Lichenologist **31**(3): 213–225 (1999)
Article No. lich.1998.0197
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TASMIDELLA, A NEW LICHEN GENUS FROM TASMANIA, WITH A REVISED CIRCUMSCRIPTION OF THE FAMILY *MEGALARIACEAE*

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Abstract: The new crustose lichen genus *Tasmidella*, containing the species, *T. variabilis* sp. nov. with two varieties, var. *variabilis* and var. *inactiva* var. nov., is described. *Tasmidella* is most closely related to *Megalaria*, from which it differs chiefly by having simple ascospores with a layered wall. Relationships with superficially similar genera are discussed. A revised circumscription of the family *Megalariaceae* is provided to take into account the inclusion of a second genus.

Introduction

Since the works of Hafellner (1984), Hertel (1984), Rambold (1989) and others, it has become evident that most of the corticolous or lignicolous crustose lichens that were previously ascribed to the genus *Lecidea* s. lat., on the basis of their having simple ascospores and apothecia with a proper exciple only, differ very widely in their hymenial characters. In fact, these species are unrelated to *Lecidea* s. str., which is a genus mainly inhabiting siliceous rocks or consolidated earth. Most temperate species have now been placed in genera such as *Biatora, Lecanora, Lecidella* or *Pyrrhospora*, or in such relatively recently described genera as *Japewia* (Tønsberg 1990), *Sarrameana* (Vězda & James 1973) or *Ramboldia* (Kantvilas & Elix 1994).

In the course of our ongoing studies of the corticolous crustose lichen flora in cool temperate Australia, especially Tasmania, one such lichen has been found that cannot readily be ascribed to any known lichen genus. Previously, this species had been referred to (incorrectly) as *Lecidella elaeochroma* (Ach.) M. Choisy s. lat. (Kantvilas 1989) but a careful examination of its anatomical characters suggests closer relationships with *Megalaria*, a genus with generally two-celled spores. This lichen is accommodated in the new genus *Tasmidella*, which is described below.

Materials and Methods

The study is based primarily on collections in HO and GZU, comprising a total of 45 specimens. Anatomical observations of the apothecia were conducted on hand-cut and microtome sections,

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0024–2829/99/030213+13 $30.00/0

mounted in water, 10% KOH or Lugol's iodine. Measurements of size ranges of asci and spores are based on approximately 30 and 100 observations, respectively. Chemical analyses were undertaken using standard methods of TLC (e.g. Culberson 1972) and HPLC (Feige *et al.* 1993). Nomenclature of lichens mentioned follows Kantvilas (1994).

Taxonomy

Tasmidella Kantvilas, Hafellner & Elix gen. nov.

Genus fungorum lichenisatorum ad familiam *Megalariaceae* pertinens. Thallus crustaceus, algis chlorococcalibus. Apothecia excipulo proprio modo. Excipulum e hyphis radiantibus constans, guttulis oleosis inspersum. Hypothecium guttulis oleosis inspersum. Asci octospori, tholo prominenti, valde amyloideo, a corpore axiali, non amyloideo omnino penetrato, gelatina euamyloidea circumcincti. Ascosporae hyalinae, non-halonatae, quasi semper unicellulares, parietibus duo stratis compositis. Pycnidia immersa, parietibus hyalinis. Conidia filiformia vel bacilliformia.

Typus: *Tasmidella variabilis* Kantvilas, Hafellner & Elix.

(Figs 1–3)

Thallus crustose. *Photobiont* a green unicellular alga. *Apothecia* lecideine, with a proper exciple only. *Excipulum* prosenchymatous, consisting of radiating hyphae, inspersed with oil droplets. *Hypothecium* inspersed with oil droplets. *Asci* eight-spored, with a prominent, deeply euamyloid tholus, penetrated completely by a non-amyloid axial body with convergent flanks; wall comprised of a non-amyloid inner layer, surrounded by a thin, euamyloid, outer layer and a euamyloid gel; dehiscence of the rostrum type. *Paraphyses* simple. *Ascospores* hyaline, non-halonate, almost always simple, with a prominent wall clearly consisting of two layers. *Pycnidia* immersed in the thallus, with a simple ovoid cavity; wall entirely hyaline; conidiophores absent; conidiogenous cells lining the cavity bottle-shaped; conidiogenesis apical, blastic, enterogenous. Conidia simple, filiform to bacilliform, straight.

Etymology: The generic name derives from the words 'Tasmania', the centre of the known distribution of the genus, and '*Lecidella*', a genus with apothecia superficially similar to those of *Tasmidella*.

The genus contains the single species, *Tasmidella variabilis* Kantvilas, Hafellner & Elix, with two chemically distinguishable varieties.

