

## Additions and corrections to the lichens of Heard Island

D. O. ØVSTEDAL and N. J. M. GREMMEN

**Abstract:** Nineteen lichens new to sub-Antarctic Heard Island are recorded. Three species are described as new: *Gyalideopsis heardense* Øvstedal, *Mycobilimbia subbyssioidea* Øvstedal and *Psoroma absconditum* Øvstedal. Altogether the total number of lichen species recorded on the island is now 90.

**Key words:** *Gyalideopsis*, lichens, *Mycobilimbia*, new species, *Psoroma*, sub-Antarctic

---

### Introduction

Sub-Antarctic Heard Island (52°05'S, 73°30'E) is a small island situated in the southern part of the Indian Ocean. The island measures about 370 km<sup>2</sup>, and reaches a height of 2750 m. The climate is cold (mean annual temperature *c.* 1.2°C), with strong winds, and about 1400 mm of precipitation per year, mostly in the form of snow. About 80% of the island is glaciated (Budd 2000), but large parts of the lowlands as well as some upland areas are free of ice.

Published accounts of Heard Island lichens are few and far between. The first was by Zahlbruckner (1906), who recorded *Lecidea sublygomma* Zahlbr. and *L. werthii* Zahlbr. from the island. Dodge (1948) studied collections made on Heard Island by the BANZARE expedition in 1929, and listed 34 species. A collection made by Gremmen in 2000/2001 yielded 71 taxa (Øvstedal & Gremmen 2006). We have re-examined some of these taxa, especially those not previously identified to species level. In addition, we have studied the collections in MEL from Heard Island, mostly

undetermined, as well as one collection from FH-Dodge. As a result, we list here 19 new records of lichens for the island. Species names for some taxa previously only identified by a generic name (Øvstedal & Gremmen 2006) are provided, and one erroneous record is corrected. This brings the total number of confirmed lichen taxa for Heard Island to 90.

### Material and Methods

Microscopical details were obtained by examining hand-cut sections or squashed material. The sections were mounted in diluted lactophenol cotton blue. Measurements, except for *Caloplaca*, were made on sections mounted in 10% KOH.

Thin layer chromatography has been performed extensively, in accordance with the standard methods of Culberson & Kristinsson (1970) and Culberson (1972), modified by Menlove (1974) and Culberson & Johnson (1982), for the determination of lichen compounds using in most cases only solvents A and B. High-pressure liquid chromatography (HPLC) on several taxa was performed by J. A. Elix.

### The Species

#### ***Amandinea punctata* (Hoffm.) Coppins & Scheidegger**

*Thallus* grey, 10–15 mm diam., thin, rimose. Medulla K/I – .

*Apothecia* black, half sunk in the thallus, up to 0.4 mm diam., true margin distinct, irregular; disc flat, rough. *Hymenium* 80–85 µm high, uppermost part pale brown,

---

D. O. Øvstedal: Bergen Museum, DNS, Allégaten 41, N-5007 Bergen, Norway. Email: dag.ovstedal@bm.uib.no  
N. J. M. Gremmen: Universiteit Antwerpen, Department of Biology, Unit of Polar Ecology, Limnology and Paleobiology, Universiteitsplein 1, B-2610, Wilrijk, Belgium; present address: Data Analyse Ecologie, Hesselsstraat 11, 7981 CD Diever, and NIOO, Yerseke, The Netherlands.

N-. *Hypothecium* and *exciple* dark brown. *Ascospores* 8 per ascus, 12–15 × 6–7 µm. *Paraphyses*, terminal cells enlarged to 3 µm diam.

*Chemistry*. No substances detected.

*Ecology and distribution*. On introduced wood (probably of a hut), with *Caloplaca* spp. Cosmopolitan.

*Specimen examined*. **Heard Island**: Atlas Cove, 1963, J. Williams & R. B. Filson. (MEL 1032388 p.p.).

**Buellia tristiuscula (Nyl. in Cromb.) Zahlbr.**

*Thallus* crustose, thin, secondarily cracked, pale brown-grey, up to 5 mm diam. Medulla K/I+ violet.

*Apothecia* black, up to 0.4 mm diam., sunk in the thallus, true margin protruding, regular to rarely knotted-irregular; disc concave, without umbo. *Hymenium* 70–75 µm high, uppermost part pale brown, N+ red. *Hypothecium* and *exciple* dark brown. *Ascospores* 8 per ascus, 13–14 × 8–9 µm. *Paraphyses*, terminal cells enlarged to 3 µm.

*Pycnidia* not seen.

*Chemistry*. No substances detected.

*Ecology and distribution*. On coastal rock. Îles Kerguelen (Crombie 1876) and Heard Island (Dodge 1948).

*Specimens examined*. **Heard Island**: 1953–54, J. M. Bechervaise (MEL 8791); Atlas Cove, 1963, R. B. Filson (MEL 1032263).

**Caloplaca pyracea (Ach.) Th.Fr. coll.**

*Thallus* very thin, greyish with an orange tinge.

*Apothecia* sunk in the substratum, crowded, up to 0.3 mm diam, disc dark orange to orange-brown, flat, lecanorine; thalline margin paler than the disc, thin. *Hymenium* 50–55 µm high. *Ascospores* 8 per ascus, 9–11 × 5–5.5 µm, septum c. 4 µm thick. *Paraphyses*, terminal cells enlarged to c. 2 µm diam. Epipsamma medium coarse.

