

# HAFELLIA DISSA AND H. LEVIERI (LICHENISED ASCOMYCETES, PHYSCIACEAE), TWO CORTICOLOUS AND LIGNICOLOUS SPECIES IN TASMANIA

WALBURGA PUSSWALD<sup>1</sup>, GINTARAS KANTVILAS<sup>2</sup> AND HELMUT MAYRHOFFER<sup>1</sup>

## ABSTRACT

Pusswald, Walburga, Kantvilas, Gintaras and Mayrhofer, Helmut. *Hafellia dissa* and *H. levieri* (lichenised Ascomycetes, Physciaceae), two corticolous and lignicolous species in Tasmania. *Muelleria* 8(2): 133–140 (1994). — A taxonomic revision of two corticolous and lignicolous species of *Hafellia* from Tasmania is presented. *Hafellia levieri* is a new combination. The main characters are discussed and notes on the known distribution in Australia are provided.

## INTRODUCTION

The lichen genus *Hafellia* belongs to the family Physciaceae. It is characterized by a crustose thallus which may be corticolous, lignicolous or saxicolous. Its apothecia are lecideine with a heavily carbonised excipulum, pigmented hypothecium, and an hymenium often interspersed with oil droplets and opaque even in thin sections. The asci are of the *Buellia*-type (Rambold, Mayrhofer & Matzer, in prep.) and 2- to 8-spored, with 2- to 4-celled ascospores, dark brown at maturity and with subapical, lateral wall thickenings of the *Callispora*-type (Mayrhofer 1984). Its conidia are bacilliform. The genus is closely related to the *Buellia disciformis* complex which differs mainly by its spores which lack *Callispora*-type thickenings.

*Hafellia* was described by Kalb, Mayrhofer & Scheidegger in Kalb (1986) to accommodate two species of *Buellia* with *Callispora*-type ascospores, i.e. *Hafellia leptoclinoides* and *H. parastata*. Sheard (1992) revised the genus in North America where five corticolous species occur, although one of the species recognised, *H. bahiana*, does not actually belong in the genus (Kalb, pers. comm.). Sheard (*op. cit.*) also made new combinations for two Southern Hemisphere species, *H. dissa* and *H. procellarum*, which Mayrhofer (1984) had previously placed in the genus *Rinodina* on account of their unequally thickened ascospore walls.

The present paper reports on two species of *Hafellia* which occur in Tasmania.

## THE SPECIES

***Hafellia dissa*** (Stirton) Mayrhofer & Sheard in Sheard, *Bryologist* 95(1): 87 (1992).

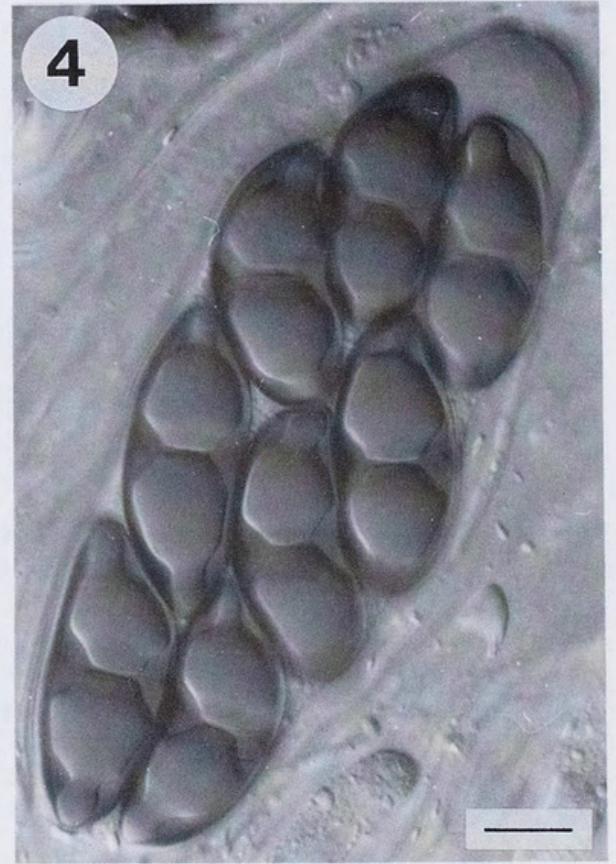
*Lecidea dissa* Stirton, *Trans. Glasgow Soc. Field Natural.* 4: 94 (1876). *Buellia dissa* (Stirton) Zahlbruckner, *Cat. Lich. Univ.* 7: 357 (1931). *Rinodina dissa* (Stirton) Mayrhofer, *Beih. Nova Hedwigia* 79: 532 (1984); TYPE: Australia: 'ad ligna decorticata in Tasmania', 1875, *H. Paton* (HOLOTYPE: GLAM; ISOTYPE: BM!).