Key to the varieties

1. Thallus mostly dull olive-yellow, UV+orange-pink, C+orange, K−, KC+orange, containing thiophanic acid and arthothelin . . . . . **var. variabilis**

1* Thallus pale grey, UV−, C−, K+yellow, KC−, containing atranorin and chloroatranorin . . . . . **var. inactiva**

Tasmidella variabilis Kantvilas, Hafellner & Elix sp. nov. var. variabilis

Thallus laevis, areolatus, rugosus vel verruculosus, crassus vel tenuis, sordide olivaceo-fulvus vel flavido-cremeus. Apothecia 0·5–1·5(–2) mm in diametro; discus planus, undulatus vel interdum

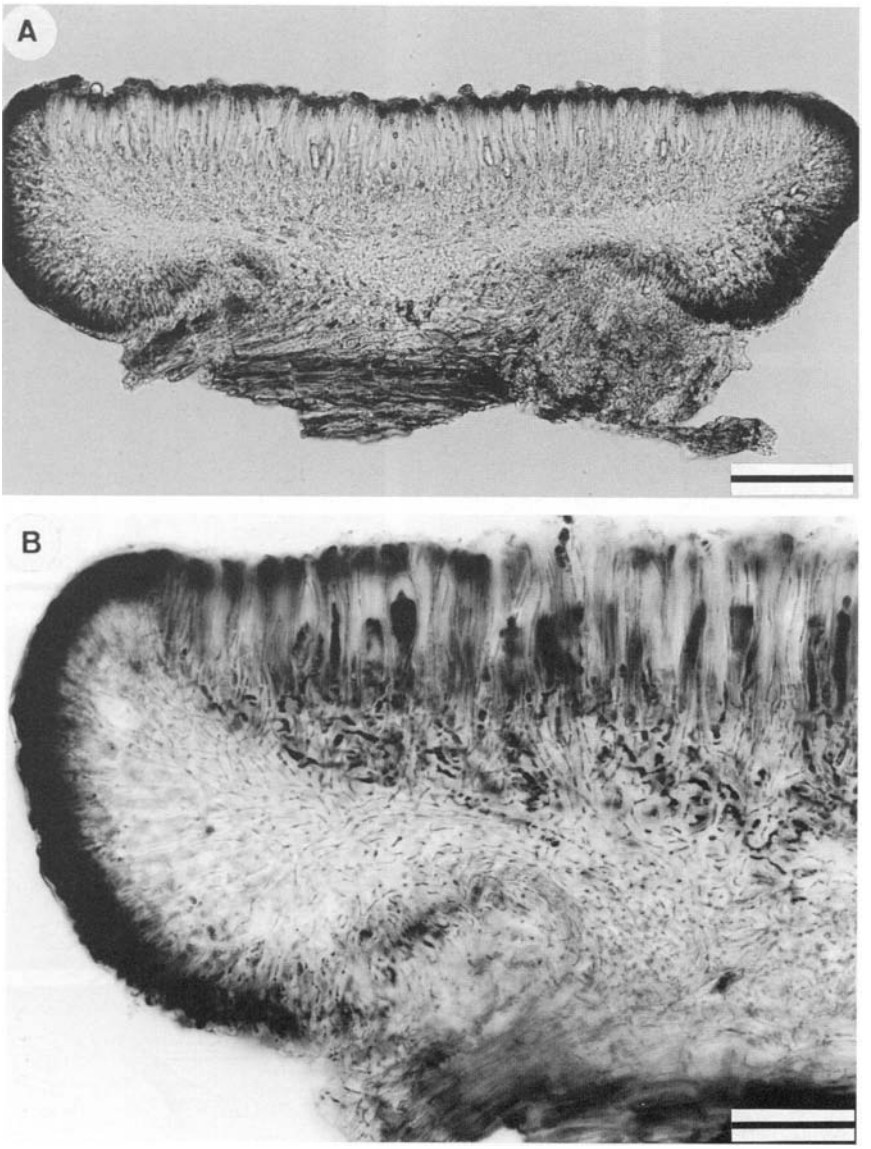

FIG. 1. *Tasmidella variabilis* var. *variabilis (Kantvilas* 222/93). A, longitudinal section of apothecium, unstained; B, longitudinal section of apothecium, stained with lactophenol-cotton blue. Scales: A = 100 μm; B = 50 μm.

convexus, impolitus, pallide cinereus vel brunneolus, vel vulgo niger, interdum caesio-pruinosus; margo niger, nitidus, persistens. Excipulum in sectione plus minusve hyalinum intra, ad marginem atro-aeruginosum vel fuscum, guttulis oleosis inspersum. Epithecium 7·5–12 μm crassum, granula numerosa, dilute brunneola, in KOH et HNO_3 non dissolventia continens. Hypothecium hyalinum, guttulis oleosis inspersum. Hymenium 60–80 μm crassum, pro maxima