*Chemistry*. Unidentified anthraquinones.

*Ecology and distribution*. On introduced wood (probably of a hut). Europe, Heard Island.

*Note*. This is a very variable taxon (see Søchting 1989), requiring further studies.

*Specimen examined*. **Heard Island**: Atlas Cove, 1963, J. Williams & R. B. Filson (MEL 1032388 p.p.).

**Caloplaca sp. A**

*Thallus* absent.

Lichen composed of agglomerated *apothecia*, each up to 0.4 mm diam., lecanorine, constricted below, Disc orange, thalline margin yellow-orange. *Hymenium* 85–90 µm high. *Ascospores* 8 per ascus, 12–13 × 5–6 µm, septum 5–6 µm. *Paraphyses*, terminal cells enlarged to 4 µm.

*Chemistry*. Unidentified anthraquinones.

*Ecology*. On introduced wood (probably of a hut).

*Note*. The specimen bears some resemblance to material growing on rock from Tristan da Cunha and Gough Island (in BG and O), and which we tentatively have assigned to *C. subglobulata* coll. The specimen cannot easily be identified as any species found in European or North American floras.

*Specimen examined*. **Heard Island**: Atlas Cove, 1963, J. Williams & R. B. Filson (MEL 1032388 p.p.).

**Caloplaca sp. B**

*Thallus* 5–6 cm wide, orange, as crowded, to 0.2 mm wide and 0.4 mm high, erect to obliquely ascending, terete, simple to rarely ramified papillae/isidia.

*Apothecia* lecanorine, sessile, up to 0.8 mm diam., constricted below. Margin concolorous with thallus, disc slightly more brownish. Cortex of thalline margin pseudo-parenchymatous. *Hymenium* 70–80 µm high, non-inspersed, epipsamma medium coarse. *Ascospores* 8 per ascus, 13–15 × 7–

8 µm; septum 5–6 µm. *Paraphyses*, terminal cells a little enlarged, to 2.5 µm diam. No oil paraphyses.

*Chemistry*. Unidentified anthraquinones.

*Ecology and distribution*. On coastal rock, Falkland Is. and Heard Island.

*Note*. We have found no name for this species. In the study of minute fruticose *Caloplaca* species by Poelt & Pelleter (1984), it comes closest to *C. ambitiosa* (Darb.) Zahlbr., described from the Falkland Islands, but that species has been placed in synonymy with *C. regalis* (Vain.) Zahlbr. (Søchting & Øvstedal 1992), a quite different species.

*Specimen examined*. **Heard Island**: collector unknown (MEL 8772).

### **Carbonea inactiva (Zahlbr.) Hertel**

*Thallus* white, 2–3 cm wide, areolate.

*Apothecia* black, up to 1 mm diam., when young flat, with distinct true margin, when older convex, with excluded true margin. *Hymenium* 60–70 µm high, uppermost part brown-green. *Hypothecium* black-brown, merging with black-brown exciple. *Ascospores* 8 per ascus, simple, colourless, broadly ovate, 9–12 × 7–9 µm. *Paraphyses* 1 µm diam., little ramified, terminal cells enlarged to *c.* 3 µm.

*Chemistry*. Atranorin and zeorin.

*Ecology and distribution*. On rock. Juan Fernandez Isl., southern Chile, Antarctica (Øvstedal & Lewis Smith 2001) and Heard Island.

*Specimen examined*. **Heard Island**: BANZARE B140-15 (FH-Dodge).

### **Cladonia fimbriata (L.) Fr.**

*Primary thallus* as small cushions, with crowded erect squamules, up to 2 mm broad and 1.5 mm high; upper side grey-green, with numerous small lobules; lower side white. *Podetia* slender, *c.* 1.5 mm broad at base, up to 8 mm high, scyphi to 6 mm

broad, with proliferations at margin; sorediate in upper half (sometimes to base), lower part with small lobules and granules.

*Chemistry*. Fumarprotocetraric acid + satellites.

*Ecology and distribution*. On moribund mosses. Cosmopolitan.

*Note*. More coarsely sorediate than usual in this species, but similar specimens occur in Norway (BG).

*Specimen examined*. **Heard Island**: *J. M. Bechervaise*, 1953 (MEL 1032638).

### **Fuscidea sp.**

*Thallus* crustose, up to 12 mm wide, thick, brown-grey, rimose, with a thin black prothallus. Medulla K/I+ dark violet.

*Apothecia* up to 1 mm diam., roundish, dark brown, sunk in the thallus, without margin. *Hymenium* 75–80 µm high, uppermost part brownish. True exciple very narrow in lower part, expanding to *c.* 30 µm broad at surface, colourless, composed of elongated, rectangular cells. *Hypothecium* colourless, amyloid. *Asci* broadly clavate, *Teloschistes*-type(?), 35–40 × 18 µm. *Ascospores* 8 per ascus, simple, colourless, broadly elliptic, 10–13 × 6–7 µm. *Paraphyses* stout, *c.* 2 µm wide, with distinct septa, terminal cells enlarged to *c.* 4 µm diam, with a brownish cap.

*Pycnidia* not seen.

*Chemistry*. Undetermined compound, dark violet when charred.

