

The lichens of Hurd Peninsula, Livingston Island, South Shetlands, Antarctica

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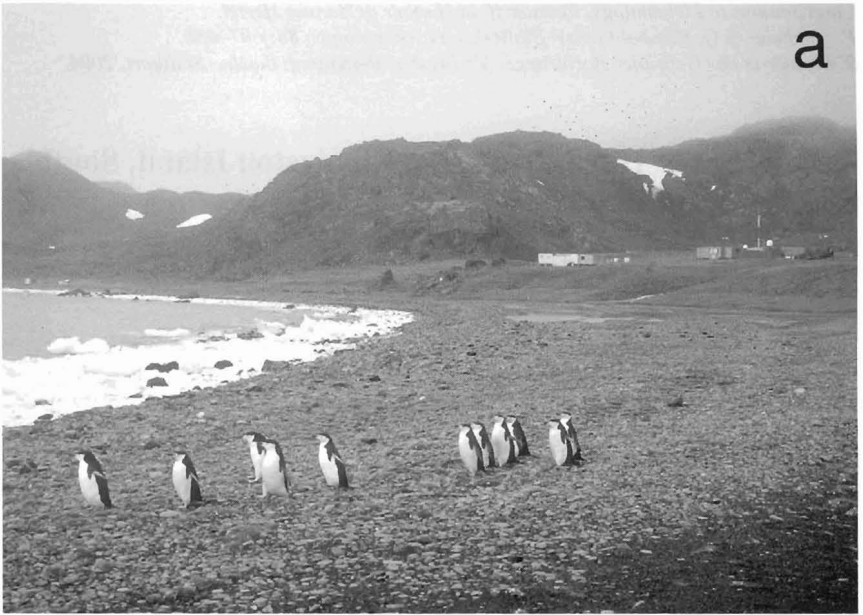
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Abstract: 187 lichen taxa are reported from Hurd Peninsula, Livingston Island, South Shetland Islands, Antarctica. 15 species are new to Antarctica, 25 are new to South Shetland Islands and 43 are new to Livingston Island. Eight species and one variety are described as new to science: *Absconditella antarctica* Söchting & Vězda, sp. nov., *Caloplaca hertelii* Söchting, Øvstedal & Sancho, sp. nov., *C. insignis* Söchting & Øvstedal, sp. nov., *Caloplaca sauronii* Söchting & Øvstedal, sp. nov., *Lecania glauca* Øvstedal & Söchting, sp. nov., *Parmeliella austroshetlandica* Øvstedal & Söchting, sp. nov., *Pertusaria oculae-ranae* Øvstedal & Söchting, sp. nov., *Tephromela parasitica* Øvstedal & Söchting, sp. nov., *Gyalidea mayaguezensis* var. *antarctica* Söchting & Vězda, var. nov. The new combinations *Amandinea augusta* (Vain.) Söchting & Øvstedal, *A. babingtonii* (Hook. f. & Taylor) Söchting & Øvstedal, *A. isabellina* (Hue) Söchting & Øvstedal, *A. latemarginata* (Darb.) Söchting & Øvstedal and *Caloplaca hookeri* (C. W. Dodge) Söchting, Øvstedal & Sancho are proposed. The lichen genus *Huea* is accepted for some Antarctic *Caloplaca* species with lecideine apothecia, and *Huea coralligera* (Hue) C. W. Dodge & G. E. Baker is selected as neotype for the genus. The biogeographic affiliations of the species are recorded and the biogeography of the lichen flora discussed. 28% of the taxa are considered bipolar and 15% cosmopolitan. The remaining species are restricted to the Southern Hemisphere and 42% are strict Antarctic endemics.

Introduction

The earliest collections of lichens from Antarctica were made by expeditions in the 19th and early 20th century, and were subsequently studied and described by contemporary lichenologists such as HUE (1908, 1915), VAINIO (1903), ZAHLBRUCKNER (1906, 1917) and DARBISHIRE (e.g. 1905, 1910, 1912). Following a period of almost 50 years of lichenological inactivity, major taxonomic advances were made by C. W. DODGE (1973) and I. M. LAMB (e.g. 1964). Later, lichenologists with bipolar experience have critically studied groups such as lecideoid lichens (HERTEL 1987), yellow *Acarospora* (CASTELLO & NIMIS 1994) *Caloplaca* (SØCHTING & ØVSTEDAL 1992; SØCHTING & OLECH 1995), *Cladonia* (STENROOS 1993), *Stereocaulon* (LEWIS SMITH & ØVSTEDAL 1991) and *Xanthoria* (CASTELLO 1995). In addition to these taxonomic studies numerous floristic accounts of various regions of Antarctica have been published (e.g. APTROOT & VAN DER KNAAP 1993; CASTELLO & NIMIS 1995; INOUE 1995; OLECH 1989a; SEPPELT 1986). An extensive bibliography is given by ØVSTEDAL & LEWIS SMITH (2001).



a



b

Fig. 1. South Bay. **a.** Caleta Española with Base Juan Carlos I and the lower slopes of Mt. Reina Sofia in the background; **b.** Caleta Argentina, view towards south, with gentoo penguin (*Pygoscelis papua*) rookery.

Although a preliminary survey of the lichens of Livingston Island was made by LINDSAY (1971), the first detailed study devoted to these organisms on the is-

land was made by OLECH (1989b), who recorded 105 lichen species from the area on-the northern slopes of Hurd Peninsula. SANCHO *et al.* (1999) published an annotated list of 100 species from almost the same area, which is the ice-free area where the Spanish Base Juan Carlos I is situated.

During the Antarctic summer, January and February 1998, the first author spent six weeks at the Spanish research station. During this visit the lichen flora of Hurd Peninsula was studied intensively, with special emphasis on the genus *Caloplaca*. Subsequently, the material was studied in cooperation with the second and third authors, who have for many years studied Antarctic lichens (e.g. SANCHO *et al.* 1999; ØVSTEDAL & LEWIS SMITH 2001). Numerous species were found which were not previously known from the island, and several species have proved to be new to science. Even though a number of specialists contributed to this study with descriptions, identifications and verification, it has not been possible to identify or describe all specimens, as some genera are insufficiently understood.

The results are presented to varying degrees of detail. References to the published data from the two previous studies are included to provide as complete a list as possible for Hurd Peninsula. Obvious synonyms have been accounted for, but, as we have not studied all vouchers from the former studies, the excluded taxa represent misidentifications, taxa based on differences in species concept, or simply taxa that were not collected or checked by us.