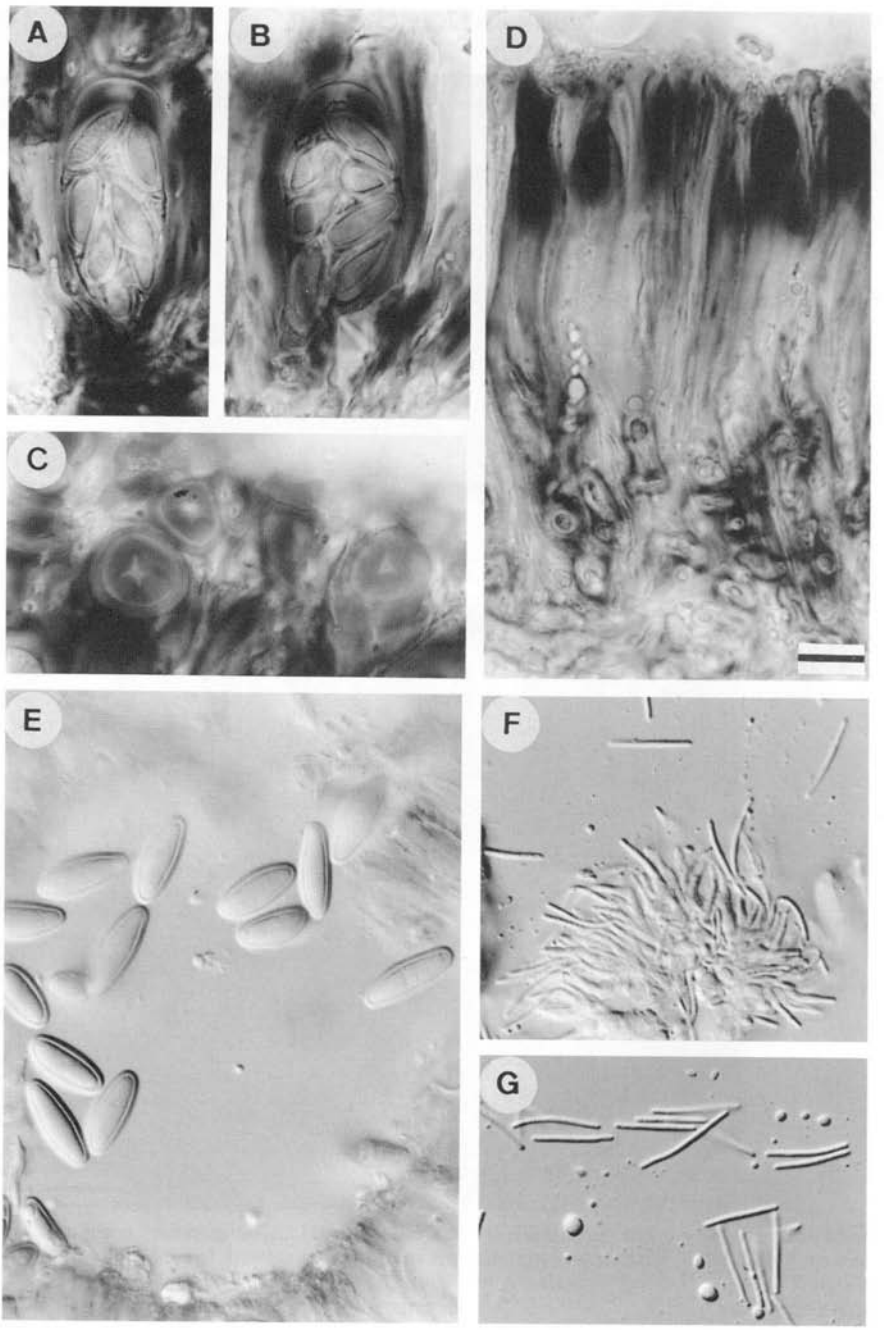

FIG. 2. *Tasmidella variabilis* var. *variabilis* (*Kantvilas* 510/84). A–B, asci, stained with Lugol's iodine; C, transverse section of ascus apices, stained in Lugol's iodine (note the ocular chamber with more intensive staining at the edges); D, longitudinal section of hymenium showing asci after rostrate dehiscence, stained in Lugol's iodine; E, ascospores with layered spore walls (interference contrast); F, cluster of conidiogenous cells (interference contrast); G, conidia (interference contrast). Scale = 10 μm.