*Ecology*. On volcanic rock, with *Tephromela atra* (Huds.) Hafellner ex. Kalb and *Rhizocarpon kerguelense* C. W. Dodge.

*Note*. From Antarctica, the sub-Antarctic and New Zealand, and the mountains of Australia the following saxicolous *Fuscidea* species are known: *F. asbolodes* (Nyl.) Hertel, *F. subasbolodes* Kantvilas and *F. ramboldioides* Kantvilas (Kantvilas 2001). *Fuscidea*

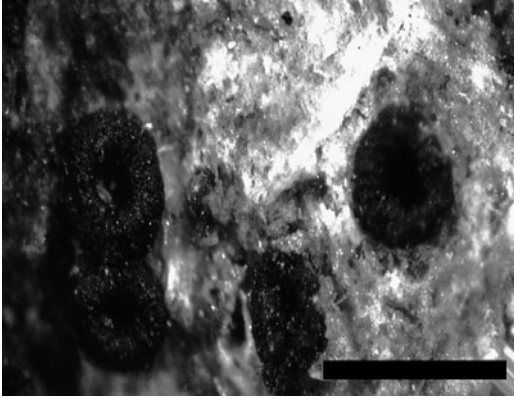


FIG. 1. *Gyalideopsis heardense* (holotype). Scale=2 mm.

*asbolodes* has a raised exciple which is dark in transverse section and has no chemical compounds, *F. subasbolodes* has sessile apothecia with dark exciple and contains norstictic acid, while *F. ramboldioides* also has sessile apothecia with a dark exciple and contains divaricatic acid.

The apothecia, which are completely immersed in the thallus and with a very reduced, colourless exciple, may point to *Huidea australiensis* Kantvilas & McCarthy from the Kosciuszko mountains in Australia, but that species has 1-septate ascospores (Kantvilas & McCarthy 2003).

*Specimen examined.* **Heard Island:** Laurens Peninsula, Mt. Olsen, 250–300 m, 1963, A. Gilchrist (MEL 1026871).

***Gyalideopsis heardense* Øvstedal  
sp. nov.**

*Gyalideopsis stipitata* Kalb & Vězda similis, sed apothecia non stipitata, et hyphophorae destitutis.

Typus: Heard Island, Atlas Cove, near camp, 25 m alt., N. J. M. Gremmen H-1273 (ADT—holotypus).

(Fig. 1)

*Thallus* crustose, thin, ecorticate, grey to grey-green, 2–3 cm wide. No *hyphophores* seen. *Photobiont* trebouxioïd.

*Apothecia* numerous, sessile, dark brown, up to 1 mm diam., with a true margin only. Margin prominent, regular; disc concave, brown-black. *Hymenium* 105–115 µm high,

uppermost part brownish, K–. *Hypothecium* colourless. *Exciple* composed of thin anastomosing hyphae in a gelatinous matrix, colourless except the outermost part which is brownish. *Asci* thick-walled, 80–90 × 15–16 µm, K/I–. *Ascospores* 1 per ascus, 65–70 × 20–26 µm, colourless, strongly muriform. *Paraphyses* thin, anastomosing.

*Chemistry.* No substances detected.

*Ecology.* On rotting grass leaves.

*Note.* None of the species keyed out by Vězda (2003) or Lücking *et al.* (2006) are identical to this species. It shares some characters with *G. stipitata* Kalb & Vězda from Ecuador, such as a single muriform ascospore, but that species has larger, stipitate apothecia, relatively broader ascospores and it has hyphophores (Kalb & Vězda 1994). The present taxon was treated as “*Lopadium*” sp. in Øvstedal & Gremmen (2006), but a closer examination showed it belongs in *Gyalideopsis*.

*Specimen examined.* Known only from type.

***Haematomma erythromma* (Nyl.)  
Zahlbr.**

*Thallus* crustose, yellow, rimose, sorediate. *Soralia* coarse, not sharply delimited, mostly along cracks.

*Apothecia* (not seen in Heard Island material) blood-red.

*Chemistry.* Placodiolic acid, atranorin, stictic acid, unidentified xanthenes.

*Ecology and distribution.* On rock between *Azorella selago* Hook. f. mounds in exposed, cool, moist area and on rock close to sea. Tierra del Fuego, Falkland Is., Marion Is., South Georgia, South Shetland Is., Antarctic Peninsula (Staiger & Kalb 1995) and Heard Island.

*Specimens examined.* **Heard Island:** Black Browed Albatross rookery, near Jacka Glacier, 1963, A. Gilchrist (MEL 1026872); same locality, date and collector (MEL 1026845); West Bay, alt. 6 m, 1950, unknown collector (MEL 8766 p.p.).

### **Lecanora elixii** Lumbsch

*Thallus* absent or as small white convex areolae around apothecia.

*Apothecia* in clusters, up to 1.5 mm diam., saddle-shaped, with thin white, fissured thalline margin and brown disc. *Hymenium* 75–80 µm high, uppermost part brownish. *Ascospores* 8 per ascus, ellipsoid, thick-walled, 12–14 × 7.5–8 µm. *Paraphyses* thick, ramified, terminal cells enlarged to 3–3.5 µm.

*Chemistry.* Atranorin (major), 5,7-dichloro-3-*O*-methylnorlichexanthone (major), 3-*O*-methylasemone (minor), 2,5,7-trichloro-3-*O*-methylnorlichexanthone (minor/trace), 3-*O*-methylthiophanic acid (trace). Also methyl ascomatate (minor) was found, but this is probably a contaminant (J. A. Elix det.).

