



New combinations in the lichen genus *Tasmidella*

Gintaras Kantvilas

Tasmanian Herbarium, Tasmanian Museum & Art Gallery, Box 5058, UTAS LPO, Sandy Bay, Tasmania 7005, Australia;
email: Gintaras.Kantvilas@tmag.tas.gov.au

Introduction

The genus *Tasmidella* Kantvilas, Hafellner & Elix was introduced by Kantvilas *et al.* (1999) to accommodate Tasmanian crustose lichens with an ecorcticate thallus, a chlorococcoid photobiont, biatorine apothecia with an annular proper exciple composed of prosenchymatous hyphae densely interspersed with oil droplets, simple, non-capitate paraphyses, 8-spored asci with a well-developed, amyloid tholus penetrated by a non-amyloid *masse axiale* with convergent flanks, 0(–1)-septate, hyaline ascospores with a distinctly two-layered wall, and filiform conidia. This combination of characters serves to distinguish *Tasmidella* from several, superficially similar genera, notably *Megalaria* Hafellner, *Lecidella* Körb. and *Ramboldia* Kantvilas & Elix (see Kantvilas *et al.* 1995 for a tabular comparison) and *Japewiella* Printzen (Printzen 1999). The genus was described as monotypic, with two varieties distinguished chiefly by their chemical constituents, and was classified, together with *Megalaria*, in the Megalariaceae. Subsequently Jaklitsch *et al.* (2016) placed it (and *Megalaria*) in the Ramalinaceae, together with, for example, *Bacidia* De Not., *Japewia* Tønsberg, *Frutidella* Kalb and numerous other crustose genera that occur in cool temperate Australia (see McCarthy 2023). This classification was maintained by Lucking *et al.* (2016) although Kistenich

Abstract

The lichen genus *Tasmidella* was initially described as monotypic, with two chemically-defined varieties. It is now found to comprise two species: *T. inactiva* (Kantvilas *et al.*) Kantvilas, *stat. nov.*, containing atranorin only, and *T. subfuscescens* (Hellb.) Kantvilas, *comb. nov.*, containing xanthonones only, with the synonyms *T. variabilis* Kantvilas *et al.* var. *variabilis* and *Lecidea dracophylli* Zahlbr. The former is recorded from Tasmania and New Zealand; the latter occurs in Tasmania, Victoria and New Zealand and is lectotypified. Salient features of *Tasmidella* and several superficially similar genera are compared.

Keywords: Australia, Bacidiaceae, lichenised Ascomycetes, Megalariaceae, New Zealand, Tasmania, Victoria

et al. (2018) explicitly exclude *Tasmidella* from the Ramalinaceae and associate it with the Lecanoraceae.

Since its first description, specimens of *Tasmidella* have continued to be added to herbaria, indicating that it is ecologically and geographically more widespread than initially thought. These additional collections have also led to a reappraisal of the status of the two varieties, whereas the ongoing study of Australasian type specimens in European herbaria has unearthed an older name for the type species. The necessary taxonomic and nomenclatural adjustments are addressed in the present paper.

Materials and methods

The study is based mainly on specimens housed in the Tasmanian Herbarium (HO) and on field observations by the author. Morphological and anatomical investigations were undertaken on hand-cut sections of the thallus and apothecia, using standard methods, reagents and stains: water, 10% KOH (K), Lactophenol Cotton Blue and Lugols Iodine (I). Amyloid reactions of the asci were undertaken on apothecial sections pretreated in K, rinsed in water and then mounted in I. Measurements of ascospores are presented in the format 5th percentile–average–95th percentile, with outlying values in brackets and *n* indicating the number of observations. Routine chemical analyses were undertaken by thin-layer chromatography following standard methods (Orange *et al.* 2010), using solvents A and C; *Lecidella flavovirens* Kantvilas & Elix was used as the reference for thiophanic acid. Nomenclature of pigments follows Meyer & Printzen (2000) and Kantvilas (2009).

Taxonomy

Tasmidella inactiva (Kantvilas, Hafellner & Elix) Kantvilas, stat. nov.

Mycobank No. MB851223

Tasmidella variabilis var. *inactiva* Kantvilas, Hafellner & Elix, *Lichenologist* 31: 220 (1999).

Type: Australia, Tasmania, Hartz Mountains National Park, Lake Osborne Track, 43°13'S 146°45'E, on *Nothofagus cunninghamii* in subalpine woodland, 820 m, 9 August 1981, G. Kantvilas 488/81 & P. James (holo—HO!; iso—BMI, GZU!).