Material and methods

The area

The investigated area is situated on Hurd Peninsula, which lies between South Bay to the north and False Bay to the south. The ice-free areas are few and separated by glacier tongues from Hurd Glacier, which covers most of the peninsula. The major part of the ice-free area is about 3 km² and is situated at the north side bordering South Bay. Around South Bay there are several smaller bays or coves where steep slopes and cliffs provide protected environments. The Spanish research base is situated in the bay Caleta Española below Mt. Reina Sophia (273 m alt.).

Hurd Peninsula is primarily composed of acid sedimentary rock belonging to the Miers Bluff Formation, but there are also scattered formations of acid volcanic rock. Such sites were visited at Punta Hesperides in South Bay and at Pico Moores at False Bay. In the specimen list the bedrock is sedimentary, unless otherwise is stated.

SANCHO *et al.* (1999) provide a detailed description of the locality, the climate and the vegetation types.

Fieldwork

Most of the fieldwork took place at South Bay at the northern side of the peninsula, but False Bay on the south side of the peninsula was visited once. Most of the collections were made within a radius of 1 km from the base. The most important collecting sites were: 1. Caleta Española, bordered to the south by Punta Polaca and to the east by the northern slopes of Mt. Reina Sofia, above Base Juan

Carlos I (62° 39.7' S, 60° 23.1' W) (Fig. 1a); 2. Johnsons Dock, with very steep sides separated by a calving glacier at the southern end (62° 39.6' S, 60° 22.7' W); 3. Caleta Argentina, which is eutrophicated by a small penguin rookery (62° 40.1' S, 60° 24' W) (Fig. 1b); 4. False Bay at Pico Moores, 300–350 m alt. (62° 41' S, 60° 20' W) (Fig. 2).

The fieldwork was performed from 12 Jan. to 28 Feb. 1998. Collection numbers given in the list are those of Söchting; in the species list dates are given only for type specimens. Vouchers of all collections are deposited at the Botanical Museum, Copenhagen (C), but many duplicates are also deposited at the Botanical Institute, Bergen (BG) and at the Botanical Institute of Madrid (MAF). Other depositions are indicated in the text.

Laboratory work and identification

Sections for microscopy were made by hand or with a Reichert-Jung Cryostat 2800 Frigocut-E. In situ photographs of specimens were taken either in the field or on their substrate in the laboratory with an Olympus DP10 digital camera. Microscopic photos were taken with an Olympus DP10 digital camera on an Olympus BX60 Microscope.

Secondary metabolites were analysed with standard TLC methods according to CULBERSON & KRISTINSSON (1970), WHITE & JAMES (1985) and CULBERSON & JOHNSON (1982), and HPLC was performed according to SÖCHTING (1997).

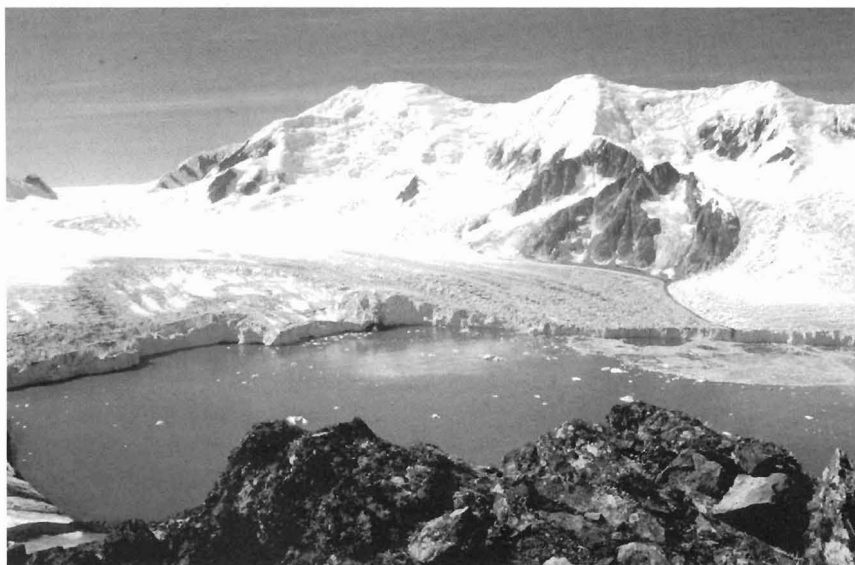


Fig. 2. False Bay seen from Pico Moores.

Nomenclature follows mainly ØVSTEDAL & LEWIS SMITH (2001). In many cases the provisional names used by them are maintained in this paper, and the

taxa are included in the biogeographic discussion, even though no formal species name has been assigned to the specimens.

Discussion

Biodiversity and biogeography

A total of 187 taxa are identified to species level and further 9 taxa have been identified only to genus level or, with uncertainty, to species level. 26 additional taxa are listed by OLECH (1989b) or by SANCHO *et al.* (1999), but are considered here as either misidentifications or are not verified by us.

Of the 187 taxa, 15 are new to Antarctica, 25 are new to South Shetland Islands and 43 are new to Livingston Island. 104 taxa have previously been recorded from South Bay.

Considering that several genera have not been thoroughly collected, e.g. *Buellia*, *Cladonia*, *Lecanora*, lecideoid species and *Verrucaria*, the documented lichen diversity is high. It may be expected that further fieldwork will increase the current total of 196 to at well over 200. From a biogeographic and conservation point of view, the small area of about 3 km² is of especial conservation value, holding more than half of the lichen species known from Antarctica, viz: 380 (ØVSTEDAL & LEWIS SMITH 2001). Hurd Peninsula and South Bay are therefore comparable in species richness to Signy Island in the South Orkneys (ØVSTEDAL & LEWIS SMITH 2001), and it is most certainly one of the richest lichen localities in the Antarctic.

28% of the identified taxa are bipolar and 15% have a more or less cosmopolitan distribution; however, it is difficult to separate these groups as the concept of bipolar species can be used in a more or less strict sense, and critical studies of montane regions are often lacking. The remaining species are restricted to the Southern Hemisphere, with 42% being strict Antarctic endemics and 11% are endemic to the Antarctic, Subantarctic and southern South American region. The degree of endemism, however, differs significantly between genera. All six *Rhizocarpon* species also occur in the Northern Hemisphere. In *Cladonia*, only 9% of the species are true Antarctic endemics, whereas a large majority (82%) is more or less bipolar or cosmopolitan, as was also pointed out by STENROOS (1993). Of the 21 species in the genera *Caloplaca* and *Huea* only four (19%) are known from the Northern Hemisphere, and 12 species (57%) are true Antarctic endemics. Even more significant is the high degree of true endemism in *Buellia* and *Amandinea* (82%), with only 12 percent of the species occurring in both Hemispheres. The taxonomy in these genera is sufficiently well studied to assume that these proportions are not likely to change much. The difference in endemism among the genera is not easily explained. However, it is very likely that genera such as *Caloplaca* and possibly *Amandinea* have had separate speciation in the far south of the Southern Hemisphere, and long range distribution appears to have been very limited. On the other hand, long-range dispersal must be hypothesised in order to explain the colonization of the Subantarctic islands (HERTEL 1987), and dispersal probably also took place – although more rarely – from north to south or vice versa. More data are needed in order to reveal the global origin of bipolar species.