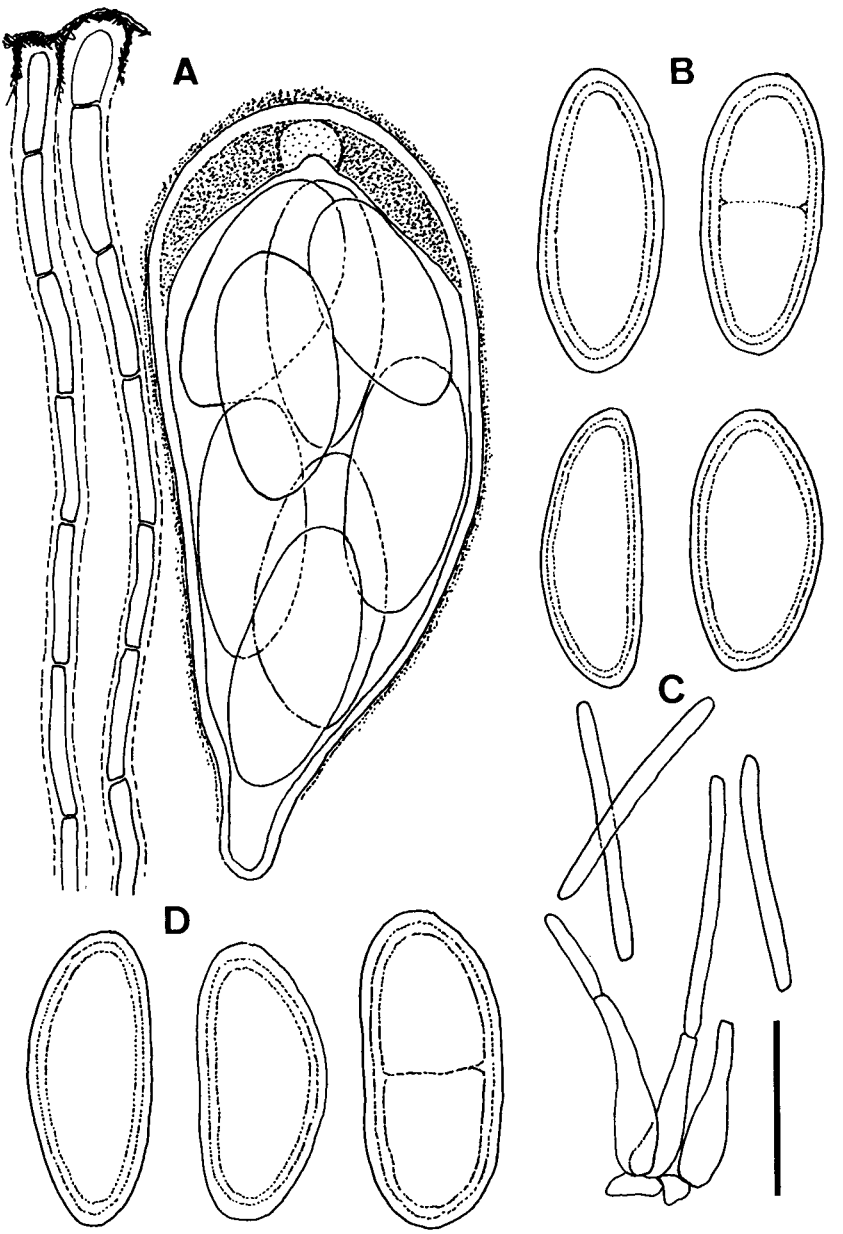

FIG. 3. A–C. *Tasmidella variabilis* var. *variabilis* (*Kantvilas* 510/84). A, ascus and paraphyses; B, ascospores; C, conidiogenous cells and conidia; D, *T. variabilis* var. *inactiva* (*Kantvilas* 488/81), ascospores. Scale = 10 μm.

parte hyalinum, guttulas oleosas granulaque destitutum, amyloideum modo ad parietes ascorum, alibi in Iodo pallide flavido-brunneum. Asci 50–70 µm longi, 15–22 µm lati, parietibus circa 1 µm crassis. Paraphyses simplices, in KOH facile secedentes, circa 2–2·5 µm crassae, apicibus usque 3 µm crassis. Ascosporae ellipsoideae vel aliquantum oblongae, rectae vel interdum curvatae, (14–)15–20(–21) µm longae, 6–8 µm latae, unicellulares vel rarissime uniseptatae, parietibus prominentibus, 1–1·5 µm crassis. Pycnidia inconspicua. Conidia 12–14 µm longa, 1 µm lata.

Typus: Australia, Tasmania, *c.* 4 km east of McPartlan Pass, 42° 51′ S, 146° 14′ E, on *Banksia marginata* in open *Eucalyptus nitida* dominated woodland, 360 m altitude, 5 December 1995, *G. Kantvilas* 186/95 (HO—holotypus, GZU—isotypus).

(Figs 1, 2, 3A–C)

Thallus smooth, areolate or wrinkled to ± verruculose, thick or thin, continuous or rather dispersed, dull olive-yellow to yellowish cream, sometimes with a black, marginal prothallus up to 1 mm wide.