Thallus smooth, rimose-areolate to weakly verruculose, pale cream or grey, to 250 µm thick but frequently much thinner, esorediate, forming diffuse patches to c. 5 cm wide; prothallus usually present, effuse, bluish black, visible at the thallus periphery or where the thallus is thin or discontinuous; photobiont with globose cells 6–13 µm wide. *Apothecia* 0.5–1.5(–2) mm wide, sessile, basally constricted; disc most commonly black to grey-black, thinly bluish grey-pruinose, sometimes pale brownish and epruinose, occasionally piebald, usually plane, or becoming undulate to convex; proper exciple prominent and persistent, glossy black, in section 70–120 µm thick laterally, blue-green K+ olive-green, N+ crimson (*cinereorufa*-green) at the upper edge, brownish at the sides, becoming dilutely pigmented to hyaline within, sometimes with traces of additional violet, K+ vivid turquoise pigment (*fucatus*-violet), composed of prosenchymatous, radiating, branched and anastomosed hyphae to 2 µm wide, densely interspersed with oil droplets to 20 µm wide; pigments deposited between (and not within) the hyphae. *Hypothecium* hyaline to pale yellowish, often patchily I+ violet, 90–200 µm thick, densely interspersed with oil droplets. *Hymenium* 60–100 µm thick, hyaline, not interspersed, bluish green, K+ olive-green, N+ crimson in the uppermost part and overlain by a layer of angular crystals that do not dissolve in K; paraphyses (1–)1.5–2 µm thick, separating easily in K, with apices generally unthickened or to 2–2.5 µm wide; asci 50–70 x 15–30 µm. *Ascospores* straight or occasionally slightly curved, ellipsoid to slightly oblong, (12–)13.5–16.4–20(–22.5) x 7–8.0–10 µm (*n* = 60); wall 1–1.5 µm thick. *Pycnidia* not found. *Chemical composition:* atranorin and chloroatranorin; thallus K+ yellowish, KC–, C–, P–, UV–. (Figure 1)

Remarks: With respect to its apothecial anatomy and ascospore size, this species is identical to *T. subfscescens* (= *T. variabilis* var. *variabilis*) (see below) and was initially described at varietal rank on the basis of its different chemical composition, with the latter taxon containing xanthones but lacking atranorin (Kantvilas *et al.* 1999). This difference is significant in that atranorin and xanthones arise by biosynthetically unrelated chemical pathways (Elix 1996). In the years since their first description, both taxa have been observed and collected frequently, and their separation at first



Figure 1. *Tasmodella inactiva* habit (holotype). Scale = 2 mm.
Photo: J. Jarman.

glance (without the aid of chemical analysis) has rarely posed a problem. *Tasmodella inactiva* has a pale greyish (rather than distinctly yellowish) thallus, its apothecial disc is commonly pruinose (but only rarely so in *T. subfuscescens*) and also tends to be persistently plane and marginate (whereas in *T. subfuscescens* the disc frequently becomes convex and the margin is excluded (see Figs 1–2). This combination of chemical and morphological distinguishing characters make it worthy of species rank. The original description of *T. inactiva* was based solely on the differentiating chemical character. For completeness, a comprehensive morphological and anatomical description is provided here.

Tasmodella inactiva is known from Tasmania and New Zealand, where it occurs as an epiphyte on the smooth bark of young trees in high-elevation rainforest and subalpine woodland and scrub. The grey thallus and thinly marginate, lightly pruinose apothecia are very distinctive. Although *T. subfuscescens* frequently occurs at the same localities, the two species are rarely sympatric.

Selected specimens examined: AUSTRALIA, TASMANIA: Weindorfers Forest, 41°38'S 145°56'E, 30.iii.1988, G. Kantvilas s.n. (HO); Anthony Road, 41°50'S 145°38'E, 560 m, 16.xii.1988, G. Kantvilas 575/88 (GZU, HO); Little Fisher River, 41°45'S 146°20'E,

850 m, 3.xi.1991, G. Kantvilas 347/91, B. Fuhrer & J. Jarman (HO); Pelion Plains, 1 km W of Pelion Hut, 41°50'S 146°02'E, 900 m, 12.iii.1992, G. Kantvilas 222/92 (GZU, HO); The Gap, Florentine Road, 42°43'S 146°29'E, 600 m, 1997, G. Kantvilas 266/97 (HO, MSC); Lots Wife, 42°57'S 146°28'E, 1070 m, 4.xii.2000, G. Kantvilas 469/00 (HO); northern shore of Lake Adelaide, 41°50'S 146°15'E, 1060 m, 3.ii.2002, G. Kantvilas 69/02 (HO); track from Twilight Tarn to Lake Webster, 42°39'S 146°35'E, 950 m, 8.iii.2021, G. Kantvilas 73/21 (HO); Lake Skinner, along banks of outlet creek, 42°56'S 146°41'E, 960 m, 3.iv.2021, G. Kantvilas 134/21 (HO). **NEW ZEALAND:** Canterbury, Craigieburn Range, Craigieburn Stream, 43°06'42"S 171°42'30"E, 1200 m, 27.xi.2010, G. Kantvilas 337/10 (CHR, HO).

