

**A new isidiate species and a new record of *Rinodina*
(Physciaceae, Ascomycota) from Tasmania**

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Abstract

Rinodina austroisidiata Elix & Kantvilas is described as new to science, and *Rinodina cana* (Arnold) Arnold is reported for the first time from Tasmania and New South Wales.

This paper continues our investigation of the genus *Rinodina* and its relatives in Australia. For the most recent additions see Elix *et al.* (2019) and Grube *et al.* (2019) and references cited therein. Methods are as described in the papers cited above.

New species

Rinodina austroisidiata Elix & Kantvilas, sp. nov. Figs 1, 2
MycoBank No. **MB835679**

Similar to *Rinodina blastidiata* Matzer & H.Mayrhofer, but differing in having a densely isidiate upper surface and somewhat larger ascospores, 24–37 × 11–18 µm.

Type: Australia, Tasmania, c. 0.5 km S of Snug Point, 43°05'S, 147°18'E, c. 10 m alt., on exposed coastal sandstone outcrops and cliffs, *G. Kantvilas 555/01*, 15.viii.2001 (holotype – HO; isotype – CANB).

Thallus up to 60 mm wide and 2 mm thick, crustose to pulvinate, densely isidiate; isidia cylindrical, becoming densely coralloid-branched, 0.05–0.2 mm wide, to 2 mm high, corticate; upper surface matt, dark chocolate-brown; prothallus not apparent; medulla white, lacking calcium oxalate (H₂SO₄–), I–; photobiont cells 7–16 µm diam. *Apothecia* 0.5–1.5 mm wide, common, lecanorine, broadly adnate to sessile and basally constricted; disc dark brown to black, epruinose, plane to undulate or weakly convex; thalline exciple 0.1–0.15 mm thick, raised above the disc, densely white-pruinose; proper excipulum dark brown to black, in section 25–50 µm thick, outer zone dark brown, K–, N+ red-brown, inner zone paler brown. *Epihymenium* 10–15 µm thick, pale brown to brown, K–, N–. *Hypothecium* 75–100 µm thick, colourless to pale yellow, K–, N–. *Hymenium* 75–110 µm thick, colourless, not or sparingly interspersed with oil droplets; paraphyses 1.5–3.5 µm wide, simple to branched, capitate, with scattered oil vacuoles 4–7 µm wide; apices brown, 4–5 µm wide; asci of the *Lecanora*-type, with 8 or fewer spores. *Ascospores* of the *Teichophila*-type (with internal wall thickenings transitioning from *Pachysporaria*- to *Milvina*- or *Physcia*-types at different stages of development), 1-septate, brown, broadly ellipsoid, 24–[29.2]–37 × 11–[13.5]–18 µm, not constricted at the septum; ontogeny of type-A; outer spore-wall finely ornamented. *Pycnidia* pyriform, immersed, brown to brown-black. *Conidia* bacilliform, 5–8 × 1 µm.

Chemistry: Thallus K–, C–, P–, UV–; no lichen substances detected by TLC.

Etymology: The species is named for its isidiate upper surface and austral distribution.

Remarks

In some respects this new species closely resembles the well-known *R. blastidiata*. Both have adnate to sessile, lecanorine apothecia, similar apothecial anatomy, *Teichophila*-type ascospores, where the spores transition from mainly *Pachysporaria*-type to *Milvina*- or *Physcia*-types at different stages of development, and lack lichen substances. However,

the two species differ markedly in the morphology of their upper surface. Whereas *R. blastidiata* has a blastidiata upper surface, *R. austroisidiata* is densely isidiate, with the cylindrical or coralloid isidia remaining corticate and not becoming sorediate or blastidiata. Furthermore, *R. blastidiata* has somewhat smaller ascospores, 16–32 × 9–15 µm, and shorter conidia, 3–4 µm long. The Arctic *R. balanina* (Wahlenb.) Vain. is also similar, but is isidiate only in the central parts of the thallus, and it differs further in having an effigurate thallus with radiating lobes and smaller ascospores, 14–18 × 7–9 µm (Mayrhofer & Moberg 2002; Sheard *et al.* 2017).