*Ecology and distribution.* On inland rock. Australia, New Zealand (Lumbsch 1994), and Heard Island.

*Note.* This taxon was included as *Lecanora* sp. by Øvstedal & Gremmen (2006). Further studies have shown that it belongs in the *Lecanora subfusca* group, and in Lumbsch (1994) it keys out as *L. elixii*. The Heard Island specimens share most of their chemical compounds with the type, but differ in also having 3-*O*-methylthiophanic acid, and lacking arthothelin, isoarthothelin, asemone, chloratranorin, 2,7-dichloronorlichexanthone, 5,7-dichloronorlichexanthone and 2,5,7-trichloronorlichexanthone, all minor or trace substances (Lumbsch 1994). We believe that such a variation in closely related xanthenes may be expected within a species, and that the Heard Island specimens belong in *L. elixii*.

*Specimen examined.* **Heard Island:** E slope of Scarlet Hill, 340 m, 2001, *Gremmen* H-1004, H-1002.

### **Lepraria nivalis** J. R. Laundon

*Thallus* leprose, 2–3 cm wide, yellow-grey. No hypothallus, medulla or marginal lobes. *Soredia* 24–28 µm, agglomerated into consoredia 40–60 µm wide, with colourless hyphal ends protruding.

*Chemistry.* Protocetraric acid (major), virensic acid (minor), atranorin (minor) and an unknown (minor) (J. A. Elix det.).

*Ecology and distribution.* Growing over moribund bryophytes. Europe, North America (Leuckert *et al.* 1995) and Heard Island.

*Note.* In this species, six chemotypes have been described (Leuckert *et al.* 1995), and it is also said to exhibit considerable morphological variation (Baruffo *et al.* 2006). In Italy, a specimen (said to be atypical) was found with atranorin, protocetraric acid, virensic acid and strepsilin dimethyl ether (Barutto *et al.* 2006), but this specimen has not been available for loan. A chemotype with atranorin, protocetraric acid and virensic acid could then be regarded as the seventh chemotype of this species. However, recently it has been shown that in the *Lep-raria jackii* Tønsberg complex, taxa that are morphologically similar, but with ecological and also slight chemical differences, differ in their ITS sequences, and are thus considered as different species (Slavíková-Bayerová & Orange 2006). In view of this, it is quite possible that *L. nivalis* will eventually also be split into several species.

*Specimen examined.* **Heard Island:** Round Hill Escarpment, 250 m alt., 2000, *Gremmen* H-0196.

### **Mycobilimbia subbysoidea** Øvstedal **sp. nov.**

*Thallus* evanescent, griseus. *Apothecia* nigra, ad 1 mm diam., inferiore in parte textura bysoidea. *Ascospores* 1–3-septatae, 30–33 × 5–6 µm.

*Typus:* Heard Island, Corinth Head, 170 m alt., 2001, *N. J. M. Gremmen*, H-1496 (ADT—holotypus).

(Fig. 2)

*Thallus* evanescent, greyish, non-corticated. Photobiont trebouxoid, algae 6–8 µm wide.

*Apothecia* black, up to 1 mm diam., with constricted base; disc flat, true margin thin but distinct. Lower side of apothecia with irregular patches of whitish, byssoid tissue.

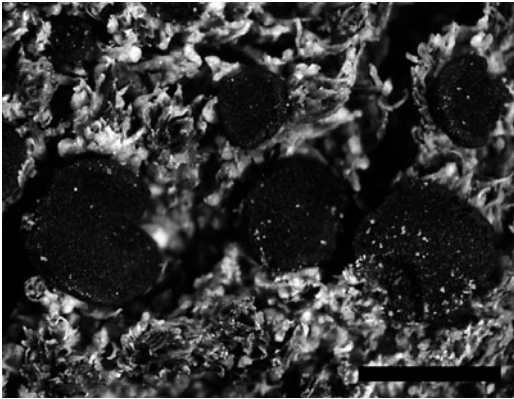


FIG. 2. *Mycobilimbia subbyssoida* (holotype). Scale = 1 mm.

*Hymenium* 100–110  $\mu\text{m}$  high, pale red-brown, amyloid. Below hymenium a thin, strongly coloured, red-brown layer, below that a blue-pigmented layer of horizontal hyphae, and beneath that a pseudoparenchymatous layer, 120–130  $\mu\text{m}$  thick, with large cells, *c.* 16  $\times$  8  $\mu\text{m}$  at margin, and with red-brown cell walls. Blue pigment: N+ red, KCl –; red-brown pigment: slightly intensifying in K and N. *Asci* of *Biatora*-type. *Paraphyses* thin, 1.5–2  $\mu\text{m}$  diam., weakly anastomosing, terminal cells not or very little enlarged. *Ascospores* 8 in asci, colourless, exospore smooth; 1–3-septate, 30–33  $\times$  5–6  $\mu\text{m}$ , ends acute.

*Pycnidia* not seen.

*Chemistry.* No tests performed due to lack of material.

*Ecology.* On moribund bryophytes.

*Note.* This taxon was included as *Mycobilimbia* sp. in Øvstedal & Gremmen (2006). Further studies of the literature, including a recent study of some Southern Hemisphere species (Kantvilas *et al.* 2005), showed that there was no name for it, and consequently it is described here as a new species.