Taxonomic notes

Amandinea

The genus *Amandinea* is separated from relatives in the genus *Buellia* by the filiform conidia in contrast to \pm ellipsoid conidia in the remaining *Buellia* species (MARBACH 2000; SCHEIDEGGER 1993). It may be questioned whether this single character is sufficient to define a genus, and a recent molecular study (WEDIN *et al.* 2002) challenges the monophyly of the genus, but as long as *Amandinea* is characterised by the filiform conidia, several Antarctic species rightly belong in this genus. They are combined into *Amandinea* in this paper.

Caloplaca

The genus *Caloplaca* is one of the most diverse in Antarctica. The reason for the high number of taxa recorded in this paper is undoubtedly a combination of trained collecting and critical identification. New species are regularly being described from Antarctica and there are even additional collections from Livingston Island that differ from those named, but are too scanty to merit formal description. Several species are still poorly understood, and a number of earlier taxa are untypified due to lack of authentic material.

Huea

DODGE & BAKER (1938) defined the genus *Huea* to host species of *Teloschistaceae* with lecideine, carbonized apothecia on a crustose thallus without any anthraquinone pigments. They included three Antarctic species in the genus, viz: *H. cerussata* (Hue) C. W. Dodge & G. E. Baker, *H. coralligera* (Hue) C. W. Dodge & G. E. Baker and *H. flava* C. W. Dodge & G. E. Baker. The latter species was chosen as the type of the genus. The type material of *H. flava* C. W. Dodge & G. E. Baker was found by CASTELLO & NIMIS (1995) to give no indication of the identity of the species. They also failed to find other clues to an understanding that could help choosing a neotype. As *Huea flava* can therefore not be typified, and we wanted to stabilize the genus *Huea*, we hereby select *Huea coralligera* (Hue) C. W. Dodge & G. E. Baker as a neotype for the genus.

Further studies are needed to fully understand this genus, but a supporting reason for accepting the genus at this stage is that preliminary sequence data of the ITS nrDNA separate the black Antarctic species from other *Caloplaca* species, including those of the similarly black *Pyrenodesmia*-group.

Species list

Species accepted from the area are listed in bold. Species reported in the literature from South Bay, but which are dubious, or have not been studied by us are given in parentheses. Taxa new to Antarctica (or to science) are preceded by three stars; those new to the South Shetland Islands are preceded by two stars, while those new to Livingston Island are preceded by one star. Where specimens are not identified to species level with certainty the stars are enclosed within brackets. Distribution outside Livingston Island is cited in accordance with ØVSTEDAL & LEWIS SMITH (2001), in which the term endemic is used in a very wide sense, e.g. for species occurring only in Antarctica.

Thallus tenuis, crustaceus, plantas emortuas ad terram humosam incrustans, nigro-viridis, si madefactus gelatinosus, algis globosis, ad *Chlorococcaceas* pertinentibus. Apothecia gyalectoidea, *Dimerellae pineti* subsimilia, 0,2–0,25 mm lata, 0,2 mm alta, ochracea, marginibus crassis, integris, discis concavis, fusco-luteis. Excipulum hyalinum. Hymenium hyalinum, 100–110 μm altum. Paraphyses copiosae, simplices, in aqua librae, 1–1,5 μm crassae, apicibus paulum incrassatis, septatae, septis indistinctis. Asci cylindrici, membranibus tenuibus, in apice incrassatis (tholis distinctis), 8-sporis. Ascospores ellipsoideae, membranibus septisque tenuibus, 18–22 μm longae, 4,5 μm crassae, uniseptatae. Hymenium, asci et ascospores I+ (vinose rubescentes).

Typus: SOUTH SHETLAND ISLANDS. *Livingston Island*: South Bay, Caleta Española, Peak of Mt. Reina Sofia, 277 m alt., soil in deep S-exposed crevice, 17 Feb. 1998, *U. Söchting 7911* (C – holotype; hb. Vězda – isotype).

Thallus a blackish-green crust covering detritus and dead plants on peaty soil, gelatinous when wet, algae chlorococcoid. *Apothecia* dispersed or sometimes aggregated, gyalectoid (like *Dimerella pineti*), 0,2–0,25 mm diam., about 0,2 mm thick, semi-immersed in the substrate. Margin thick, prominent, entire, pale yellow brown. Disc concave, yellow brown. *Excipulum* hyaline. *Hymenium* hyaline, about 100–110 μm high. *Paraphyses* numerous, simple, 1–1,5 μm thick, straight, septate (hardly visible), with slightly inflated apical cells. *Asci* cylindrical, thin walled, only thickened at the tholus, with 8 spores. *Ascospores* ellipsoid, 18–22 \times 4,5 μm , one-septate, thin walled. Hymenium, asci and ascospores I+ (strongly wine red).

Note: This new species is placed in the genus *Absconditella* due to the gyalectoid, pale yellow brown apothecia, the hyaline excipulum, the relatively high hymenium, the cylindric asci with well developed tholus, the thin walled, septate ascospores and the I+ wine red reaction of the hymenium. *Absconditella antarctica* is separated from the previously described five species of *Absconditella* by a combination of the following characters: semi-immersed, relatively large, up to 0,25 mm broad, *Dimerella pineti*-like apothecia, two-celled ascospores and growth on peaty soil.

** *Acarospora badiofusca* (Nyl.) Th. Fr.

Antarctic endemic recorded from South Orkney Islands and South Georgia.

SOUTH BAY, Punta Polaca, 5–10 m alt., soil on rock, *US 7693*; Caleta Argentina, crevices in copper rich intrusions, *US 7782*.

* *Acarospora convoluta* Darb.

Antarctic endemic recorded from South Orkney Is., South Shetland Is. and Antarctic Peninsula.

SOUTH BAY, Punta Hesperides, acid, volcanic bedrock, sheltered rock crevice, *US 7943*.

