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A new species of *Rinodina* (Physciaceae, Ascomycota) from eastern Australia

Helmut Mayrhofer & John A. Elix

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A new species of *Rinodina* (Physciaceae, Ascomycota) from eastern Australia

Helmut Mayrhofer

University of Graz, Institute of Biology, Division of Plant
Sciences, NAWI Graz, Holteigasse 6, 8010 Graz, Austria
e-mail: helmut.mayrhofer@uni-graz.at

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

Rinodina michaelae H.Mayrhofer & Elix, characterized by the presence of 6-*O*-methylarthothelin and zeorin, is described as new to science from Queensland and New South Wales, Australia.

The saxicolous species of *Rinodina* (Ach.) S.F.Gray in Australia are relatively well known following the initial treatment by Mayrhofer (1984), further additions by Mayrhofer *et al.* (1990), Matzer & Mayrhofer (1994), Matzer *et al.* (1998) and Trinkaus *et al.* (1999), and the more recent revisions by Kaschik (2006) and Elix (2011). In this paper we describe a new saxicolous species of *Rinodina* from Queensland and New South Wales.

Methods

Observations and measurements of photobiont cells, thallus and apothecium anatomy, asci and ascospores were made on hand-cut sections mounted in water and 10% KOH (K). Asci were also observed in Lugol's Iodine (I), with and without pretreatment in K. Medullary sections were treated with 10% sulfuric acid (H₂SO₄), and apothecial sections with 50% nitric acid (N).

The new species

Rinodina michaelae H.Mayrhofer & Elix, sp. nov. Figs 1, 2
Mycobank number: **MB 825243**

Similar to *Rinodina fijiensis* Elix & Giralt, but differs in having a brown to dark brown hypothecium, larger ascospores, and in containing 6-*O*-methylarthothelin.

Type: Australia, Queensland, Kerry, Duck Creek Road, near Lamington National Park close to O'Reilly's Mountain Resort, 28°10'S, 153°04'E, 850–950 m alt., on basalt, *H. Mayrhofer 11478*, *E. Hierzer & R.W. Rogers*, 18.viii.1993 (GZU – holotype).

Thallus to 40 mm wide, crustose, continuous and rimose to areolate-subsquamulose; individual areoles 0.1–0.5 mm wide, to 0.15 mm thick, scattered or contiguous, concave to plane; upper surface matt, smooth to verruculose, esorediate, grey-white to cream or pale yellow-brown; prothallus marginal, white or absent; medulla white, lacking calcium oxalate (H₂SO₄-), I-; photobiont cells 7–12 µm diam. *Apothecia* 0.2–0.7 mm wide, scattered, lecanorine, immersed at first, then broadly adnate but rarely sessile and basally constricted; disc pale brown to brown-black, epruinose, plane to weakly convex; thalline margin thick and raised above the disc at first, becoming thinner and excluded in convex apothecia. *Proper excipulum* indistinct, in section 70–80 µm thick, outer zone dark brown, K-, N-; inner zone paler brown. *Epihymenium* 10–15 µm thick, brown to dark brown, K-, N-. *Hypothecium* 150–240 µm thick, dark brown to brown-black, K+ yellow solution, N-. *Hymenium* 70–80 µm thick, colourless; subhymenium 40–50 µm thick, yellow-brown; paraphyses 1.5–2.5 µm wide, simple to branched, capitate, with apices 3–3.5 µm wide and brown caps, not interspersed with oil droplets;

asci of the *Lecanora*-type, 2–7-spored or rarely 8-spored. *Ascospores* transitioning from *Serotina*- to *Dirinaria*-, *Physcia*-, *Pachysporaria*- or *Buellia*-type, 1-septate, brown, broadly ellipsoid, 20–[23.9]–28 × 12–[13.9]–18 µm, not constricted at the septum, often with paler spore-ends, rarely becoming fusiform with age; ontogeny of type-B; outer spore-wall smooth. *Pycnidia* pyriform, immersed, brown to brown-black; conidia bacilliform, 3.5–5 × 1 µm. *Chemistry:* Thallus K+ pale yellow, C+ orange, P-, UV+ orange; containing zeorin (major), 6-*O*-methylarthothelin (major), arthothelin (trace), 4,5-dichloro-6-*O*-methylnorlichexanthone (trace), 2,4,5-trichlorolichexanthone (trace).

Etymology: The species is named in honour of Dr. Michaela Kaschik (née Lambauer) for her contribution to our knowledge of the saxicolous species of *Rinodina* in Australia.

Remarks

The new species is characterized by the crustose, rimose-areolate to subsquamulose, grey-white to cream or pale yellow-brown, saxicolous thallus containing zeorin and 6-*O*-methylarthothelin, immersed to broadly adnate, lecanorine apothecia, 0.2–0.7 mm wide, asci with 2–7(–8) spores, non-interspersed paraphyses, 1-septate ascospores that transition from *Serotina*- to *Dirinaria*-, *Physcia*-, *Pachysporaria*- or *Buellia*-type, 20–28 × 12–18 µm, and the straight, bacilliform conidia, 3.5–5 × 1 µm. Morphologically, it closely resembles *R. fijiensis* from the Fiji Islands, in that both have crustose, areolate to subsquamulose thalli that lack vegetative propagules, and similar immersed to subimmersed, lecanorine apothecia that become adnate at maturity (Elix & Giralt 2015). However, *R. fijiensis* differs in having a colourless hypothecium, smaller *Pachysporaria*-type ascospores, 15–21 × 8–12 µm, and in containing atranorin, zeorin and arthothelin. Anatomically, the new species resembles *R. sheardii* Tønsberg, a corticolous lichen from North America. Like *R. michaelae*, *R. sheardii* has a brown to dark brown hypothecium, similar-sized ascospores that transition from *Pachysporaria*- to *Physcia*-, *Mischoblastia*- to *Milvina*-type with apparent type-B ontogeny (Sheard 2010). The two taxa are also chemically similar, but *R. sheardii* contains the xanthonenes thiomelin and zeorin, rather than 6-*O*-methylarthothelin and zeorin. Two other saxicolous *Rinodina* species in Australia contain zeorin and xanthonenes, namely *R. thiomela* (Nyl.) Müll.Arg., and *R. xanthomelana* Müll.Arg., but both species differ from *R. michaelae* in having colourless hypothecia and prominent oil paraphyses in the hymenium, and they also contain thiomelin and satellites rather than 6-*O*-methylarthothelin.

At present, the new species is known from hinterland regions of New South Wales and southern Queensland. Associated species include *Heterodermia speciosa* (Wulfen) Trevis., *Lepra subventosa* (Malme) I.Schmitt & Lumbsch var. *subventosa* and *Pertusaria xanthoplaca* Müll.Arg.

SPECIMENS EXAMINED

Queensland: • Type locality, on basalt, *H. Mayrhofer 11485a*, *E. Hierzer & R.W. Rogers*, 18.viii.1993 (GZU), *H. Mayrhofer 11485b*, *E. Hierzer & R.W. Rogers*, 18.viii.1993 (CANB). *New South Wales:* • Royal National Park, 0.5 km N of Garie Beach, 34°09'59"S, 151°04'03"E, 50 m alt., on E-exposed sandstone rocks in open *Eucalyptus* forest, *M. Lambauer 0120*, 28.x.2003 (GZU).

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Figure 1. *Rinodina michaelae* (holotype in GZU). Scale = 1 mm.



Figure 2. Ascospore ontogeny of *R. michaelae*. Scale = 10 μ m.