*Specimen examined.* Known only from the type specimen.

### ***Orceolina kerguelensis* (Nyl.) Hertel**

*Thallus* placodioid, thick, wax-like, 1–3 cm diam., pale orange, in inner part

strongly areolate, towards margins with elongate lobes.

*Apothecia* immersed in inner areolae, opening as a small pore. *Hymenium* 230–250  $\mu\text{m}$  high. *Ascospores* colourless, simple, uniseriate, 26–30  $\times$  14–17  $\mu\text{m}$ , with double walls. *Paraphyses* thin, flexuose, anastomosing.

*Chemistry.* One unidentified compound.

*Ecology and distribution.* On inland rock. Îles Kerguelen, Prince Edward Is. (Øvstedal & Gremmen 2001) and Heard Island.

*Specimen examined.* **Heard Island:** South Barrier Plateau, 1965, *J. Crick* (MEL 1020720).

### ***Peltigera aubertii* C. W. Dodge**

*Thallus* foliose, 2–3 cm wide, lobes concave, 3–4 mm wide, a few with downturned margins. *Upper side* brown, thinly tomentose towards the margins, mostly glabrescent in the inner part. *Lower side* pale ochre, with tomentose veins which are pale towards the margin but darkening in the inner part. *Rhizines* white and simple when young, becoming dark and confluent when old. *Photobiont* cyanobacterium, dull blue-green.

*Apothecia*, none seen.

*Chemistry.* No substances detected.

*Ecology and distribution.* Among bryophytes. Patagonia, South Georgia, Prince Edward Is., Îles Kerguelen (Vitikainen 2002) and Heard Island.

*Note.* These specimens were included in *P. aff. truculenta* De Not. by Øvstedal & Gremmen (2006).

*Specimen examined.* **Heard Island:** Gremmen H-1528, H-1223.

### ***Placopsis parellina* Nyl. s. lat.**

*Thallus* placodioid, 5–6 cm diam., ivory to very pale ochre, cracked-rimose, marginal lobes indistinct. *Cephalodia* pale orange, 2–4 mm wide, with radiating fissures.

*Apothecia* up to 1.3 mm wide, sessile, concave, thalline margin prominent, concolorous with thallus; disc flat, brown, non-pruinose. *Hymenium* c. 120 µm high. *Ascospores* 20–21 × 10–12 µm.

*Chemistry.* Gyrophoric acid.

*Ecology.* On inland rock.

*Note.* This taxon keys out as *P. parellina* Nyl. in Lamb (1947), who had a broad view of *P. parellina*, with many forms and varieties. One of these, common in the Antarctic, and included in *P. parellina* by Øvstedal & Lewis Smith (2001), was raised to species level as *P. antarctica* D. C. Galloway *et al.* by Galloway *et al.* (2005), and the authors claimed that *P. parellina* s. str. is a squamulose species restricted to a small region of coastal Chile. Thus the present taxon is probably undescribed at species level.

*Specimens examined.* **Heard Island:** N of C. Laurens, *A.N.A.R.E.*, 1949 (MEL 8788 & MEL 8768); Jacka Valley, 180 m, *A.N.A.R.E.*, 1949 (MEL 8768); Laurens Peninsula, alluvial flat, south of the peninsula, 100–130 m, 1963, *A. Gilchrist* (MEL 1026855).

**Placopsis aff. fusciculoides D. C. Galloway**

*Thallus* placodioid, up to 2 cm wide, whitish, cracked-wrinkled, lobes distinct at the margin, up to 0.5 mm broad, short; sorediate. *Soralia* in the inner part of thallus, up to 0.4 mm diam., concolorous with the thallus, crateriform, with a distinct rim; soredia coarse. *Cephalodia* pinkish-ochre, cerebriform, sometimes with radiating fissures.

*Apothecia* sessile, up to 1 mm diam., with somewhat irregular outline; thalline margin thick, with sorediate spots. *Disc* pink, non-pruinose. *Hymenium* c. 220 µm high. *Ascospores* 8 per ascus, 25–30 × 15–18 µm.

*Chemistry.* Gyrophoric acid.

*Ecology.* On soil.

*Note.* This taxon has some resemblance externally to *P. fusciculoides* D. C. Galloway (Galloway 2005), but differs in its chemistry,

the delimited soralia, the larger ascospores and ecology.

*Specimen examined.* **Heard Island:** N of C. Laurens, 1949, *A.N.A.R.E.* (MEL 8778).

**Psilolechia leprosa Coppins & Purvis**

*Thallus* crustose, minutely granular, grey-green, up to 3 mm wide. Alga green, 4–5 µm diam.

*Apothecia* pinkish, tuberculate, without margins, up to 0.4 mm diam. *Hymenium* 30–35 µm high, uppermost part colourless, K+ violet. *Hypothecium* colourless. *Ascospores* 8 per ascus, colourless, 0(–1) septate, 7–9 × 3–3.5 µm.

*Chemistry.* Gyrophoric acid.

*Ecology and distribution.* On rock in a sea cave. Europe (Coppins & Purvis 1992) and Heard Island.