Acarospora gwynnei C. W. Dodge & B. A. Rudolph

Antarctic endemic, widespread in Antarctica. Reported from Livingston Island by SANCHO *et al.* (1999).

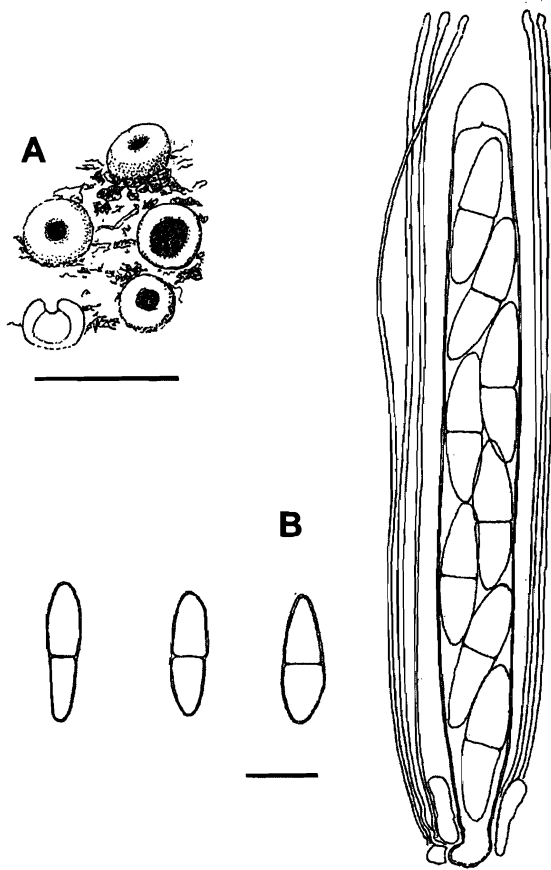


Fig. 3. *Absconditella antarctica*, holotype. **A.** Apothecia, habitus and vertical section (bar = 0.5 mm); **B.** Ascus, paraphyses (hardly visible septa not shown) and ascospores (bar = 10 µm).

***Acarospora macrocyclos* Vain.**

Antarctic endemic, widespread in Antarctica. Reported from Livingston Island by OLECH (1989b) and SANCHO *et al.* (1999).

***Amandinea augusta* (Vain.) Søchting & Øvstedal, comb. nov.**

Bas.: *Buellia augusta* Vain., *Lichenes. Expédition Antarctique Belge. Résultats du Voyage du S. Y. Belgica en 1897–1898–1899 sous le commandement de A. de Gerlache de Gomery. Rapports Scientifiques. Botanique*, p. 26 (1903).

Antarctic endemic reported from South Georgia, South Orkney Is., South Shetland Is. and Antarctic Peninsula; also from Livingston Island by OLECH (1989b) and SANCHO *et al.* (1999).

SOUTH BAY, Mt. Reina Sofia, on bone, *US 7742*.

**** *Amandinea babingtonii* (Hook. f. & Taylor) Søchting & Øvstedal, comb. nov.**

Bas.: *Lecanora babingtonii* Hook. f. & Taylor, in Hooker, *Flora Antarctica* 2: 535 (1847).

Antarctic endemic recorded from Bouvetøya and Antarctic Peninsula.

SOUTH BAY, Johnsons Dock, S-side, 10–50 m alt., vertical rock, *US 7852*, *US 7853*.

***Amandinea coniops* (Wahlenb. ex Ach.) M. Choisy**

Bipolar species, widespread in Antarctica. Reported from Livingston Island by OLECH (1989b) and SANCHO *et al.* (1999).

SOUTH BAY, Caleta Argentina, 5–50 m from the shore, bird perching rock, *US 7715*; Johnsons Dock, 20 m from the shore, acid, NW-exposed, coastal rock, *US 7796*.

*** *Amandinea isabellina* (Hue) Søchting & Øvstedal, comb. nov.**

Bas.: *Lecidea isabellina* Hue, *Lichenes. Deuxième Expédition Antarctique Française*, p. 157 (1915).

Antarctic endemic, widespread in Antarctica.

SOUTH BAY, Johnsons Dock, S-side, 10–50 m alt., rock, *US 7843a*.

***Amandinea latemarginata* (Darb.) Søchting & Øvstedal, comb. nov.**

Bas.: *Buellia latemarginata* Darb., *Wiss. Ergeb. Schwed. Südpolexped.* 4(11): 15 (1912).

Antarctic endemic, widespread in Antarctica. Reported from Livingston Island by OLECH (1989b) and SANCHO *et al.* (1999).

***Amandinea petermannii* (Hue) Matzer, H. Mayrhofer & Scheid.**

Antarctic endemic, widespread in Antarctica. Reported from Livingston Island by OLECH (1989b) as *Rinodina petermannii* (Hue) Darb.

SOUTH BAY, Punta Polaca, eutrophicated maritime rock, *US 7594*; Caleta Argentina, 5–50 m from the shore, bird perching rock, *US 7714*.

**** *Arthonia lapidicola* (Taylor) Branth & Rostr.**

Bipolar species recorded from South Orkney Is.

SOUTH BAY, Johnsons Dock, 20 m from the shore, 25–50 m alt., sheltered, moist rock crevice, *US 7822*.

(*Arthonia subantarctica* Øvstedal)

Reported from Livingston Island by OLECH (1989b).

**** *Arthopyrenia praetermissa* Lindsey**

Antarctic endemic recorded from South Georgia and South Orkney Is.

SOUTH BAY, Johnsons Dock, 20 m from the shore, 25–50 m alt., sheltered, humid rock in crevice, *US 7817*; Peak of Mt. Reina Sofia, *US 7919*.

() *Arthrorhaphis cf. alpina* (Schaer.) R. Sant.**

Bipolar species, recorded from Antarctic Peninsula.

SOUTH BAY, Punta Hesperides, acid, volcanic bedrock, soil on top of boulder, *US 7939*.

Note: Areola very few and small, so identification to species is unsecure.

**** *Aspicilia* sp. A (in ØVSTEDAL & LEWIS SMITH 2001)**

Antarctic endemic reported from James Ross I.

SOUTH BAY, Johnsons Dock, 20 m from the shore, 25–50 m alt., vertical rock, *US 7830*.

***Austrolecia antarctica* Hertel**

Antarctic endemic recorded from South Shetland Is. and Antarctic Peninsula. Reported from Livingston Island by SANCHO *et al.* (1999).