ICON: Mayrhofer (1984: 513, 531, 536); figs. 1–2, 5, 6.

*Thallus* corticolous, crustose, thin, continuous, membranous to areolate, with a roughened, occasionally warty surface, whitish, whitish grey to pale ochraceous. *Prothallus* not apparent. *Apothecia* 0.2–1.0 mm diam., lecideine, adnate to sessile, rarely contiguous; disc black, persistently plane or becoming convex; margin concolorous with the disc, usually persistent, becoming excluded in convex apothecia.

<sup>1</sup> Institut für Botanik, Karl-Franzens-Universität Graz, Holteigasse 6, A-8010 Graz, Austria

<sup>2</sup> Tasmanian Herbarium, G.P.O. Box 252C, Hobart, Tasmania, Australia 7001



Figs. 1–2. *Hafellia dissa* (MEL 1031109). 1. Ascus with two mature ascospores. 2. Ascospores in different focusing showing the spore wall-ornamentation. Fig. 3. *H. parastata* (Hafellner 16726). Mature ascospores. Fig. 4. *H. levieri* (Kantvilas s.n.). Ascus with eight mature ascospores. Scales = 10  $\mu$ m.

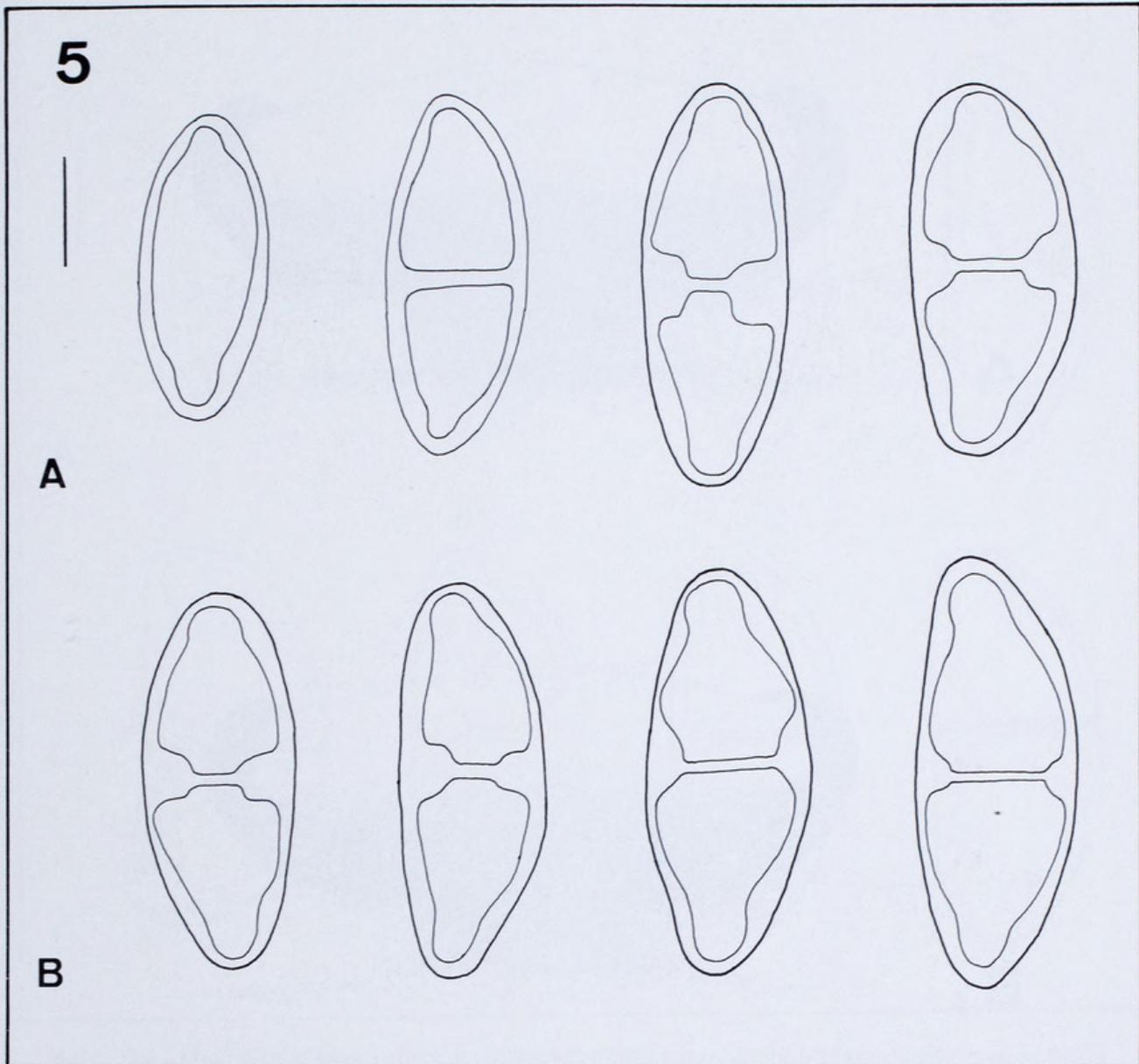


Fig. 5. *Hafellia dissa* (MEL 1013109). A. Ontogeny of ascospores. B. Mature ascospores. Scale = 10  $\mu\text{m}$ .

*Exciple* composed of radially arranged hyphae, carbonized, dark red-brown, paler in the inner part. *Epihymenium* 10–20  $\mu\text{m}$  thick, brown to red-brown, K–. *Hymenium* 80–120  $\mu\text{m}$  thick, interspersed with oil droplets, interspersion striate. *Hypothecium* to c. 150  $\mu\text{m}$  thick, dark