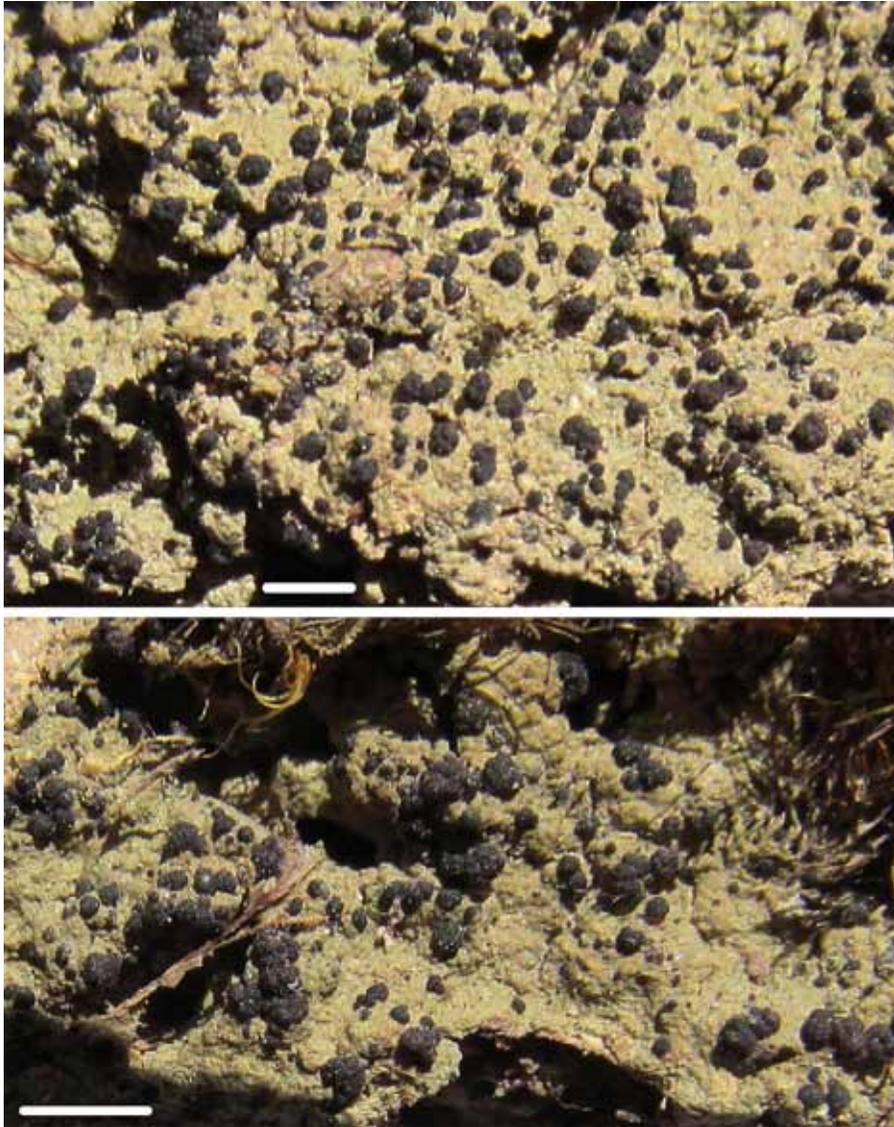


Figure 1. *Micarea rubiformis* (holotype). Scales: 2 mm.

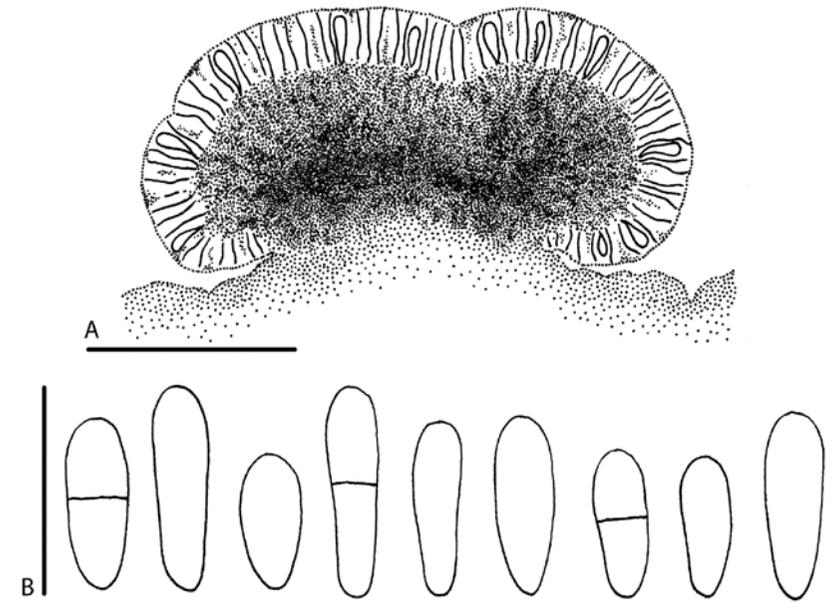


Figure 2. *Micarea rubiformis* (holotype). A, Vertical section of an apothecium (semi-schematic); B, Ascospores. Scales: A = 0.2 mm; B = 20 μ m.