SOUTH BAY, Punta Polaca, vertical rock near shore, 50 m alt., *US 7601*; Lower slopes of Mt. Reina Sofia, vertical rock, *US 7646*; Johnsons Dock, 20 m from the shore, 25–50 m alt., vertical rock, *US 7903*; Pico Radio, 1 km W of Base Juan Carlos I, 50–130 m alt., rock, *US 7961*; FALSE BAY, Pico Moores, acid, volcanic bedrock, 300–350 m alt., exposed rock, *US 7787*, *US 7795*.

**** *Bacidia rhodochroa* (Hue) Darb.**

Antarctic endemic recorded from South Orkney Is. and Antarctic Peninsula.

SOUTH BAY, Lower slopes of Mt. Reina Sofia, sheltered crevice on NW-exposed, vertical rock, *US 7761*.

***Bacidia stipata* I. M. Lamb**

Antarctic endemic, widespread in Antarctica. Reported from Livingston Island by OLECH (1989b) and SANCHO *et al.* (1999).

SOUTH BAY, Lower slopes of Mt. Reina Sofia, along seepage rock on vertical, S-exposed rock, *US 7660*; Punta Polaca, 5–10 m alt., coastal rock, *US 7689*; Lower slopes of Mt. Reina Sofia, vertical rock, *US 7767*; Sally Rocks, crevice in vertical rock, *US 7783*; Punta Polaca, 10 m from the shore, vertical side of bird perching rock, *US 7872*; Punta Hesperides, acid, volcanic bedrock, vertical, N-exposed rock, *US 7929*, *7930*; Punta Hesperides, acid, volcanic bedrock, 5–10 m alt., vertical, S-exposed side of bird-perching rock at shore, *US 7949*.

(*Bacidia trachona* (Ach.) Lettau.)

Reported from Livingston Island by OLECH (1989b).

**** *Bacidia tuberculata* Darb.**

Antarctic-Subantarctic endemic recorded from Falkland Is., Bouvetøya, South Orkney Is. and continental Antarctica.

SOUTH BAY, Caleta Española, moss on rock near shore, *US 7608*; Caleta Argentina, 5–50 m from the shore, moss on raised beach, *US 7713*; Johnsons Dock, 20 m from the shore, 25–50 m alt., moss, *US 7824*; Caleta Española by Base Juan Carlos I, *US 7987*.

***Bacidia* sp. A (in ØVSTEDAL & LEWIS SMITH 2001)**

Antarctic endemic recorded from South Shetland Is. and continental Antarctica.

SOUTH BAY, Lower slopes of Mt. Reina Sofia, vertical SW-exposed rock, *US 7667*; Johnsons Dock, 20 m from the shore, 25–50 m alt., sheltered humid rock in crevice, *US 7818*; Peak of Mt. Reina Sofia, W-exposed seepage rock, *US 7917*.

Note: According to S. Ekman (pers. comm.) this is the same taxon as SANCHO *et al.* (1999) reported as *B. trachona* (Ach.) Lettau.

(*) *Baeomyces* cf. *rufus* (Huds.) Rebert.**

Thallus 2–3 cm wide, green-grey to brownish, composed of overlapping, minute squamules. Soralia and schizidia present. Apothecia not seen in Antarctic material. *Chemistry* (TLC): stictic acid complex. Morphology, anatomy and lichen metabolites are very similar to North European specimens, but until apothecia are found, the identification remains uncertain. First report of *Baeomyces* from Antarctica.

SOUTH BAY, Pico Radio, 1 km W of Base Juan Carlos I, 50–130 m alt., soil, *US 7977*.

*** *Bellemeria alpina* (Sommerf.) Clauzade & Cl. Roux**

Bipolar species recorded from South Georgia and South Shetland Islands.

SOUTH BAY, Lower slopes of Mt. Reina Sofia, SW-exposed sloping rock, *US 7653*.

**** *Bellemeria pullata* (Darb.) Øvstedal**

Antarctic endemic recorded from South Georgia and Bouvetøya.

FALSE BAY, Pico Moores, acid, volcanic bedrock, 300–350 m alt., rock, *US 7792*.

*** *Bellemeria subsorediza* (Lynge) R. Sant.**

Bipolar species recorded from South Georgia, Bouvetøya and South Shetland Is.

SOUTH BAY, Lower slopes of Mt. Reina Sofia, S-exposed, sloping rock, *US 7665*.

***Bellemeria* sp. A (in ØVSTEDAL & LEWIS SMITH 1999)**

SOUTH BAY, Caleta Argentina, 5–50 m from the shore, pebbles on slope below late-lying snow bed, *US 7721*.

Note: Reported from Livingston I. by SANCHO *et al.* (1999) as *Aspicilia glacialis* C. W. Dodge, but this is incorrect. It may be undescribed, but as there are many species described as *Aspicilia* from the Northern Hemisphere, with which we are not familiar, we leave it as *Bellemeria* sp. A.

**** *Bouvetiella pallida* Øvstedal**

Antarctic endemic. First report since its description from Bouvetøya (ØVSTEDAL 1986).

SOUTH BAY, Caleta Española, Lower slopes of Mt. Reina Sofia, soil on rock, *US 7759*.

***Bryonora castanea* (Hepp) Poelt**

Bipolar species recorded from South Shetland Is. and Antarctic Peninsula. Reported from Livingston Island by OLECH (1989b).

SOUTH BAY, Lower slopes of Mt. Reina Sofia, moss in late melting depression, *US 7675*; Mt. Reina Sofia, moss over rocks, *US 7741*; Punta Hesperides, acid, volcanic bedrock, N-exposed rock, *US 7934*.

**** *Bryonora peltata* Øvstedal**

Antarctic endemic recorded from South Orkney Is. and Antarctic Peninsula.

SOUTH BAY, Lower slopes of Mt. Reina Sofia, moss on exposed rock, *US 7881*; Pico Radio, 1 km W of Base Juan Carlos I, 50–130 m alt., moss in snow bed, *US 7964*.

***Bryoria* sp. A (in ØVSTEDAL & LEWIS SMITH 1999)**

Antarctic endemic recorded from South Georgia, South Orkney Is. and South Shetland Is. Reported from Livingston Island as *Bryoria chalybeiformis* (L.) Brodo & D. Hawksw. by SANCHO *et al.* (1999).

***Buellia anisomera* Vain.**

Antarctic endemic, widespread in Antarctica. Reported from Livingston Island by OLECH (1989b) and SANCHO *et al.* (1999).

SOUTH BAY, Punta Polaca, maritime rocks, *US 7583a*.