red-brown. *Paraphyses* 1–2  $\mu\text{m}$  thick, occasionally branched, with clavate apices, 3–5  $\mu\text{m}$  thick, brown to red-brown. *Asci* 2-spored. *Ascospores* of the *Callispora*-type (Figs. 1 and 6) with regular apical and septal wall thickenings, 1-septate, ellipsoid, brown, rugulate (Fig. 2), lacking a torus, (22–)26–40(–42)  $\times$  (10–)11–16  $\mu\text{m}$ , length to breadth ratio: 2.5. *Pycnidia* pyriform, immersed, dark-brown. *Conidia* bacilliform, 5  $\times$  1  $\mu\text{m}$ .

*Chemistry*: Atranorin and diploicin; thallus K+ yellow, C–, P+ yellow.

#### REMARKS

*Hafellia dissa* is characterised by its two-spored asci (Fig. 1), its rugulate ascospores (Fig. 2) with relatively poorly developed wall thickenings (Fig. 5) and by an exciple which, together with the hypothecium, forms a more or less closed structure consisting of non-radially arranged hyphae in its central part (Fig. 6 A). It thus differs from the related *H. callispora* (Knight) Mayrhofer & Sheard which

6

A



B

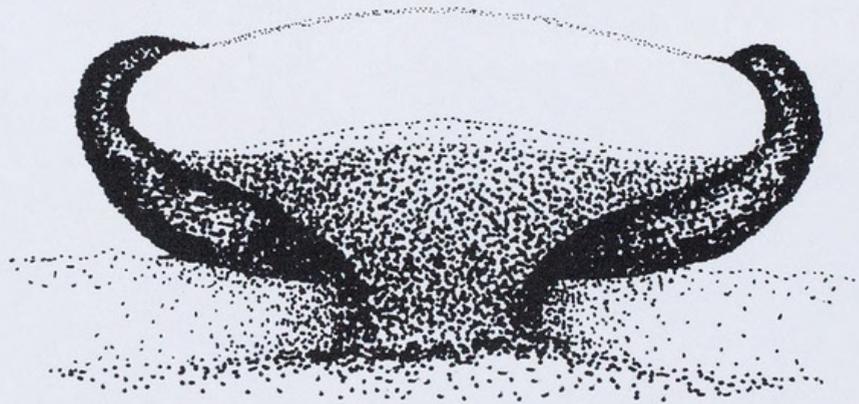


Fig. 6. Longitudinal sections of ascocarps (half schematic). A. *Hafellia dissa* with highly carbonised hypothecium. B. *H. callispora* with paler hypothecium ('open' exciple).

has eight-spored asci and an 'open' exciple (Fig. 6 B), and from *H. parastata* (Nyl.) Kalb which has eight-spored asci and smooth-walled ascospores with strongly developed wall-thickenings (Figs. 3 and 8).