*Note.* The specimen has been compared with Norwegian specimens in BG and found to be similar in all essential details, except that the ascospores are somewhat larger (7–9 × 3–3.5 µm) in the Heard Island specimen. New to Heard Island and the Southern Hemisphere. Erroneously reported as *Micarea prasina* by Øvstedal & Gremmen (2006).

*Specimen examined.* **Heard Island:** Atlas Cove, 60 m alt., *N. J. M. Gremmen* H-1485.

**Psoroma absconditum Øvstedal sp. nov.**

*Thallus* fuscus, squamulosus, squamulae ad 1 mm altum. *Apothecia* ad 2 (–4) mm lata, discus fuscus. *Ascospores* 13–16 × 9–11 µm, minutae rugulosae.

*Typus:* Heard Island, near top of Corinth Head, 107 m, 2001, *N. J. M. Gremmen* H-1536 (ADT—holotypus).

(Fig. 3)

*Thallus* up to 2 cm wide, composed of small, pale brown, and equally broad, adnate to subsaccendent, incised squamules up to 1 mm long.

*Apothecia* not common, at first almost urceolate and vivid brown, later expanding

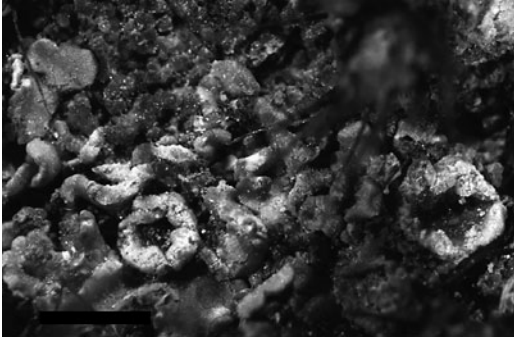


FIG. 3. *Psoroma absconditum* (holotype). Scale=2 mm.

to 2 (–4) mm diam., almost flat, with thin, rugose thalline margins, concolorous with the thallus; disc slightly concave, deep brown. *Cephalodia* small, compressed squamulose with digital outgrowths, bluish brown, with *Nostoc*, on and between the squamules. *Hymenium* 120–160  $\mu\text{m}$  high, uppermost part yellow-brown. The cortex of the apothecium is pseudoparenchymatous, with thin-walled cells in the inner part and more thick-walled cells towards the surface, with a few minute hairs. *Ascospores* 8 per ascus, 13–16  $\times$  9–11  $\mu\text{m}$ , with a minutely rugulose surface.

*Chemistry.* No substances detected.

*Ecology and distribution.* In tufts of *Ditrichum* cf. *immersum* van Zanten. Apothecia and clusters of mature squamules occur at ground level, while a few small squamules are on the lower part of bryophyte stems. Îles Kerguelen and Heard Island.

*Note.* This taxon was treated as *Psoroma* sp. by Øvstedal & Gremmen (2006). When a specimen was found in the Kerguelen material collected by N. J. M. Gremmen in 2004, we re-examined all material and relevant literature and concluded that it was an undescribed species (Jørgensen 2003, pers. comm.). Immature specimens may resemble *P. asperellum* Nyl., which is found in New Zealand, South Africa and Marion and Prince Edward Islands (see Øvstedal & Gremmen 2001), but that species has narrower and more ascending squamules, and the ascospores are distinctly larger.

*Additional specimens examined.* **Heard Island:** fluvio-glacial plain N of Pageos Moraine, 84 m, 2001, Gremmen, H-1334 and H-1335; E-slope of Scarlet Hill, 340 m, 2001, Gremmen H-0998; near top of SW end of Corinth Head, 107 m, 2001, Gremmen H-1537. **Kerguelen,** main island, Val Studer, 600 m, 2004, Gremmen K-101 (BG).

### **Rhizocarpon nidificum (Hue) Darb.**

*Thallus* crustose, composed of several smaller ones, up to 6 cm diam., areolate, green, with black hypo- and prothallus.

*Apothecia* immersed between the areolae, black, angular, 0.3–0.5 mm diam., proper margin thin but distinct. *Hymenium* 60–80  $\mu\text{m}$  high, uppermost part red-brown, K+ burgundy red. *Ascospores* 8 per ascus, early dark greenish brown, 3-septate, 14–18  $\times$  8–12  $\mu\text{m}$ .

*Chemistry.* Psoromic and rhizocarpic acids.

*Ecology and distribution.* On inland rock. Antarctica, South Georgia (Øvstedal & Lewis Smith 2001), Marion Island (Øvstedal & Gremmen 2001), Heard Island.

*Specimen examined.* **Heard Island:** Schmidt Glacier moraine, Australian Antarctic Research Expedition, 1949 (MEL 8787).

### **Rinodina otagensis (Zahlbr.) H. Mayrhofer**

*Thallus* crustose, greyish brown to pale brown, thin, cracked, up to 10 mm diam.

*Apothecia* half immersed in the thallus, biatorine, up to 0.5 mm diam., disc dark brown, flat, rough. *Hymenium* 50–80  $\mu\text{m}$  high, uppermost part red-brown. *Ascospores* 8 per ascus, *Dubyana*-type, 1-septate, brown, 16–20  $\times$  8–10  $\mu\text{m}$ , smooth. *Paraphyses*, terminal cells broad, enlarged to 4  $\mu\text{m}$  diam.

*Chemistry.* No substances detected.

*Ecology and distribution.* On coastal rocks. New Zealand (Mayrhofer 1983) and Heard Island.