***Buellia cladocarpiza* I. M. Lamb**

Antarctic endemic, widespread in Antarctica. Reported from Livingston Island by OLECH (1989b) and SANCHO *et al.* (1999).

SOUTH BAY, Mt. Reina Sofia, vertical rock, *US 7734*; Lower slopes of Mt. Reina Sofia, shaded rock, *US 7879*.

() *Buellia* cf. *darbishirei* I. M. Lamb**

Antarctic endemic recorded from Antarctic Peninsula and continental Antarctica.

SOUTH BAY, Johnsons Dock, 20 m from the shore, 25–50 m alt., rock, *US 7829*.

* ***Buellia falklandica* Darb.**

Antarctic and Falkland Is. endemic, widespread in Antarctica.

SOUTH BAY, Caleta Española, pebbles on raised beach, *US 7604*; Punta Polaca, 5–10 m alt., coastal rock, *US 7692*.

(**) ***Buellia* aff. *graminicola* Øvstedal**

SOUTH BAY, Caleta Española by Base Juan Carlos I, on moss in crevice on vertical rock, *US 7703*; Caleta Española, moribund moss on soil, *US 7886*; Caleta Argentina, 5–50 m from the shore, moss on raised beach, *US 7717*; Johnsons Dock, 20 m from the shore, NW-exposed coastal rock, *US 7802*; Johnsons Dock, S-side, 5–10 m alt., bird perching rock, *US 7855*.

Note: The sorediate terricolous and muscicolous *Buellia* specimens include several different chemotypes containing one or two xanthenes and sometimes atranorin. None of them, however, contains 6-*O*-methyl-arthothelin, which is the secondary metabolite in *B. graminicola*. The chemotaxonomy of the group is presently unclear. *Buellia graminicola* was formerly recorded only from South Georgia.

***Buellia granulosa* (Darb.) C. W. Dodge**

Antarctic endemic, widespread in Antarctica. Reported from Livingston Island by OLECH (1989b) and SANCHO *et al.* (1999).

SOUTH BAY, Punta Polaca, 5–10 m alt., coastal rock, *US 7687*; Johnsons Dock, 20 m from the shore, NW-exposed, coastal rock, *US 7798*.

** ***Buellia grimmiae* Filson**

Antarctic endemic recorded from Antarctic Peninsula and Continental Antarctica.

SOUTH BAY, Lower slopes of Mt. Reina Sofia, moss, *US 7659*.

** ***Buellia illaetabilis* I. M. Lamb**

Antarctic endemic recorded from Antarctic Peninsula.

SOUTH BAY, Johnsons Dock, 20 m from the shore, 25–50 m alt., vertical rock, *US 7832*.

***Buellia papillata* (Sommerf.) Tuck.**

Bipolar species, widespread in Antarctica. Reported from Livingston Island by OLECH (1989b) and SANCHO *et al.* (1999).

***Buellia perlata* (Hue) Darb.**

Antarctic endemic recorded from South Orkney Is. and Antarctic Peninsula. Reported from Livingston Island by OLECH (1989b).

SOUTH BAY, Lower slopes of Mt. Reina Sofia, horizontal rock, *US 7778*.

***Buellia russa* (Hue) Darb.**

Antarctic endemic, widespread in Antarctica. Reported from Livingston Island by OLECH (1989b) and SANCHO *et al.* (1999).

SOUTH BAY, Caleta Española, pebbles on raised beach, *US 7629*; Pico Radio, 1 km W of Base Juan Carlos I, 50–130 m alt., vertical, N-exposed rock, *US 7982*.

***Buellia subpedicellata* (Hue) Darb.**

Antarctic endemic recorded from South Orkney Is. and Antarctic Peninsula. Reported from Livingston Island by OLECH (1989b).

SOUTH BAY, Punta Polaca, bird perching stone near the shore, *US 7593*.

*** *Caloplaca ammiospila* (Wahlenb.) H. Olivier**

Bipolar-montane species, widespread in Antarctica.

SOUTH BAY, Caleta Argentina, moss on rock with *Usnea aurantiaco-atra*, *US 7622*; Caleta Española, detritus on vertical rock, *US 7637*; Lower slopes of Mt. Reina Sofia, moss on horizontal rock, *US 7643*; Mt. Reina Sofia, moss on horizontal rock, *US 7733*; Mt. Reina Sofia, moss in rock crevice, *US 7739*.

***Caloplaca athallina* Darb.**

Antarctic endemic, widespread in Antarctica, but most common in continental Antarctica. Reported from Livingston Island by OLECH (1989b) and SANCHO *et al.* (1999).

SOUTH BAY, Lower slopes of Mt. Reina Sofia, on top of bird perching stone, *US 7669*; Caleta Argentina, 5–50 m from the shore, moss on bird perching stone, *US 7711*; Lower slopes of Mt. Reina Sofia, moss on bird perching rock, *US 7768*; Johnsons Dock, S-side, 10–50 m alt., moss, *US 7844*; Lower slopes of Mt. Reina Sofia, moss in rock crevice, *US 7863*.

Note: This taxon is closely related to *C. tiroliensis*, which has more dispersed apothecia. The two species are sometimes difficult to separate.

*** *Caloplaca buelliae* Olech & Søchting**

Antarctic endemic recorded from South Orkney Is. and South Shetland Is.

SOUTH BAY, Punta Polaca, maritime rocks, parasitic on *Buellia anisomera*, *US 7583*; Punta Polaca, 5–10 m alt., parasitic on *Buellia anisomera*, *US 7694*; Caleta Argentina, 5–50 m from the shore, parasitic on *Buellia anisomera* on bird perching rock, *US 7712*.

***Caloplaca cirrochrooides* (Vain.) Zahlbr.**

Antarctic endemic, widespread in Antarctica. Reported from Livingston Island by OLECH (1989b) and SANCHO *et al.* (1999).

SOUTH BAY, Punta Polaca, bird perching rock few m from shore, *US 7579*; Johnsons Peak, 300–350 m alt., sheltered, vertical rock, *US 7836*; Johnsons Dock, S-side, 10–50 m alt., vertical, sheltered rock, *US 7840*; Caleta Española by Base Juan Carlos I, pebbles on beach, *US 7985*, *US 9565*.

(*Caloplaca citrina* (Hoffm.) Th. Fr.)

Reported from Livingston Island by OLECH (1989b) and SANCHO *et al.* (1999). Probably a misidentification of *Caloplaca cirrochroides*.

*** *Caloplaca hertelii* Söchting, Øvstedal & Sancho, sp. nov.

Fig. 4

Caloplacae exsecutae similis, sed paraphysibus apicaliter non inflatis et substantiam 5-chloroemodin continens.