#### DISTRIBUTION AND ECOLOGY

*Hafellia dissa* occurs in the cool temperate regions of southern Australia and has been recorded from Tasmania, Victoria, South Australia and south-western Western Australia (Fig. 9). It is apparently confined to dry sclerophyll forest and woodland where it occurs on the bark of a variety of trees and shrubs, including species of *Eucalyptus*, *Acacia*, *Casuarina*, *Callitris*, *Melaleuca* and the exotic *Crataegus*, as well as on dead, decorticated wood. Lichens with which it may be associated include *Buellia disciformis*, *Pertusaria trimera*, *P. gibberosa*, *Usnea inermis*, *Ramalina celastri*, *R. glaucescens*, *Flavoparmelia rutidota*, *Candelariella xanthostigmoides*, *Punctelia subrudecta* and *Pyrrhospora laeta*.

Several other lichens display a similar, southern Australian, essentially mediterranean-climate distribution, including *Heterodea muelleri* (Filson 1978), *Teloschistes chrysophthalmus* and *T. sieberianus* (Filson 1969), *Menegazzia caesio-*

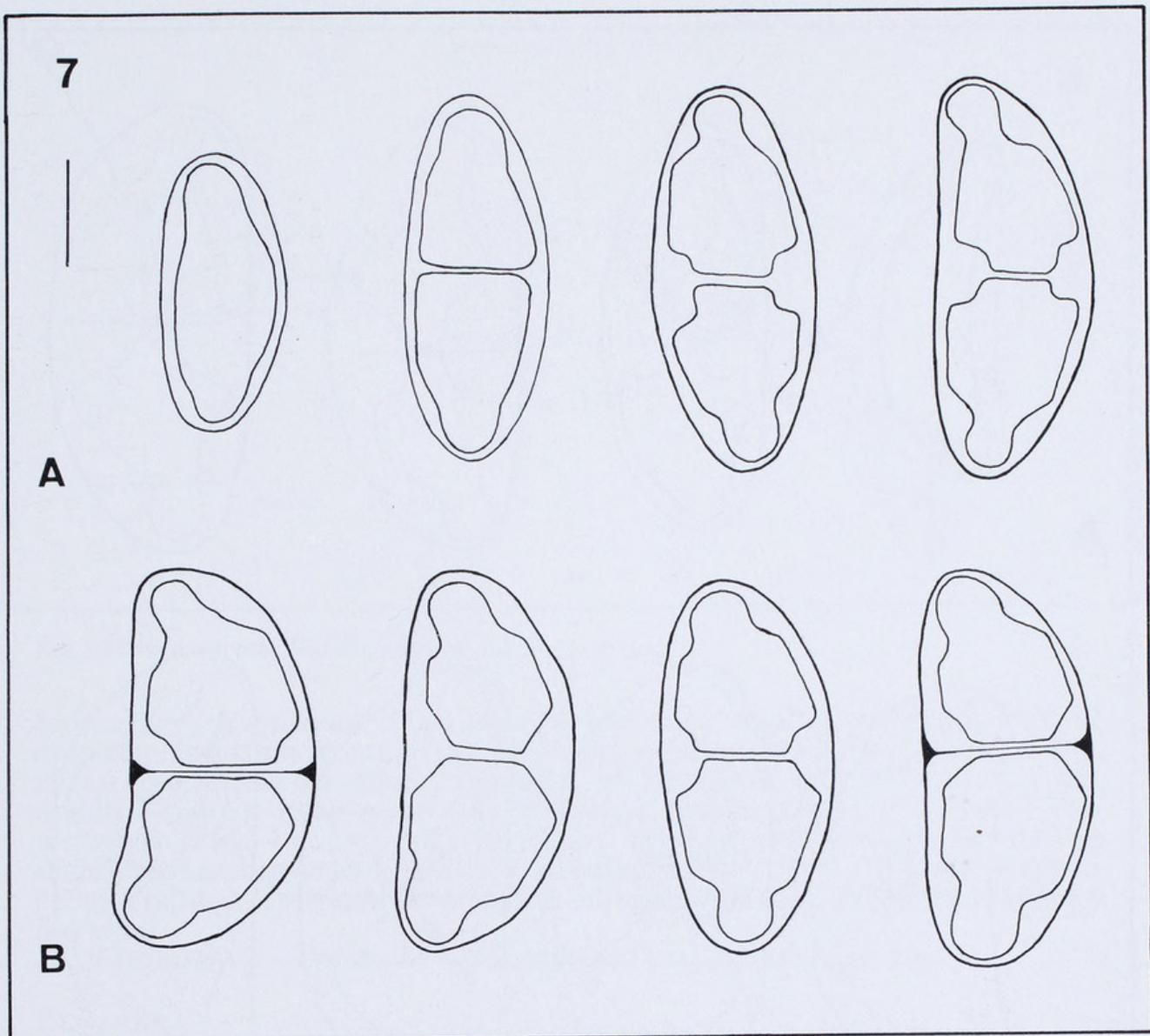


Fig. 7. *Hafellia levieri* (Kantvilas s.n.). A. Ontogeny of ascospores. B. Mature ascospores. Scale = 10  $\mu$ m.

*pruinosa* (James & Galloway 1992) and several species of *Xanthoparmelia*, for example *X. metaclystoides*, *X. furcata* and *X. neotinctina* (Elix *et al.* 1986).