Apothecia mostly 0·5–1·5(–2) mm diam., usually scattered; disc plane, undulate or occasionally convex, especially when old, matt, pale grey, pale brownish to flesh-coloured or, most commonly, black, at times ± piebald, sometimes with a thin, grey to bluish grey pruina, especially when young; margin black, shiny and prominent, entire, crenulate to flexuose, mostly persistent and excluded only in the largest, most convex apothecia. *Excipulum* in section ± hyaline within, with a pigmented outer layer up to *c.* 30 µm thick, blackish blue-green, K+olive greenish, N+reddish purple at the upper edge, dark brown, K+olive, N − at the sides, inspersed with occasional to very abundant oil droplets up to 20 µm diameter; patches of a purple, N −, K+turquoise-blue pigment sometimes also present; all pigments deposited between the hyphae (not within them); excipular hyphae intricately interwoven but increasingly radiating towards the outer edge of the excipulum, with lumina narrow, *c.* 1–1·5 µm wide, not become markedly thicker within the pigmented zone. *Epithecium* 7·5–12 µm thick, containing numerous pale brown, angular granules, mostly 3–8 µm wide, insoluble in KOH and HNO_3, in dark apothecia also with a bluish green pigment, K+olive greenish, N+purple (fading somewhat). *Hypothecium* hyaline, unchanged in KOH or HNO_3, densely to sparsely inspersed with oil droplets. *Hymenium* 60–80 µm thick, mostly hyaline and unchanged in KOH or HNO_3, not inspersed with oil droplets or granules, in black apothecia bluish green, K+olive greenish, N+purple in the upper part, amyloid only at the ascus walls, remainder I+pale yellow-brown or at most very faintly bluish at very low concentrations of iodine. *Asci* 50–70 × 15–22 µm, with a non-amyloid wall *c.* 1 µm thick and a discrete, deeply amyloid outer layer 0·5–1·0 µm thick. *Paraphyses* simple or rarely with occasional anastomoses at the base, separating rather easily in KOH, *c.* 2–2·5 µm thick; apices up to *c.* 3 µm thick, with a gelatinous, at times pigmented (as above) cap. *Ascospores* ellipsoid to somewhat oblong, straight or sometimes rather curved and bean-shaped, (14–)15–20(–21) × 6–8 µm, simple or very rarely one-septate; wall prominent, 1–1·5 µm thick, clearly consisting of at least two layers of ± equal thickness (outer layer not a gelatinous perispore). *Pycnidia* inconspicuous detectable only by chance; conidiogenous cells 9–12 × 2–3 µm. *Conidia* 12–14 × 1 µm.

Chemistry. Arthothelin, thiophanic acid; thallus UV+orange-pink, C+orange, K−, KC+orange, PD−.

Remarks. Tasmidella variabilis var. *variabilis* is a very distinctive lichen, characterized macroscopically by its yellowish thallus and numerous, lecideine apothecia with a plane, pale, piebald to black disc and persistent, black, glossy margin. With experience, the new taxon can usually be recognized and identified in the field, despite there being an abundance of other corticolous, lecideoid lichens in the Tasmanian flora, from genera as diverse as *Bacidia, Catillaria, Fuscidea, Megalaria, Ramboldia* and *Sarrameana*, which overlap its ecological range.

This lichen may be rather variable, with the thallus ranging from quite thick and yellowish in exposed situations, to rather thin and pallid when in shaded microhabitats. In the latter case, some of the chemical spot tests that aid its identification may be very weak. Pigmentation of the apothecia also appears to be related to the degree of exposure: macroscopically black apothecia, and their associated dark bluish green or blackish pigments seen in microscope sections, occur mainly in exposed thalli, whereas rather pallid apothecia are found in the shade. The range of pigments observed is similar to those that occur in several Australian species ascribable to *Megalaria*, as well as in other lichens such as the tropical *Lopezaria versicolor* (Fée) Kalb & Hafellner. Pruina occur mainly on younger apothecia. With age, the apothecia frequently become quite convex and deformed, and sometimes proliferate with small, secondary, superficial apothecia.

The presence of septate spores appears to be entirely random. In most apothecial sections, all the spores are invariably simple. The few septate spores seen tended to be deformed and not easily dislodged from the ascus in routine squash preparation. However, in one preparation, most spores seen were septate and a single spore with a second septum dividing one of the cells was also observed. Interestingly, septation seems to occur mainly in the smaller spores.

Distribution and ecology. Tasmidella variabilis var. *variabilis* is a very widespread lichen in Tasmania, occurring most commonly in generally high rainfall areas in western Tasmania. It ranges from lowland, coastal sites, subjected to frequent mist, to alpine altitudes (Fig. 4A). It grows in a wide range of vegetation types including cool temperate rainforest, buttongrass (*Gymnoschoenus sphaerocephalus*) moorland, wet sclerophyll forest, alpine heathland and wet scrub. In Victoria, it appears to be uncommon and is known from a single minute fragment from cool temperate rainforest.