*Note.* The specimens agree with the description in Mayrhofer (1983) in most



details, but differ by the somewhat larger ascospores (16–20 × 8–10 µm), which are not warted.

*Specimens examined.* **Heard Island:** Black Browed Albatross rookery, near Jacka Glacier, 1963, *A. Gilchrist* (MEL 1027762); West Bay, 6 m, 1950, unknown collector (MEL 8766).

***Thelenella mawsonii* (C. W. Dodge) H. Mayrhofer & McCarthy**

*Thallus* crustose, thin, green-grey, finely cracked, up to 5 mm diam.

*Perithecia* black, subglobose, up to 0.5 mm diam., with rough surface. *Involucrellum* only in upper part of perithecium. *Ascospores* 8 per ascus, pale yellowish, 46–50 × 18–20 µm.

*Chemistry.* No substances detected.

*Ecology and distribution.* On inland and coastal rocks. Îles Kerguelen, Macquarie I., Bouvetøya (Øvstedal & Lewis Smith 2001) and Heard Island.

*Specimens examined.* **Heard Island:** Laurens Peninsula, below Mt. Olsen, 250 m alt., *S. Chown*, *D. Marshall* & *J. Klok*, H-1236; Atlas cove, 1963, *R. Filson* 4584 & *J. Williams* (MEL 1032266 p.p.).

***Umbilicaria decussata* (Vill.) Zahlbr.**

*Thallus* foliose, umbilicate, up to 9 mm wide. Upper side brown-black, with low ridges in the inner part, ridges with thin white pruinum. Lower side coal black, without rhizines. *Thallospores* unicellular, 5–7 µm.

*Apothecia* not seen.

*Chemistry.* Gyrophoric acid.

*Ecology and distribution.* On rock, with *Rhizocarpon* sp. Cosmopolitan in colder areas (Øvstedal & Lewis Smith 2001).

*Note.* Very similar to Antarctic populations, except that the thallospores are smaller (5–7 µm). The small size of the thalli, up to 9 mm diam., indicates a low age of the population, implying that the species is a recent colonizer of the island. This is the

first record of the genus in any of the subantarctic islands of the Indian Ocean (Kerguelia).

*Specimen examined.* **Heard Island:** South Barrier Plateau, at the crater, 300–500 m, 1965, *J. Crick* (MEL 1020723).

***Verrucaria aethiobola* Wahlenb.**

*Thallus* crustose, up to 15 mm diam., pale buff, finely secondarily cracked, 0.3–0.5 mm thick; without prothallus.

*Perithecia* 0.3–0.5 mm diam., 25% protruding, *ostiole* irregular, depressed. *Involucrellum* black, extending to base-level. *Exciple* yellowish to pale brown. *Ascospores* 8 per ascus, 14–18 × 7–8 µm.

*Ecology and distribution.* On rock, with *Thelenella mawsonii*. Europe, North America, Antarctica, South Georgia (Øvstedal & Lewis Smith 2001) and Heard Island.

*Note.* Similar to the Arctic *V. aethiobola*, but differs in the better developed involucrellum and somewhat smaller ascospores (14–16 × 7–8 µm). It differs from the Antarctic populations (denoted cf. *aethiobola*, see Øvstedal & Lewis Smith 2001), in having distinctly smaller ascospores.

*Specimen examined.* **Heard Island:** Atlas Cove, 1963, *R. Filson* 4584 & *J. Williams* (MEL 1032266 p.p.).

**Discussion**

The 19 species described here brings the total number of species known from Heard Island to 90. Several taxa described or recorded by Dodge (1948) have not been found in FH-Dodge and are not included here, but when they are eventually located, the number of species will certainly increase. The new species described here are all small and inconspicuous, and easily overlooked, and almost certainly they will be found elsewhere on the island. In general the additional species fit into the geographical patterns outlined by Øvstedal & Gremmen (2006).

We are greatly indebted to Professor J. A. Elix, Canberra, for help with chemical analyses, to Professor T. Tønsberg, Bergen, for comments on the manuscript and to Professor P. M. Jørgensen, Bergen, for comments on *Psoroma*. Mrs B. Helle and Mr J. Berge, both Bergen, are thanked for technical assistance. NJMG thanks D. M. Bergstrom and the Australian Antarctic Division for the opportunity to work on Heard Island, as part of AAD project 1015, and also the Netherlands Polar Program for financial support.