#### ADDITIONAL SPECIMENS EXAMINED

*Tasmania* — Bushy Park Road near Plenty, on *Crataegus* in sheltered gully, 16 June 1969, G.C. Bratt & M.H. Bratt 69/531 (HO); Hummocky Hills, 200–470 m a.s.l., 20 Sep. 1992, A.V. Ratkowsky s.n. (HO); c. 5 km south of Beaconsfield, 80 m a.s.l., on *Acacia dealbata* in pasture, 23 May 1980, G. Kantvilas 221/80 (HO).

*Bass Strait* — Flinders Island, mountain to the west of Palana, growing on fallen timber, 16 Apr. 1965, R.B. Filson 7082 (MEL 1031109); Kent Group, Dover Island, 550 m at 11° East of South of the Squashway, 85 m a.s.l., 16 Dec. 1970, J.S. Whinray (MEL 1012827).

*Western Australia* — Yanchep State Forest, Roadside, Picnic Area north of Yanchep National Park, north of Perth, on *Eucalyptus* sp., *Acacia* sp., *Melaleuca* sp., 28 Aug. 1988, M. & H. Mayrhofer 8566 (HO), 8567 (ANUC), 8572 (PERTH), 8579 (GZU).

*South Australia* — Fred Rattei's Scrub, 7 km west of Springton, 500–530 m a.s.l., on *Eucalyptus* sp., 12 Aug. 1981, M. & H. Mayrhofer 2699 (ANUC), 6660 (GZU).

*Victoria* — Copi flats, south side of Wyperfeld National Park, 125 km north of Horsham, on *Callitris* sp., 18 Aug. 1981, M. & H. Mayrhofer 4713 (GZU); Shire of Dimboola, Mallee scrub, on twigs, 30 July 1894, J.M. Reader (MEL 7503).