The new species was collected from exposed bluffs of coastal Triassic sandstone. This habitat is not uncommon in south-eastern Tasmania, and because it is known to support several unusual lichen species, has been frequently investigated. However, at present *R. austroisidiata* is known only from the type collection, where it grows in a rich lichen association dominated by macrolichens, including *Xanthoparmelia amplexula* (Stirt.) Elix & J.Johnst., *X. australasica* D.J.Galloway, *X. mougeotina* (Nyl.) D.J.Galloway, *X. scabrosa* (Taylor) Hale and *Punctelia borrieri* (Sm.) Krog. The occurrence of species such as *Coccocarpia palmicola* (Spreng.) Arv. & D.J.Galloway, *Pannaria elixii* P.M.Jørg. & D.J.Galloway and *Trapelia glebulosa* (Sm.) J.R.Laundon on adjacent rocks suggests a moister, cooler, more sheltered situation. In contrast, *R. blastidiata* is most commonly seen in Tasmania on coastal granite, associated with *Tylothallia verrucosa* (Müll.Arg.) Kantvilas, *Catillaria austrolittoralis* Kantvilas & v.d.Boom and species of *Caloplaca*.

New record

Rinodina cana (Arnold) Arnold, *Verh. Zool.-Bot. Ges. Wien* **30**, 125 (1880)

This species was known previously from Europe and North America (Sheard 2010), and in Australia from Queensland and Victoria (McCarthy *et al.* 2017). It is characterized by its continuous, cracked to areolate, pale grey to yellow-grey, crustose thallus that lacks secondary lichen substances and is often delimited by a dark prothallus, its small cryptolecanorine or lecideine apothecia with *Mischoblastia*- or *Milvina*-type ascospores, 16–23 × 8.5–13 µm, which sometimes become rounded (*Pachysporaria*-type) when mature. It is distinguished from the very common *R. oxydata* (A.Massal.) A.Massal. by the absence of atranorin and by smaller ascospores. A detailed description is given in Sheard (2010) and an illustration in McCarthy *et al.* (2017). It is here reported from Tasmania and New South Wales for the first time.

SPECIMENS EXAMINED

New South Wales. ● South Coast, Boat Harbour, Gerringong, 34°44'59"S, 150°49'55"E, 1–3 m alt., on sandstone rocks along the foreshore, *J.A. Elix 46429*, 24.v.2017 (CANB).
Tasmania. ● Slopes of Mt Murray, 42°28'S, 147°58'E, 200 m alt., on dolerite stones in rough pasture, *G. Kantvilas 273/06 pr.p.*, 5.vii.2006 (HO).

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Observations on the vertical distribution of lichens on a *Eucalyptus radiata* subsp. *radiata* tree in burnt lowland forest, Victoria, including a new State record

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Abstract

A large, recently fallen branch presented an opportunity to record the previously undocumented vertical lichen distribution and canopy species on *Eucalyptus radiata* Sieber ex DC. subsp. *radiata* (narrow-leaf peppermint) in burnt lowland forest in Victoria, Australia. Ten species were detected from the canopy and eight were recorded from a shaded, unburnt part of the buttress. The heavily charred bark on the remainder of the lower trunk supported only *Hypocenomyce australis* and *Cladonia rigida* var. *rigida* squamules. Fifteen species were recorded overall, with the lignicolous *Xylographa isidiosa* a new record for Victoria. The zone near the base of the tree supported a Cladoniaceae-dominated community with *C. rigida* var. *rigida* extending higher up the trunk and into the lower canopy. *Pannoparmelia wilsonii* and *X. isidiosa* occurred only on canopy branches and attained the greatest coverage of all species observed. These observations provide a preliminary insight into the lichen flora of *Eucalyptus radiata* subsp. *radiata*, and the contribution this makes to biodiversity in a fire-affected, lowland forest by providing suitable lichen habitat.

Introduction

Differences in light intensity, humidity and nature of the bark are evident between the base of the tree and canopy branches (McCune 1993; Fritz 2009; Li *et al.* 2017) and, accordingly, spatial heterogeneity appears to be a critical factor influencing the height at which different lichen communities develop (Pirintsos *et al.* 1993; Morley & Gibson 2010; Kobylinski & Fredeen 2014; Li *et al.* 2017). For practical reasons most lichen studies consider the flora up to a height of 2 m with incidental evidence of canopy species derived from recently fallen twigs and debris on the forest floor. However, surveying only the base of the tree can underestimate species of conservation concern as well as their population size (Fritz 2009). Hence, weather events leading to large, wind-thrown branches (such as reported on in this study) and/or entire trees (e.g. Jarman & Kantvilas 1995; Milne & Louwhoff 1995; Aptroot 1997; Fritz 2009; Li *et al.* 2017), present an invaluable opportunity to scrutinize the canopy lichens more systematically.

