

Polycoccum crespoae sp. nov., the first report of a lichenicolous fungus on *Chondropsis semiviridis* (Parmeliaceae)

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Abstract: *Polycoccum crespoae* sp. nov. is described from thalli of *Chondropsis semiviridis* collected in Australia (Victoria). It has consistently 4-spored asci but differs from known 4-spored species in the size and shape of the ascospores. Attention is also drawn to another undescribed *Polycoccum* found on another genus of Parmeliaceae, *Karooowia adhaerens*, from South Africa (Cape Province).

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Introduction

When the genus *Polycoccum* Sauter ex Körb. (Dothideales, *Dacampiaceae*) was revised by Hawksworth & Diederich (1988), 23 species were accepted, most of which were narrowly host-specific and gall-forming. Since that time, a further ten species have been recognized, also confined to particular host genera or species. The species are separated microscopically and differ in the sizes of the perithecia, asci, and ascospores, ascus shape, number of spores per ascus, and ascospore shape and ornamentation. The biology of lichenicolous *Dacampiaceae* was examined by Ríos & Grube (2000) who found that the species were primarily mycoparasitic.

Polycoccum montis-wilhelmii Diederich, the only other species of the genus previously known from Parmeliaceae, forms galls on thalli of *Hypotrachyna sinuosa* on Mt Wilhelm in Papua New Guinea (Aptroot *et al.* 1997). In the course of investigations into the pycnidia of lichens in the Parmeliaceae, two further *Polycoccum* species were encoun-

tered incidentally on material borrowed from The Natural History Museum, London (BM), one on *Chondropsis semiviridis* from Australia, and the other on *Karooowia adhaerens* from South Africa. While the material of the latter was too scanty to prepare a full description, that on the *Chondropsis* was abundant enabling the new species *P. crespoae* to be formally described here.

Methods

Mature ascospores were measured in water, 10% KOH, Lugol's iodine (after pre-treatment with 10% KOH), and lactophenol cotton-blue (after warming) at $\times 1600$ magnification on a Zeiss Axioskop photomicroscope. There were no significant differences between the measurements in different mountants. The mean value was calculated and the results are given as: (extreme minimum) minimum value—mean (italic)—maximum value (extreme maximum). Thirty-eight ascospores, 10 perithecia, and 3 mature asci were measured in the Axioskop. Larger numbers of perithecia and asci were not studied to avoid using too great a proportion of the perithecia in the holotype; in these cases measurements are given without a mean. Drawings were prepared with a drawing tube.

The Species

Polycoccum crespoae Váczi & D. Hawksw., sp. nov.

Perithecia immersa, (105–)115–135 (–155) μm alta, (85–)100–120(–130) μm lata. Asci 44–64 \times 12.5–