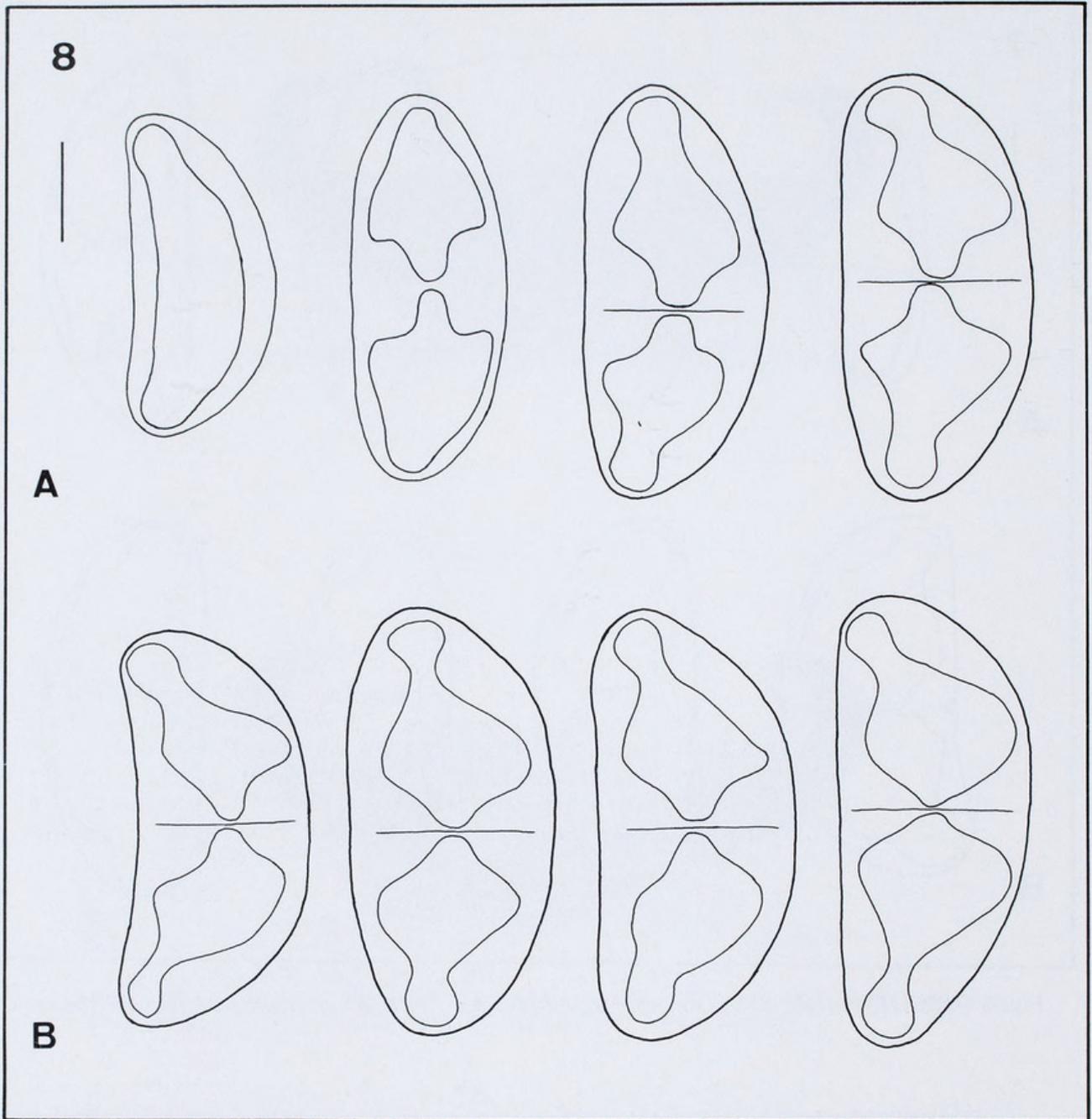


Fig. 8. *Hafellia parastata* (Hafellner 16726). A. Ontogeny of ascospores. B. Mature ascospores. Scale = 10  $\mu$ m.

***Hafellia levieri* (Jatta) Pusswald & Kantvilas *comb. nov.***

**BASIONYM:** *Buellia levieri* Jatta, *Boll. Soc. bot. ital.*: 258 (1911); **TYPE:** [Australia, Tasmania,] 'ad truncos prope Geeveston, alt 800 p' [240 m], *W.A. Weymouth* (**HOLOTYPE:** NAP!).

**ICON:** Figs. 4, 7

*Thallus* corticolous, crustose, thin, continuous, membranous, uneven, rimose to areolate, sordid-white to pale ochraceous, delimited by a black, discontinuous prothallus. *Apothecia* 0.2–0.8 mm diam., lecideine, sessile, dispersed; disc black, persistently plane or very slightly concave; margin concolorous with the disc, thick and  $\pm$  inrolled when young, persistent. *Exciple* composed of radially arranged hyphae, heavily carbonized, dark red-brown. *Epihymenium* 10–20  $\mu$ m thick,