Fire is increasingly a part of our landscape, and literature on post-fire recovery of lichens indicates a link to the intensity of the blaze and time since fire (Pharo & Beattie 1997; Kantvilas & Jarman 2006; Cranfield *et al.* 2011; Kantvilas *et al.* 2015). Some lichen species are host specific and/or restricted to particular forest types. McMullin & Wiersma (2019) suggest that lichen richness and abundance can be effective indicators of forest continuity and can be used as tools to prioritise forest areas in terms of management.

While lichens are frequently overlooked, they can play an important ecological role in eucalypt forests (Pharo & Beattie 1997; Cranfield *et al.* 2011). Cranfield *et al.* (2011) documented the canopy lichens of *Eucalyptus marginata* Sm. in jarrah silviculture forest in Western Australia, and Jarman & Kantvilas (unpublished data) referred to observations on canopy lichens for *E. obliqua* in wet forest in Tasmania. No studies have investigated the canopy lichens of narrow-leaf peppermint (*E. radiata* subsp. *radiata*, hereafter referred to as *E. radiata*), a common tree species in lowland forest in Victoria. *Eucalyptus radiata* is a small woodland or tall forest tree and can grow to a height of *c.* 45 metres in mountainous forest, although in more open sites it tends to be much smaller (EUCLID 2015). The subfibrous bark is finely fissured and persistent to the smaller canopy branches, creating the potential for suitable lichen habitat into the crown.

This study provides initial observations on the canopy lichens of *E. radiata*, including evidence of continuity between the lower trunk flora and that along canopy branches, and the suitability of this tree species as a partially charred host in a previously burnt lowland forest.

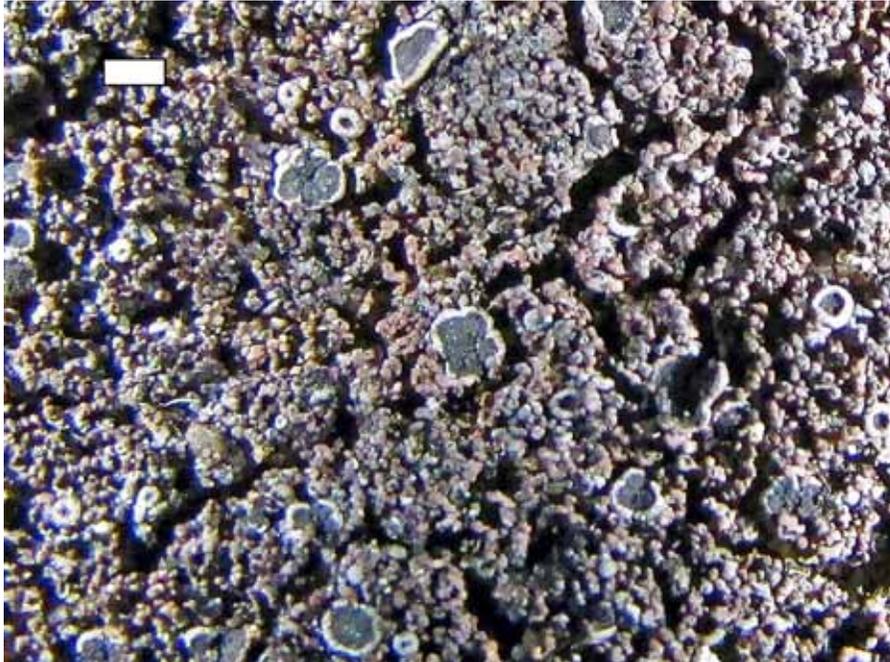


Figure 1. *Rinodina austroisidiata* (holotype in HO). Scale = 1 mm.

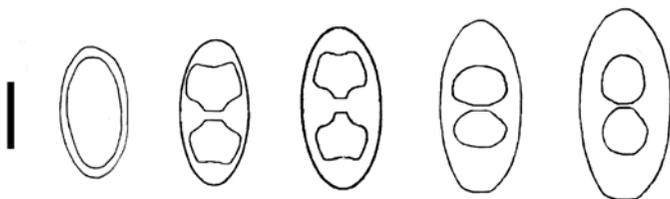


Figure 2. Ascospore ontogeny of *Rinodina austroisidiata*. Scale = 10 µm.