***Tasmodella subfuscescens* (Hellb.) Kantvilas, comb. nov.**

Mycobank No. MB851224

Biatora subfuscescens Hellb., *Bih. Kongl. Svenska Vetensk.-Akad. Handl., Afd. 3* 21 (no. 13): 104 (1896); *Lecidea dracophylli* Zahlbr., *Catal. Lich. Univ.* 3: 756 (1925).

Type: New Zealand, Canterbury, Porters Pass, 1000 m, on twigs of *Dracophyllum*, February 1874, *Sv. Bergrenn* L5 (lectotype, here designated, S L3882!; isolecto—S3883!).

=*Tasmodella variabilis* Kantvilas, Hafellner & Elix var. *variabilis*, *Lichenologist* 31: 214 (1999).

Type: Australia, Tasmania, c. 4 km E of McPartlan Pass, 42°51'S 146°14'E, on *Banksia marginata* in open *Eucalyptus nitida*-dominated woodland, 360 m, 5 December 1995 G. Kantvilas 186/95 (holo—HO!; iso—GZU!).

A comprehensive description of this species, with anatomical illustrations is provided by Kantvilas *et al.* (1999). It is anatomically identical to *T. inactiva* but with the thallus generally coarser, more verruculose, dull yellowish and containing xanthenes, and the apothecial disc black, pale brown or piebald, rarely pruinose, frequently becoming convex and immarginate with age, with young apothecia frequently regenerating on old, moribund apothecia. Ascospores are (13-)14–16.7–21(–22) x 6-6.9-8 µm ($n = 70$). Conidia filiform, 12–14 x 1 µm. Chemical composition: thiophanic acid, arthothelin (\pm trace); thallus K-, KC-, C+ orange, P-, UV+ orange-pink. (Figure 2)

Remarks: Although Galloway (1985) seemingly lectotypified this species, he did not distinguish between two collections held in S; thus formal lectotypification is undertaken here. The annotations on Bergrenn's type

collection (including 'L5') are believed to be in the hand of Per J. Hellbom (*in litt.*, anonymous reviewer).

This species is readily distinguished macroscopically by the combination of a yellowish thallus and black to piebald or brown apothecia. The structure of the exciple, the characteristic ascus type and, in particular,

the double ascospore wall, clearly evident in high-power light microscopy, distinguish it from superficially similar crustose lichens which can occur in the same habitats; these features were illustrated by Kantvilas *et al.* (1995). The only species with a similarly yellowish thallus and bluish green apothecial pigmentation is