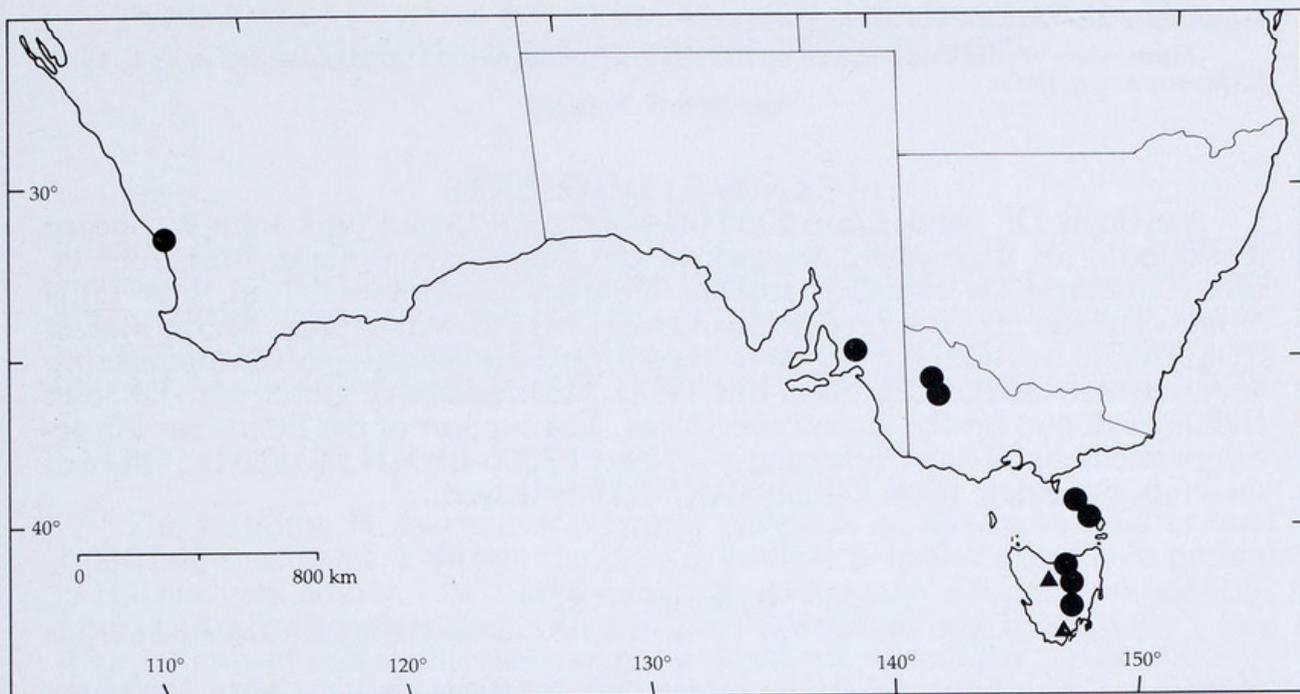


Fig. 9. Distribution of *Hafellia dissa* (●) and *H. levieri* (▲).

brown, K<sup>-</sup>. *Hymenium* 100–125(–150)  $\mu\text{m}$  thick, hyaline, interspersed with oil droplets, interspersed striate. *Hypothecium* to c. 50  $\mu\text{m}$  thick, dark brown. *Paraphyses* occasionally branched, 2  $\mu\text{m}$  thick, apices clavate, 4  $\mu\text{m}$  thick, brown. *Asci* usually 8-spored, occasionally with fewer than 8 spores. *Ascospores* of the *Callispora*-type (Figs. 4 and 7), with apical and septal wall thickenings, ellipsoid to slightly curved, brown to dark brown, smooth, 30–38.5  $\times$  12.5–16.0  $\mu\text{m}$ , length to breadth ratio: 2.3; cell lumina somewhat angular; torus often developed. *Pycnidia* not seen.

*Chemistry*: containing no substances detectable by t.l.c. or h.p.l.c.

#### REMARKS

*Hafellia levieri* is characterized by its eight-spored asci, smooth-walled ascospores with somewhat angular cell-lumina (Figs. 4, 7), an exciple, which together with the hypothecium, forms a more or less closed structure consisting of non-radially arranged hyphae in its central part (Fig. 5 A), and by the absence of any detectable thallus chemistry. It is most closely related to an undescribed taxon from the rainforests of northern New South Wales and south-eastern Queensland which differs mainly by the presence of norstictic acid. It is also similar to *H. parastata* which has broader (30–[–40]  $\times$  15–20  $\mu\text{m}$ ) and different shaped ascospores (Figs. 3 and 8) and contains atranorin and diploicin.