Typus: ANTARCTICA. *South Shetland Islands*: Livingston Island, South Bay, Caleta Española, lower slopes of Mt. Reina Sofia, acid, sedimentary bedrock, 62° 39.7' S, 60° 23.3' W, 100 m alt., horizontal, slightly eutrophicated rock, 30 Jan. 1998, *U. Söchting* 7775 (C – holotype; BG, MAF – isotypes).

Etymology: *Caloplaca hertelii* is named after Hannes Hertel, who has contributed significantly to the knowledge of lecideoid lichens in Antarctic and Subantarctic regions.

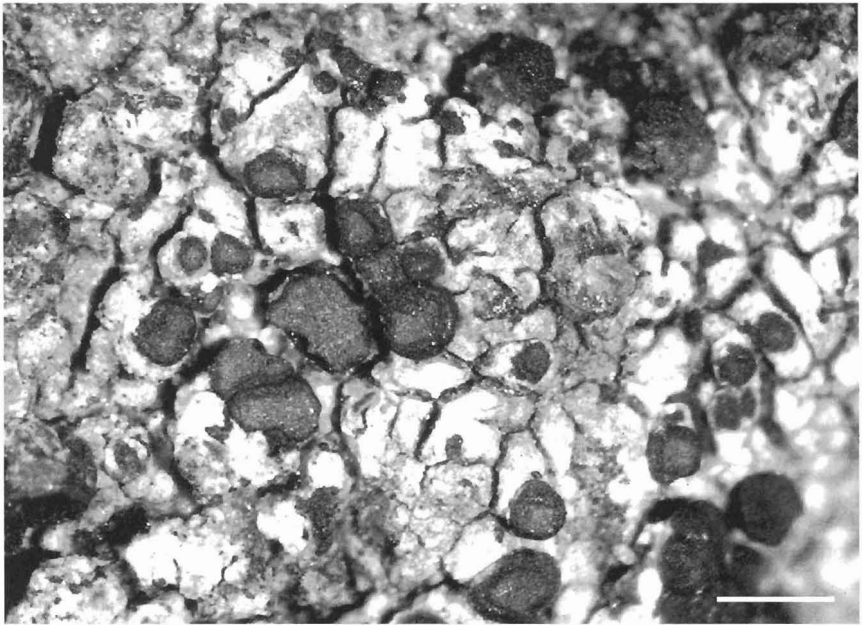


Fig. 4. *Caloplaca hertelii*, US 7758. Habitus (bar = 0.5 mm).

Thallus crustose, effuse, saxicolous or sometimes lichenicolous, up to ca. 1 cm, cracked areolate; areoles initially flat, later sometimes convex, dark grayish to blackish with black, slightly fibrillose hypothallus; surface irregular, shining. *Apothecia* crowded, lecideine, up to 0.6 mm, soon ± angular, broadly sessile. Margin thin, 0.06 mm, black, occasionally slightly orange on inner side, shining, only slightly prominent, eventually disappearing. Disc flat to eventually slightly convex, uneven, initially dark orange, but with age and exposure to light soon turning dark with olive or citrine tinge and eventually jet black and ± shining. Proper

margin in outer part dark emerald green, K-. *Hypothecium* with oil droplets. *Hymenium* 60–70 µm, with scarce, coarse epipsamma. *Paraphyses* 1.5–2 µm, flexuose, sparingly to richly branched, apically not inflated; some end cells with emerald pigment. *Asci* with 8 spores. *Spores* polarilocular, ellipsoid, 10.5–13.5 × 6–8 µm. *Septum* 3–5 µm.

Chemistry: 5-chloroemodin (major), 5,7-dichloro-3-*O*-methylnorlichexanthone, 2,5,7-trichloro-3-*O*-methylnorlichexanthone.

Note: *Caloplaca hertelii* has a superficial affinity to the Northern Hemisphere species *C. exsecuta* due to the saxicolous habit and the very dark or black thalline margin. However, the content of 5-chloroemodin, which is unknown in any Northern Hemisphere *Caloplaca*, separates it from *C. exsecuta*, which contains parietin as the major substance.

Further collections studied: SOUTH BAY, Punta Polaca, vertical rock on bird perching cliff, *US 7597*; Punta Polaca, vertical rock near shore, *US 7600*; Caleta Española at base Juan Carlos I, 10–20 m alt., moss on stones on raised beach, *US 7755*; Lower slopes of Mt. Reina Sofia, boulder, *US 7758*; Punta Hesperides, acid, volcanic bedrock, vertical, N-exposed rock, *US 7932*.

Caloplaca hookeri (C. W. Dodge) Søchting, Øvstedal & Sancho, comb. nov.

Fig. 5

Bas.: *Gasparrinia hookeri* C. W. Dodge, *Trans. Amer. Microsc. Soc.* 84: 525 (1965). – *Typus:* COCKBURN ISLAND, J. D. Hooker, with *Buellia australissima* (Nyl.) Zahlbr. and *B. babingtonii* (Hook. f. & Taylor) I. M. Lamb & C. W. Dodge, sub *B. australissima* (Nyl.) Zahlbr. (BM – lectotype, selected here).

Syn.: *Gasparrinia gainii* (Hue) C. W. Dodge, *Lichen flora of Antarctica*: 266 (1973). – *Lecanora elegans* var. *gainii* Hue (1915). – *Typus:* Petite Île dans la Baie Marguerite, sur les rochers (diorites), XV^e excursion, no. 266, 24 Jan. 1909 (PC – lectotype, selected here).

Syn.: *Kuttlingeria fuegiensis* C. W. Dodge, *Nov. Hedw.* 19: 499 (1970). – *Typus:* CHILE. *Tierra del Fuego*, 1965, *P. Redon 14 115-D* (FH – holotype).

Syn.: *Kuttlingeria siplei* C. W. Dodge, *Nov. Hedw.* 15: 322 (1968). – *Typus:* Melchior Archipelago, Omega (Lystad) Island, 64° 20' S, 62° 56' W, west water landing, on dark grey granite, *P. A. Siple 358*. – *Note:* The type material is missing in FH, but three out of four additional collections labeled *K. siplei* by Dodge represent *Caloplaca hookeri*. A neotype is selected here: *Kuttlingeria siplei* C. W. Dodge, ANTARCTIC PENINSULA. Melchior Archipelago, Gordon Lien Island, east side of main island near shore, 7 March 1941, *P. A. Siple, R. G. Frazier & D. Bailey 334e* (FH – neotype).