## REFERENCES

- Baruffo, L., Zedda, L., Elix, J. A. & Tretiach, A. (2006) A revision of the lichen genus *Lepraria* s. lat. in Italy. *Nova Hedwigia* **83**: 387–429.
- Coppins, B. J. & Purvis, O. W. (1992) *Psilolechia*. In *The Lichen Flora of Great Britain and Ireland* (O. W. Purvis, B. J. Coppins, D. L. Hawksworth, P. W. James & D. M. Moore, eds): 508–510. London: Natural History Museum Publications.
- Crombie, J. M. (1876) Lichenes Terrae Kergueleni: an Enumeration of the Lichens collected in Kergulen's Land by the Rev. A. E. Eaton during the Venus-Transit Expedition in 1874–75. *Journal of the Linnean Society London, Botany* **15**: 180–193.
- Culberson, C. F. (1972) Improved conditions and new data for the identification of lichen products by a standardized thin-layer chromatographic method. *Journal of Chromatography* **238**: 113–125.
- Culberson, C. F. & Johnson, A. (1982) Substitution of methyl tert-butyl ether for diethyl ether in the standardized thin-layer chromatographic method. *Journal of Chromatography* **238**: 483–487.
- Culberson, C. F. & Kristinsson, H. (1970) A standardized method for the identification of lichen products. *Journal of Chromatography* **46**: 85–93.
- Ekman, S. & Tønsberg, T. (2002) Most species of *Lepraria* and *Leproloma* form a monophyletic group closely related to *Stereocaulon*. *Mycological Research* **106**: 1262–1276.
- Galloway, D. J. (2005) *Placopsis fusciculoides* (Ascomycota: Agyriaceae), a new lichen from Aotearoa New Zealand, British Columbia and Bolivia. *Australasian Lichenology* **57**: 16–20.
- Galloway, D. J., Lewis Smith, R. I. & Quilhot, W. (2005) A new species of *Placopsis* (Agyriaceae: Ascomycota) from Antarctica. *Lichenologist* **37**: 321–327.
- Jørgensen, P. M. (2003) Conspectus familiae *Pannariaceae* (Ascomycetes lichenosae). *Ilicifolia* **4**: 1–79.
- Kalb, K. & Vězda, A. (1994) Neue Arten der Flechtengattung *Gyalideopsis* Vězda (*Gomphillaceae*). *Nova Hedwigia* **58**: 511–528.
- Kantvilas, G. (2001) The lichen family *Fuscidaeae* in Tasmania. *Bibliotheca Lichenologica* **78**: 169–192.
- Kantvilas, G. & McCarthy, P. M. (2003) *Hueidea* (*Fuscidaeae*), a new lichen genus from alpine Australia. *Lichenologist* **35**: 397–407.
- Kantvilas, G., Messuti, M. I. & Lumbsch, H. T. (2005) Additions to the genus *Mycobilimbia* s. lat. from the Southern Hemisphere. *Lichenologist* **37**: 251–259.
- Lamb, I. M. 1947. A monograph of the lichen genus *Placopsis* Nyl. *Lilloa* **13**: 151–288.
- Leuckert, C., Kümmerling, H. & Wirth, V. 1995. Chemotaxonomy of *Lepraria* Ach. and *Leproloma* Nyl. ex Crombie, with particular reference to Central Europe. *Bibliotheca Lichenologica* **58**: 245–259.
- Lücking, R., Aptroot, A., Umana, L., Chaves, J. L., Sipman, H. J. M. & Nelsen, M. P. 2006. A first assessment of the Ticolichen biodiversity inventory of Costa Rica: the genus *Gyalideopsis* and its segregates (Ostropales: *Gomphillaceae*), with a worldwide key and name status checklist. *Lichenologist* **38**: 131–160.
- Lumbsch, H. T. (1994) Die *Lecanora subfusca*-Gruppe in Australasien. *Journal of the Hattori Botanical Laboratory* **77**: 1–175.
- Mayrhofer, H. (1983) The saxicolous species of *Rinodina* in New Zealand. *Lichenologist* **15**: 267–282.
- Menlove, J. E. (1974) Thin-layer chromatography for the identification of lichen substances. *Bulletin British Lichen Society* **3**: 3–5.
- Øvstedal, D. O. & Gremmen, N. J. M. (2001) The lichens of Marion and Prince Edward Islands. *South African Journal of Botany* **67**: 552–572.
- Øvstedal, D. O. & Gremmen, N. J. M. (2006) Lichens of sub-Antarctic Heard Island. *South African Journal of Botany* **72**: 353–366.
- Øvstedal, D. O. & Lewis Smith, R. I. (2001) *The Lichens of Antarctica and South Georgia. A Guide to Their Identification and Ecology*. Cambridge: Cambridge University Press.
- Poelt, J. & Pelletier, U. (1984) Zweigstrauchige Arten der Flechtengattung *Caloplaca*. *Plant Systematics and Evolution* **148**: 51–88.
- Slavíková-Bayerová, Š. & Orange, A. (2006) Three new species of *Lepraria* (Ascomycota, *Stereocaulaceae*) containing fatty acids and atranorin. *Lichenologist* **38**: 503–513.
- Søchting, U. (1989) Lignicolous species of the lichen genus *Caloplaca* from Svalbard. *Opera Botanica* **100**: 241–257.
- Søchting, U. & Øvstedal, D. O. (1992) Contributions to the *Caloplaca* flora of the western Antarctic area. *Nordic Journal of Botany* **12**: 121–134.
- Staiger, B. & Kalb, K. (1995) *Haematomma*-Studien. I. Die Flechtengattung *Haematomma*. *Bibliotheca Lichenologica* **59**: 1–198.
- Tønsberg, T. (1992) The sorediate and isidiate, corticolous, crustose lichens in Norway. *Sommerfeltia* **14**: 1–331.
- Vězda, A. (2003) *Gyalideopsis tuerkii* (lichenisierte Ascomycotina, *Gomphillaceae*), eine neue Art der Alpen. *Herzogia* **16**: 35–40.
- Vitikainen, O. (2002) Notes on *Peltigera* (Peltigeraceae) in southern South America and Antarctic regions. *Mitteilungen Institut Allgemeines Botanik Hamburg* **30–32**: 297–303.