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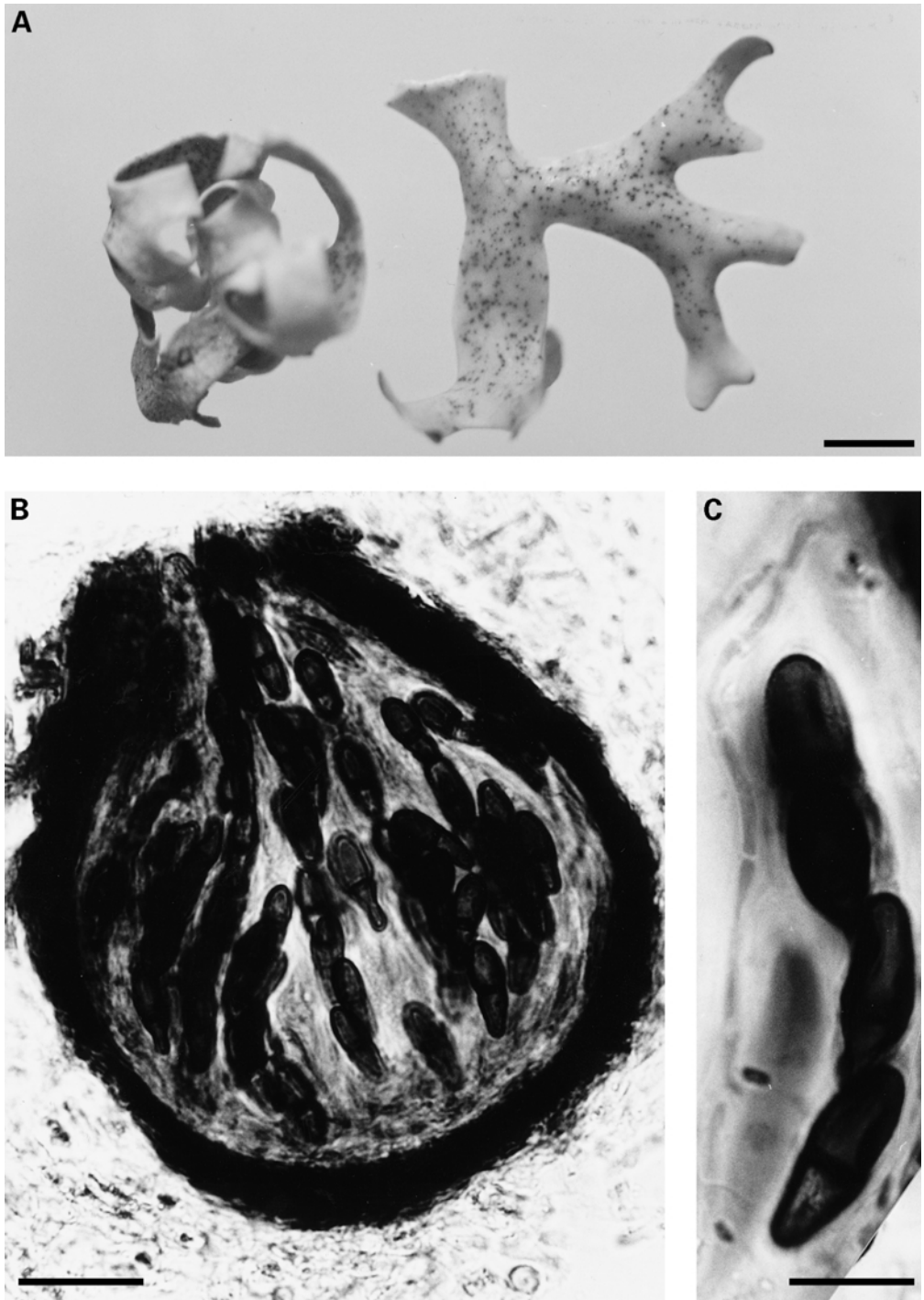


FIG. 1. *Polycoccum crespoae* (holotype). A, infected thalli of *Chondropsis semiviridis*, dried and rolled up (left) and re-hydrated in water (right), the latter showing abundant perithecia; B, vertical section of perithecium; C, ascus with branched cellular pseudoparaphyses. Scales: A=2 mm; B=15 μ m; C=10 μ m.