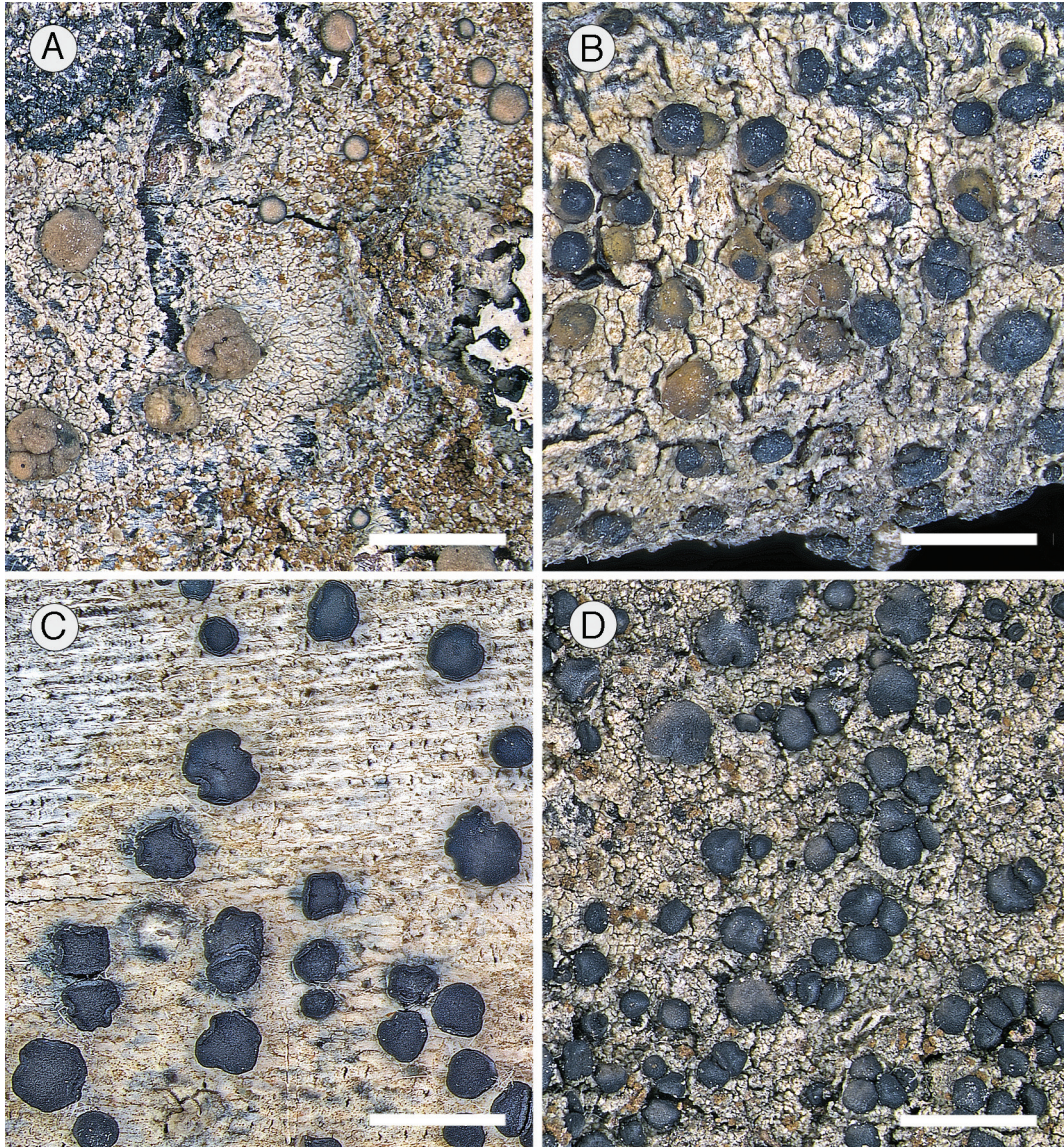


Figure 2. Variation in *Tasmidella subfuscescens*. **A.** Very pale yellowish thallus from deep shade, with apothecia with a pale brownish disc and dark margin (Kantvilas 294/90). **B.** "Typical" form from emergent *Banksia* in buttongrass moorland: verruculose, yellowish thallus with black, brown or piebald apothecia (Kantvilas 126/84). **C.** Very thin, smooth, patchy thallus with jet-black, persistently marginate apothecia with a plane disc, collected from the dead leaves of alpine *Richea pandanifolia* (Kantvilas 72/21). **D.** Coarse, verruculose, yellowish thallus with generally dark apothecia, collected from an exposed habitat (Kantvilas 28/18). Scales = 2 mm. Photos: J. Jarman.

Lecidella flavovirens, which is chemically very similar, but is sorediate, has *Lecidella*-type asci, a rather cellular, paraplectenchymatous exciple, and ascospores with an unlayered wall; this species also occurs in much drier habitats (Kantvilas & Elix 2013). The most intensely pigmented apothecia are found in the most exposed, sunniest habitats; in deep shade the apothecia are frequently flesh-coloured but nevertheless with a dark, glossy margin. Salient features of *Tasmidella*, *Lecidella* and several other crustose taxa are compared in Table 1.

Tasmidella subfuscescens is known from Tasmania, Victoria and New Zealand. In Tasmania, it is extremely widespread and common in high rainfall areas, ranging from sea-level to alpine elevations. It occurs mostly on bark and wood, with a particularly favoured habitat being the trunks and branches of emergent small trees of *Banksia marginata* in buttongrass (*Gymnoschoenus*) moorland (Figure 2B), and the twigs and small branches of alpine shrubs. It also occurs on the dead leaves of *Richea pandanifolia* leaves in alpine woodland. These populations have a very smooth, effuse thallus and jet-black, marginate apothecia (Figure 2C), but accord with *T. subfuscescens* in all critical features. In Victoria, the species has been recorded from smooth-barked

understorey trees and shrubs in wet forest, whereas the New Zealand specimens studied are from the bark of small trees and shrubs at higher elevations.