In most cases, the new lichen is a pioneer species, occurring on the smooth bark of young saplings, shrubs or canopy twigs in forest, habitats not unlike those where var. *inactiva* occurs (see below). In buttongrass moorland and heathland, it is also frequently one of the dominant epiphytes on emergent trees such as *Banksia marginata*. It associates with a wide range of lichens including *Coccotrema cucurbitula, Menegazzia testacea, M. platytrema, M. confusa, M. subpertusa, Pertusaria truncata, Hypogymnia tasmanica, H. lugubris, Parmelina pseudorelicina, Haematomma nothofagi, Phlyctis subuncinata,*

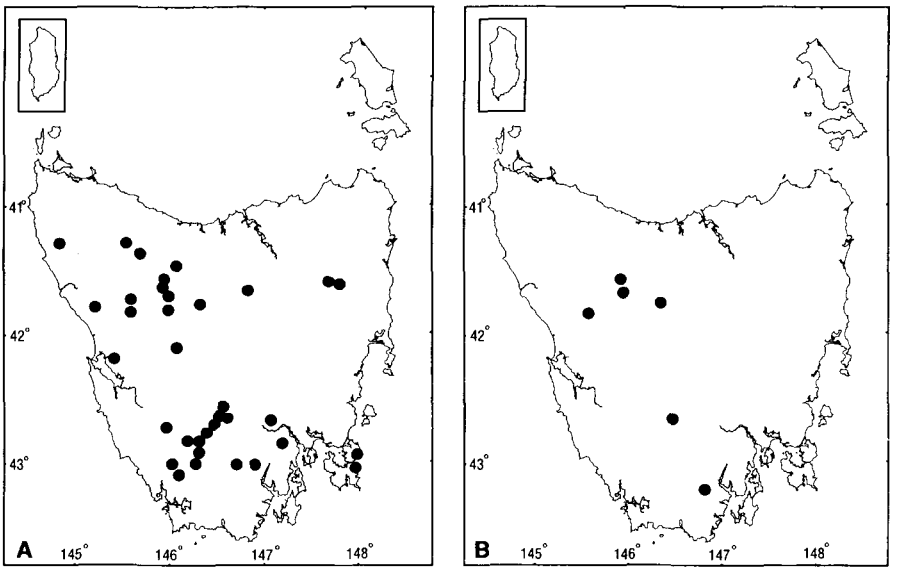

FIG. 4. Distribution in Tasmania. A, *Tasmidella variabilis* var. *variabilis;* B, *T. variabilis* var. *inactiva.*

Hypotrachyna sinuosa and species of *Fuscidea, Catillaria, Usnea* and *Mycoblastus.*

Selected specimens examined (total =40): **Australia**: *Tasmania*: Crossing Plains, 43° 06′ S, 146° 11′ E, 180 m alt., 1984, *G. Kantvilas* 510/84 (GZU, HO); Badger Creek, 43° 06′ S, 146° 02′ E, 280 m alt., 1989, *G. Kantvilas* 70/89 (GZU, HO); Mt Sprent, 42° 48′ S, 145° 58′ E, 510 m alt., 1987, *G. Kantvilas* s.n. (GZU, HO); Mt Field National Park, near Lake Emmett, 42° 38′ S, 146° 33′ E, 980 m alt., 1990, *G. Kantvilas* 157/90 (HO); track to Clemes Peak, Tasman Peninsula, 43° 04′ S, 147° 57′ E, 400 m alt., 1995, *G. Kantvilas* 68/95 (GZU, HO); Black Bog Creek, 41° 35′ S, 145° 56′ E, 810 m alt., 1984, *G. Kantvilas & P. James* 382/84 (BM, HO); Mt Wedge 42° 51′ S, 146° 18′ E, 1140 m alt., 1981, *G. Kantvilas* 873/81 (BM, HO); road to Cradle Valley, 41° 29′ S, 146° 35′ E, 520 m alt., 1989, *G. Kantvilas* 317/89 (GZU, HO); Anthony Road, 41° 49′ S, 145° 38′ E, 480 m alt., 1993, *G. Kantvilas* 222/93 (GZU, HO); Drys Bluff, 41° 42′ S, 146° 49′ E, 1150 m alt., 1989, *A. Moscal* 18201 (HO); Mount Rufus, 42° 07′ S, 146° 06′ E, 1250–1350 m alt., 1985, *H. Mayrhofer* 9624 (GZU); Bermuda Road, 43° 04′ S, 146° 57′ E, 440–480 m alt., 1990, *G. Kantvilas & J. Jarman* 589/90 (HO, IMI). *Victoria*: Bellel Creek, 1983, *G. Kantvilas* s.n. (HO).

Tasmidella variabilis var. inactiva Kantvilas, Hafellner & Elix var. nov.

Varietas morphologia anatomiaque idem ac varietatis principalis, sed thallo pallide griseo et atranorinum chloroatranorinumque continenti differt.

Typus: Australia: Tasmania: Hartz Mountains National Park, Lake Osborne Track, 43° 13′ S, 146° 45′ E, on *Nothofagus cunninghamii* in subalpine woodland, 820 m altitude, 9 August 1981, *G. Kantvilas & P. James* 488/81 (HO—holotypus, GZU, BM—isotypi).

(Fig. 3D)

Description as for the main variety, but with thallus typically pale grey, and containing chloroatranorin (major) and atranorin; thallus UV −, K+yellow, KC −, C −, PD −. *Pycnidia* not seen.