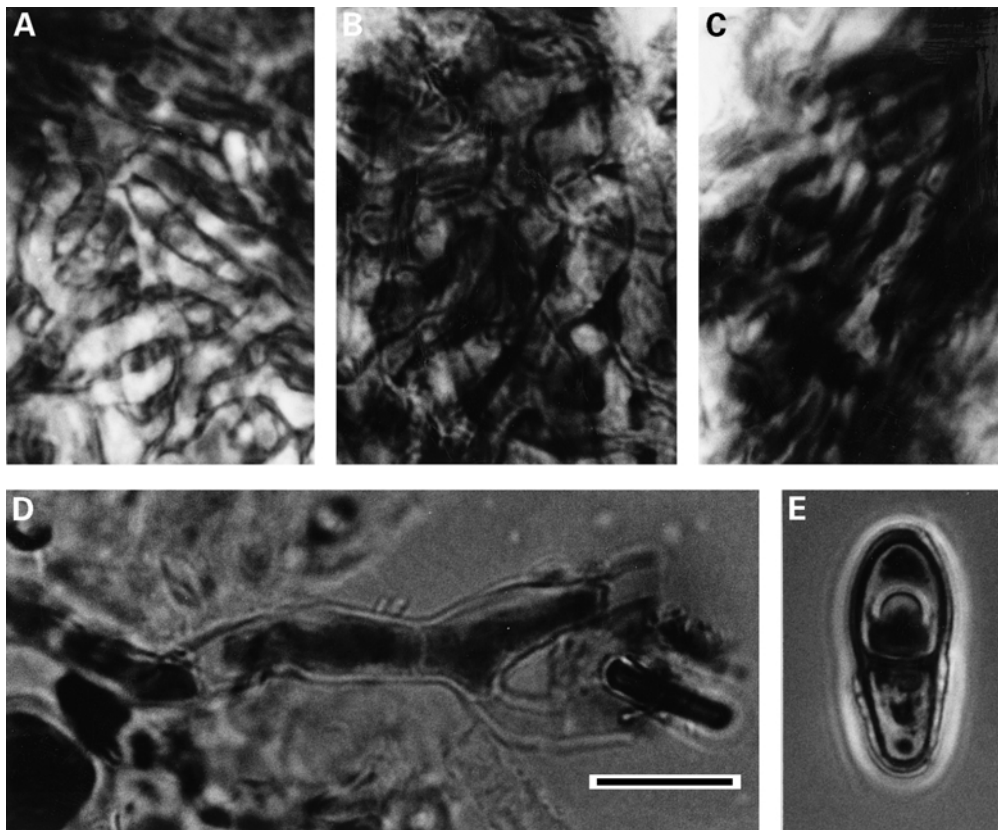


FIG. 2. *Polycoccum crespoae* (holotype). A, surface view of young perithecium showing a hyphal structure; B, surface view of mature perithecium showing angular pseudoparenchymatous cells; C, vertical section of wall of mature perithecium; D, hypha penetrating into the algal layer of the host; E, ascospore with phase contrast illumination showing the gelatinous sheath. Scale=10 μ m.

13 μ m, 4-spore. Ascospores late ellipsoideae vel soleiformes, brunneae, leviter verruculosae, 1-septatae, (14-)17-19.7-20(-21) \times (6-)6.5-6.8-7.5(-8) μ m.

Typus: Australia, Victoria, Wyperfeld National Park, Round Lake area, on *Chondropsis semiviridis* on sandy soil, 19 September 1977, E. C. Wallace s. n. (BM 691115—holotypus).

(Figs 1-3A)

Ascomata perithecia, immersed, arising singly, frequently in small patches of 13-25 separate perithecia, the patches mostly 2-3 mm wide, sometimes becoming confluent and forming more extensive infections, not producing galls. *Perithecia* subglobose to broadly ellipsoid, when mature slightly narrower in the upper part, (105-)115-

135(-155) μ m tall and (85-)100-120(-130) μ m wide, dark brown; ostiole (10-)25-35 (-55) μ m wide, not protruding above the thallus surface; walls (6-)8-14(-15) μ m thick in vertical section, when mature composed of 4-6 layers of angular and radially compressed pseudoparenchymatous cells (*textura angularis*), brown; individual cells (5-)7-9(-13) \times 2-3 μ m in vertical section, 7-9 \times 2-7 μ m in surface view (the narrower cells elongated and orientated vertically in young perithecia); cell walls 0.5-1 μ m thick. *Mycelium* immersed, sparse; hyphae spreading through the cortex of the host; hyphae filamentous, rather uneven in thickness, hyaline; cells (4.5-)8-10.5(-12.5) \times (1-)1.5-2(-2.5) μ m; walls less than 0.5 μ m

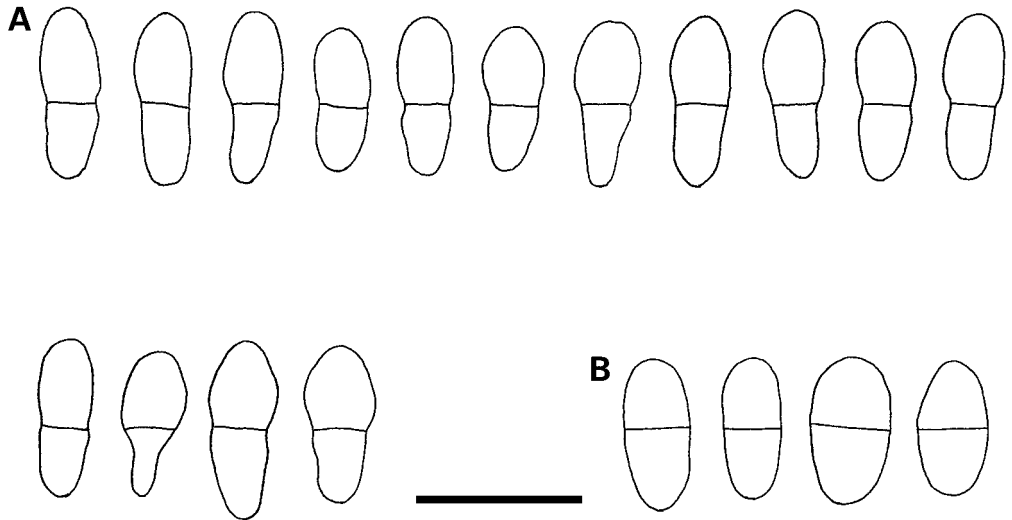


FIG. 3. Ascospore outlines. A, *Polycoccum crespoae* (holotype); B, *Polycoccum* sp. on *Karooivia adhaerens* (BM 676683). Scale = 10 μ m.