Selected specimens examined: AUSTRALIA, TASMANIA: Lake Esperance, 43°14'S 146°46'E, 980 m, 29.iii.1963, *P.W. James s.n.* (BM, HO); near Parrawe, 41°19'S 145°35'E, 420 m, 25.iv.1973, *G.C. Bratt 73/389* (HO); Platypus Tarn, 42°41'S 146°35'E, 1000 m, 13.iii.10980, *G. Kantvilas 20/80* (BM, HO); Mt Balfour, 41°17'S 144°53'E, 340 m, 17.xii.1983, *A. Moscal 4926* (HO); Mt Sprent, 42°47'S 145°59'E, 510 m, 17.ii.1987, *G. Kantvilas s.n.* (GZU, HO); Three Thumbs, 42°36'S 147°52'E, 480 m, 12.viii.1989, *G. Kantvilas 202/89* (HO); c. 1.5 km SSE of Platform Peak, 42°42'S 147°04'E, 670 m, 31.v.1990, *G. Kantvilas 294/90* (HO); Pelion Plains, 1 km W of Pelion Hut, 41°50'S 146°02'E, 890 m, 11.iii.1992, *G. Kantvilas 247/92* (GZU, HO); Sphinx Bluff, 41°37'S 147°44'E, 1370 m, 8.iv.1996, *G. Kantvilas 15/96* (HO); Downie Plains near Lake Augusta, 41°52'S 146°33'E, 1150 m, 10.vii.2005, *G. Kantvilas 171/05* (HO); Shipstern Bluff, 43°12'S 147°45'E, 80 m, 29.v.2011, *G. Kantvilas 181/11* (HO); Drip Beach, 43°13'S 147°04'E, 2 m, 3.iv.2018, *G. Kantvilas 28/18* (HO); Twisted Tarn, 42°39'S, 146°34'E, 1120 m, 8.iii.2021, *G. Kantvilas 72/21* (HO). **VICTORIA:** Belle Creek, 5.x.1983, *G. Kantvilas s.n.* (HO); Errinundra Saddle, Rainforest Walk, 37°19'03"S 148°50'19"E, 910 m, 16.iv.2008, *G. Kantvilas 170/08 & J. Elix* (HO); Baw Baw NP, Mt Erica car park, 37°53'S 146°21'E, 1050 m, 13.iv.2008, *G. Kantvilas 187/08* (HO, MEL); Baw Baw NP, Mushroom Rocks,

Table 1. Comparison of some salient features of *Tasmidella* and some superficially similar genera.

	<i>Tasmidella</i>	<i>Megalaria</i>	<i>Lecidella</i>	<i>Ramboldia</i> (black-fruited species)	<i>Sarrameana</i>
thallus chemistry	atranorin or xanthonones	nil, ± atranorin, ± zeorin, ± depsidones	commonly xanthonones, ± atranorin, ± zeorin, ± depsidones	commonly depsides	atranorin (±)
major apothecial pigments	<i>cinereorufa</i> -green (N+ crimson)	<i>cinereorufa</i> -green (N+ crimson), <i>atrarad</i> , <i>hypnorum</i> -blue	<i>cinereorufa</i> -green (N+ crimson)	brown, K+ olive, N-	<i>cinereorufa</i> -green (N+ crimson)
apothecial exciple	annular, ± hyaline internally, interspersed with oil droplets; composed of radiating, prosenchymatous hyphae	cupulate, usually layered, internally hyaline or opaque, interspersed with oil droplets; composed of radiating, prosenchymatous hyphae	annular, internally hyaline or opaque, not interspersed, composed of ± radiating hyphae that become paraplectenchymatous at the outer edge	cupulate, ± hyaline internally, not interspersed; composed of radiating, prosenchymatous hyphae	cupulate, ± hyaline internally, interspersed with oil droplets; composed of radiating, prosenchymatous hyphae
ascus <i>masse axiale</i>	conical, penetrating the tholus completely	cylindrical and penetrating the tholus entirely (<i>M. grossa</i>) or conical, usually with an intensely amyloid edge	cylindrical, with a rounded apex, not penetrating the tholus entirely	cylindrical and penetrating the tholus entirely, often with diverging flanks	absent; tholus uniformly amyloid
ascospores	(0-)1-septate, ellipsoid, with a two-layered wall	1-septate, ellipsoid; wall single-layered	simple, ellipsoid; wall single-layered	simple, ellipsoid; wall single-layered	fusiform-acicular, simple or spuriously 3-7-septate; wall single-layered

37°53'S 146°21'E, 1200 m, 13.iv.2008, G. Kantvilas 144/08 (HO).
NEW ZEALAND: Canterbury, Craigieburn Range, Craigieburn Stream, 43°06'42"S 171°42'30"E, 1200 m, 27.xi.2010, G. Kantvilas 341/10 (HO).

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