Remarks. Despite careful anatomical examination of all the material available, no consistent differences other than the chemical one, could be found to separate this taxon from its close relative, var. *variabilis*. Although the concentration of the secondary metabolites produced by these taxa may vary with the exposure of the thallus, these compounds are invariably present. Moreover, since the atranorin and arthothelin chemosyndromes arise by two quite distinctive and unrelated biosynthetic pathways, we believe that the two chemical races warrant taxonomic recognition. Var. *inactiva* has a pale greyish thallus, which is usually rather thinner than that of var. *variabilis*, although it nevertheless falls within the range of thallus thickness exhibited by the latter. It is inadvisable to attempt to distinguish the two varieties without a spot or UV test, however, because the thallus of either taxon may be quite pallid when growing in shade. The apothecia of var. *inactiva* tend be more neatly and regularly plane, with a relatively thick persistent, blue-grey pruina, but these too fall well within the range of variation displayed by var. *variabilis*.

Distribution and ecology. Tasmidella variabilis var. *inactiva* is by far the less common of the two varieties, as well as having a narrower ecological niche. It is known only from Tasmania, where it appears to be confined mainly to small canopy twigs in cool temperate rainforest (Fig. 4B). To date it has been recorded only from *Nothofagus cunninghamii*, associated with such typical canopy lichens as species of *Catillaria* and *Fuscidea, Pyrrhospora laeta, Haematomma nothofagi, Pertusaria truncata, Coccotrema cucurbitula, Hypogymnia tasmanica, Menegazzia myriotrema* and *Usnea xanthopoga*.

Additional specimens examined: **Australia**: *Tasmania*: Anthony Road, 41° 50′ S, 145° 38′ E, 560 m alt., 1988, *G. Kantvilas* 575/88 (GZU, HO); Little Fisher River, 41° 45′ S, 146° 20′ E, 820 m alt., 1984, *G. Kantvilas* 707/84 (HO); Pelion Plains, 41° 50′ S, 146° 02′ E, 900 m alt., 1992, *G. Kantvilas* 222/92 (GZU, HO); The Gap, 42° 43′ S, 146° 29′ E, 600 m alt., 1997, *G. Kantvilas* 266/97 (HO); Weindorfers Forest, 1988, *G. Kantvilas* s.n. (HO).

Discussion

The genus *Megalaria* was separated from *Catinaria* by Hafellner (1984), essentially on the basis of differences in ascus wall and spore wall characters. Thus *Catinaria*, as exemplified by the widespread species *C. atropurpurea* (Schaerer) Vězda & Poelt, has asci that lack an axial body and spores with a simple proper wall surrounded by a dense perisporal sheath. In contrast, *Megalaria*, as exemplified by *M. grossa* (Pers. ex Nyl.) Hafellner, has asci with an axial body (barrel-shaped in the case of *M. grossa* but conical in other species) and its spores lack a distinct perispore but may have layered proper walls. A slightly altered and more detailed circumscription of *Megalaria* was presented by Ekman & Tønsberg (1996), who included further characters such as the texture of the excipulum and the reactions in KOH and HNO_3 of

TABLE 1. *Comparison of salient characters of* Megalaria *and* Tasmidella

Character	*Megalaria*	*Tasmidella*
Conidia	Ellipsoid to ampulliform *(M. grossa)*	Bacilliform to filiform
Ascus axial body	Barrel-shaped (*M. grossa*) to conical, with a darker amyloid zone adjacent to the ocular chamber	Conical, with a thin, slightly darker zone
Paraphyses	Simple or sparingly branched, with a few anastomoses	Simple
Ascospores	1-Septate; wall unlayered in LM*	Simple (very rarely 1-septate); wall two-layered in LM
Thallus chemistry	Depsides, depsidones, terpenes	Depsides, xanthones

*LM =light microscopy.

the insoluble apothecial pigments. These authors also discuss the variation in the shape of the axial body in *Megalaria*.

The characters of the known species of *Megalaria* are summarized and compared with those of *Tasmidella* in Table 1. Clearly both genera have a number of characters in common, such as their ascus-type, the main anatomical features of their exciple, location and type of pigments present, and the degree of ramification of their paraphyses. The major anatomical difference between the two genera is the structure of the ascospore wall and the degree of spore septation. The shape of the ascal axial body in *Tasmidella* differs somewhat from that of *Megalaria grossa* but falls within the broader circumscription of *Megalaria* as provided by Ekman & Tønsberg (1996). Further differences are displayed by the conidia: according to Coppins (1992), in *M. grossa* they are ellipsoid to oblong, 3–4 × 1·5–2 μm, whereas in *Tasmidella* they are filiform to bacilliform and 9–12 × 2–3 μm. However, conidia in *Tasmidella* are extremely difficult to locate and were observed in only one specimen (*Kantvilas* 510/84). The two genera also differ macroscopically: the species of *Megalaria* generally have larger apothecia with thicker margins than does the overall smaller, more delicate *Tasmidella*.