thick. *Hamathecium* of branched and anastomosed cellular pseudoparaphyses, abundant, persistent, repeatedly septate, 1.5–2 μ m thick; centrum I– (Lugol's iodine). *Asci* broadly clavate, short-stalked, bitunicate in structure with an internal apical beak, 44–64 \times 12.5–13 μ m, 4-spored; discharge fissitunicate; contents I+ yellow-orange (Lugol's iodine), ascus wall I– (Lugol's iodine). *Ascospores* overlapping monoseriate, deep yellow-brown, ellipsoid to soleiform, 1-septate, the upper cell larger and the lower sometimes somewhat attenuated, constricted at the septum, thick-walled, minutely warted, with a thin enveloping gelatinous sheath 1 μ m thick, overall excluding the sheath (14–)17–19.7–20(–21) \times (6–)6.5–6.8–7.5(–8) μ m, length:breadth ratio 2.5:1.

Etymology. Named in recognition of Professor Ana María Crespo de Las Casas's contributions to lichenology and our gratitude to her for enabling us to collaborate on this paper.

Host. *Polycoccum crespoae* infects thalli of *Chondropsis semiviridis* (Parmeliaceae). The fungus does not form galls in the specimen studied, but appears to be mildly pathogenic

as the most infested areas of the thallus become discoloured brownish. It occurs on inrolled parts of the upper surface of the thallus, and is most easily found when the specimens unroll after re-hydration in water (Fig. 1A).

Distribution. Known only from the holotype from Australia (Victoria). The fungus was not noted on other material in BM, but should be sought on other specimens of this species within the range of the host in Australia and New Zealand (Elix & Child 1987). In addition, species currently placed in *Neofuscelia* and *Xanthoparmelia* might also be checked as these 'genera' are now known to be extremely closely related and perhaps congeneric with *Chondropsis* (Crespo *et al.* 2001).

Observations. *Polycoccum montis-wilhelmii* on *Hypotrachyna* (see above) is gall-forming and has 8-spored asci with smaller ascospores (14.5–16 \times 6.5–7 μ m). Scant material of another undescribed *Polycoccum* was discovered on a third genus in the Parmeliaceae during our studies. This occurred on a specimen of *Karooivia adhaerens* (South Africa: Cape Province: 19 km south of Prince Albert, summit of Swartberg Pass, on

rock, alt. 1650 m, 6 February 1986, *F. Brusse* 4883, BM 676683) and had 8-spored asci and thick-walled, dark brown, equal-celled (isolocular), ellipsoid ascospores of $13\text{--}17 \times 7\text{--}8 \mu\text{m}$ (Fig. 3B; the walls to $2 \mu\text{m}$ thick). The fungus on the *Karooivia* is mentioned here to encourage the search for additional infected specimens and permit its formal description.

Polycoccum crespoae is unusual in the genus in having consistently 4-spored asci. These also occur in *P. crassum* Vězda (on *Peltigera*) but in that species the ascospores are coarsely warty and $(25\text{--})30\text{--}32\text{--}(36) \mu\text{m}$ long. Both 4- and 6-spored asci occur in three species: *P. clauzadei* Nav.-Ros. & C. Roux (on *Xanthoria elegans*) with coarsely warty, dark brown, ascospores $15\text{--}18.5\text{--}(19.5) \times (6.5\text{--})7\text{--}9\text{--}(9.5) \mu\text{m}$; *P. microsticticum* (Leighton ex Mudd) Arnold (on saxicolous *Acarospora*, *Buellia* and *Hymenelia* species) with ascospores $14\text{--}18 \times 7\text{--}8.5 \mu\text{m}$; and *P. peltigerae* (Fuckel) Vězda (on *Peltigera*) with centrally septate ascospores that are generally more pointed at the apices and measure $(12\text{--})13.5\text{--}16\text{--}(18) \times 4\text{--}6\text{--}(7) \mu\text{m}$.

The new species is closest to *P. microsticticum* in the overall ascospore dimensions, but in that fungus the ascospores are darker in colour, more coarsely ornamented, smoothly rounded at the apices, centrally septate, and relatively broad with a length: breadth ratio of 2:1.

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