The type specimen is a tiny fragment of smooth bark less than 1 cm wide but bearing abundant, well-developed apothecia.

#### DISTRIBUTION and ECOLOGY

*Hafellia levieri* is known only from Tasmania where it has been recorded from cool temperate rainforest, growing on the upper branches of *Nothofagus cunninghamii* with *Menegazzia weindorferi*, *Parmelia salcrambidiocarpa*, *P. cunninghamii*, *P. tenuirima*, *Pertusaria truncata*, *Usnea oncodes* and *Catillaria tasmanica*. The habitat of the type collection is unknown but is likely to be from wet forest also (Fig. 9).

That only two collections of this species are known, despite extensive recent collecting activity in Tasmania, particularly in wet forests, suggests that it is extremely rare.

## ADDITIONAL SPECIMEN EXAMINED

Tasmania — Little Fisher River, on *Nothofagus cunninghamii* in rainforest, 850 m a.s.l., 1983, *G. Kantvilas s.n.* (HO).

## ACKNOWLEDGEMENTS

We thank Dr. habil. Klaus Kalb (Neumarkt/OPf.) and Prof. John W. Sheard (Saskatoon) for stimulating discussions and valuable comments, Prof. John A. Elix (Canberra) for chemical analysis of selected specimens, Prof. Pier Luigi Nimis (Trieste) for arranging the loan from NAP, as well as Mag. Mario Matzer (Graz) for his assistance in various ways during the preparation of the manuscript. We are grateful to the curators of BM, GZU, MEL, and NAP as well as to Dr Josef Hafellner (Graz) for the loan of specimens. The support of the Fonds zur Förderung wissenschaftlicher Forschung — Project P8500-BIO (H.M.) and the Office of the National Estate (G.K.) is gratefully acknowledged.

## REFERENCES

- Elix, J.A., Johnston, J. & Armstrong, P.M. (1986). A revision of the lichen genus *Xanthoparmelia* in Australasia. *Bull. Br. Mus. Nat. Hist. (Bot.)* 15: 163–362.
- Filson, R.B. (1969). A review of the genus *Teloschistes* and *Xanthoria* in the lichen family Teloschistaceae in Australia. *Muelleria* 2: 65–115.
- Filson, R.B. (1978). A revision of the genus *Heterodea*. *Lichenologist* 10: 13–25.
- James, P.W. & Galloway, D.J. (1992). *Menegazzia*. *Flora of Australia* 54: 213–246.
- Kalb, K. (1986). *Lichenes Neotropici*. Fasc. IX, No. 351–400: 1–16, Neumarkt.
- Mayrhofer, H. (1984). The saxicolous species of *Dimelaena*, *Rinodina* and *Rinodinella* in Australia. *Beih. Nova Hedwigia* 79: 511–536.
- Sheard, J.W. (1992). The lichenized Ascomycete genus *Hafellia* in North America. *Bryologist* 95(1): 79–87.

Manuscript received 12 August 1993.



Pusswald, Walburga, Kantvilas, Gintaras, and Mayrhofer, Helmut. 1994. "Hafellia dissa and H. levieri (lichenised Ascomycetes, Physciaceae), two corticolous and lignicolous species in Tasmania." *Muelleria: An Australian Journal of Botany* 8(2), 133–140. <https://doi.org/10.5962/p.198475>.

**View This Item Online:** <https://www.biodiversitylibrary.org/item/209968>

**DOI:** <https://doi.org/10.5962/p.198475>

**Permalink:** <https://www.biodiversitylibrary.org/partpdf/198475>

#### **Holding Institution**

Royal Botanic Gardens Victoria

#### **Sponsored by**

State Botanical Collection, Royal Botanic Gardens Victoria

#### **Copyright & Reuse**

Copyright Status: In copyright. Digitized with the permission of the rights holder.

License: <http://creativecommons.org/licenses/by-nc-sa/4.0/>

Rights: <https://biodiversitylibrary.org/permissions>

This document was created from content at the **Biodiversity Heritage Library**, the world's largest open access digital library for biodiversity literature and archives. Visit BHL at <https://www.biodiversitylibrary.org>.