Some of the main differences between *Tasmidella* and some superficially similar genera from the Tasmanian flora (*Lecidella, Ramboldia*) are summarized in Table 2. All three have biatorine apothecia, essentially *Lecanora*-type asci and simple ascospores. As currently circumscribed, the genera being compared may well be heterogeneous, so *Tasmidella* is compared only to their type species. For some time, *T. variabilis* had been confused with *Lecidella elaeochroma*, but the differences between these genera are very clearly evident, at least at the anatomical level. The two species can also be readily distinguished by the broader spores and dark hypothecium of *Lecidella elaeochroma*, a lichen that is quite rare and strictly alpine in Tasmania (see Elix & Kantvilas 1994). In addition, there are some as yet unidentified lichens in the Australian flora that closely resemble *Tasmidella* macroscopically but differ in some essential characters. In the cool temperate rainforests of New South Wales, there is an undescribed but rather common lichen that is indistinguishable

TABLE 2. *Comparison of type species of some superficially similar crustose lichen genera*

Character	*Tasmidella variabilis*	*Lecidella viridans*	*Ramboldia stuartii*
Apothecial margin	Prominent and persistent	Prominent and persistent	Not prominent, sometimes excluded
Exciple structure	Prosenchymatous	Paraplechtenchymatous	Prosenchymatous
Ascus axial body	Conical with convergent flanks	Cylindrical	Cylindrical to divergent
Paraphyses	± Conglutinated	Easily free	Conglutinated
Ascospore shape	Narrowly elliptical	Broadly elliptical	Narrowly elliptical
Ascospore wall	Two-layered in LM*	One-layered in LM	One-layered in LM
Apothecial pigments	Bluish, N+red	Bluish, N+red	Brownish, N −
Thallus chemistry	Depsides, xanthones	Xanthones	Depsides

*LM =light microscopy.

from *Tasmidella variabilis* var. *variabilis* in gross morphology and thallus chemistry, yet it has branched paraphyses, and narrower spores with only a single wall (*Kantvilas* 242/88, 470/88). Similarly, in Tasmania, another taxon has been collected rarely, which also differs mainly in its branched paraphyses and single-walled spores (*Kantvilas* 238/97).

Delimitation of the Megalariaceae

With the inclusion of further species in the genus *Megalaria* (Ekman & Tønsberg 1996; Schreiner & Hafellner 1992) and now the description of a second, related genus, the circumscription of the family *Megalariaceae* requires modification. Further investigations are required to establish whether additional genera of the *Lecanoraceae* s. ampl. should be transfered to the *Megalariaceae* or whether the latter should be merged with the *Lecanoraceae*. Whilst critical analyses of hymenial characters in the *Lecideaceae* sensu Zahlbruckner have led to the circumscription of a number of fairly unrelated, easily distinguishable groups of genera, the concepts of genera and families to be accepted in the Lecanorineae sensu Rambold & Triebel (1992) and Hafellner *et al.* (1993) are yet to be resolved satisfactorily. The presence of asci with an axial body in the euamyloid tholus is generally accepted as an important character, but some of the observable structural details are subject to ongoing discussion as to their taxonomic value. These are the shape of the axial body, its partial or complete penetration of the tholus, and the presence or absence of a strongly reactive surrounding layer. The distribution of these elements, especially in large genera such as *Rinodina* s. ampl. (Rambold *et al.* 1994), *Bacidia* s. ampl. (Ekman 1996), *Lecanora* s. ampl., and corticolous and lignicolous species groups in *Lecidea* s. ampl. and *Biatora* s. ampl. (e.g. Printzen 1995) is still not well understood. Hence we are of the opinion that

to broaden the concept of the *Lecanoraceae* as generally accepted would be a backward step and prefer to retain the separate family *Megalariaceae* as delimited below.

Mycobiont lecanoralean belonging to the sub-order Lecanorineae. *Photobiont* a coccal green alga (Tschermak-Woess 1984; Ekman & Tønsberg 1996). *Thallus* crustose; vegetative diaspores such as soredia and microlobules sometimes present. *Apothecia* with a prominent proper exciple that is prosenchymatous in section, frequently containing bluish, N+purple-red pigments in at least some tissues. *Asci* commonly eight-spored, with a euamyloid tholus and a virtually non-reactive axial body that typically extends through the tholus to the non-reactive surrounding wall layer; ocular chamber present; ascal gel amyloid; hymenial gel weakly amyloid or non-reactive. *Paraphyses* never richly branched, with few anastomoses and ramifications. *Ascospores* two-celled (*Megalaria*) or simple (*Tasmidella*). *Pycnospores* shortly ellipsoid to ampulliform (Coppins 1992; Ekman & Tønsberg 1996) in *Megalaria*, filiform to bacilliform in *Tasmidella*.

We thank Mrs J. Wardlaw (Chemistry Dept, Australian National University) for assistance with HPLC analyses.

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Accepted for publication 5 *December* 1998