Note: This species was erroneously named *Caloplaca lucens* (Nyl.) Zahlbr. by SØCHTING & ØVSTEDAL (1992). The misinterpretation was based on the extremely sparse type material in H. However, recently we were able to study *Caloplaca lucens* from the classic locality, Iles Kerguelen, and also have seen isotype material from BM. We are convinced that the Antarctic taxon represents a different species, for which several epithets are available. HUE (1915) described *Lecanora elegans* var. *gainii* based on collections from the second Charcot expedition, but the name was not used at species level until DODGE (1973) made the combination *Gasparrinia gainii* (Hue) C. W. Dodge. Accordingly *Gasparrinia hookeri* C. W. Dodge, described in DODGE (1965) takes priority.

Due to the taxonomic confusion the distribution of this taxon is uncertain. Apart from South Shetland Islands we have seen specimens from South Orkney

Islands (Signy I.) and from Antarctic Peninsula. Reports from Livingston Island by OLECH (1989b) as *Xanthoria elegans* and by SANCHO *et al.* (1999) as *C. lucens* relate to this species. *Caloplaca hookeri* favours rocks eutrophicated by e.g. penguin rookeries.

Further collections studied: SOUTH BAY, Caleta Argentina, eutrophicated rocks near penguin rookery, US 7611.

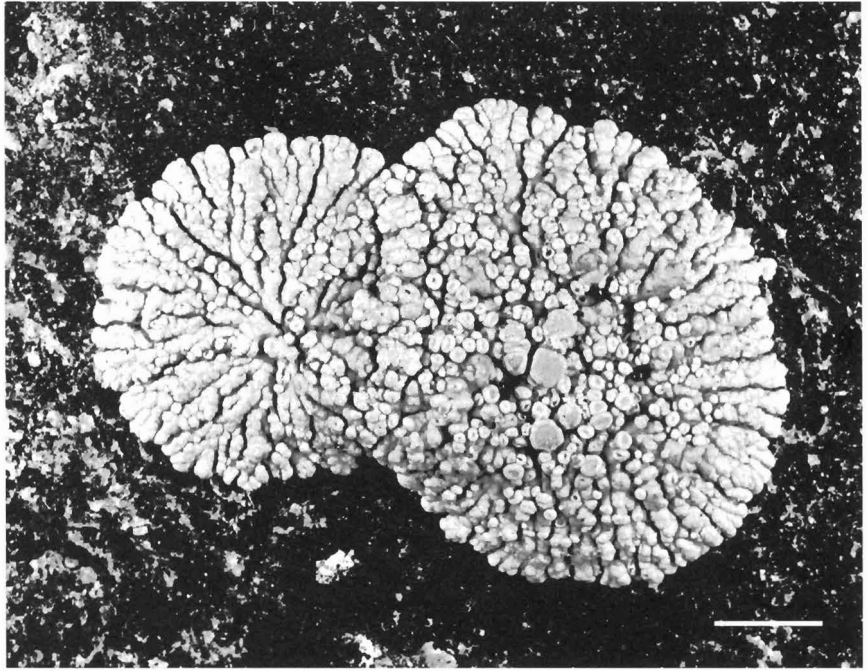


Fig. 5. *Caloplaca hookeri*. Habitus (bar = 5 mm).

*** *Caloplaca insignis* Søchting & Øvstedal, sp. nov.

Fig. 6

Caloplacae ammiospilae similis, sed thallus subfruticosus et substantiam 5-chloroemodin continens.

Typus: ANTARCTICA. *South Shetland Islands:* Livingston Island, South Bay, Punta Hesperides, 62° 38.6' S, 60° 22.3' W, acid, volcanic bedrock, vertical, N-exposed rock, 50 m alt., 18 Feb. 1998, U. Søchting 7933 (C – holotype, BG, MAF – isotypes).

Thallus very irregular, crustose to microfruticose, up to ca. 5 mm large, but often forming large coherent pulvinate thalli along crevices in rocks. The thallus is composed of vertical lobes, flattened areolae or elongated, ± coralloid squamules that can be phyllocladia-like; thalli often fastened to the substrate by rhizomorph-like hyphal strands with pedicellate ends. Thallus colour bluish grey to very pale in shaded positions, and very dark bluish or even black when exposed. *Apothecia* zeorine, numerous, often covering most of the thallus, up to 1 mm diam., sessile to slightly stipitate, orange to redbrown or almost black when strongly exposed to

light. Margin smooth to strongly crenulated, thin, initially slightly prominent, later almost level with disc, concolorous with the thallus. *Spermogonia* numerous, black, in section with bluish-green apex, K⁻. *Conidia* bacilliform, 3–3.5 × 1 µm. *Excipulum* cortex consisting of a strongly glutinized prosoplectenchymatous tissue with anticlinally orientated hyphae towards the surface. Proper excipulum fan-shaped with strongly glutinized cells. *Hypothecium* of densely interwoven glutinized cells, with lipid droplets. *Hymenium* ca. 70 µm. *Paraphyses* 1.5 µm thick, apically sparingly branched and gradually widened to 2.5 µm. *Asci* with 8 spores. *Spores* polarilocular, ellipsoid, 13–14 × ca. 8 µm. *Septum* ca. 4 µm.

Chemistry: 5-chloroemodin only.

Ecology: *Caloplaca insignis* prefers more or less sheltered crevices, where its basal hyphae penetrate fissures. In exposed situations the surface of the thallus and the apothecia are red-brown to almost black, but when sheltered the thallus is greenish grey with pale yellow apothecia.

Note: This species is distinguished by the microfruticose, coralloid structure of the thallus. Analogous thallus morphology is found in several other genera in Antarctica, e.g. in *Buellia cladocarpiza*, *Catillaria corymbosa* and *Lecania brialmontii*. This phenomenon is so special for Antarctica that it is likely to be an adaptation to specific micro-climatic parameters.

Two other features make *C. insignis* remarkable. All parts are exceedingly gelatinous, and the only secondary metabolite is 5-chloroemodin, a compound so far only known from four other Antarctic lichen species, *C. buelliae*, *C. hertelii*, *C. psoromatis* and *C. siphonospora*.

Further collections studied: SOUTH BAY, Lower slopes of Mt. Reina Sofia, SE-exposed, sheltered crevice, *US 7657*; Lower slopes of Mt. Reina Sofia, exposed quartz intrusion, *US 7671*; Caleta Española by base, crevice in vertical rock, *US 7701*; Lower slopes of Mt. Reina Sofia, sheltered crevice on NW-exposed, vertical rock, *US 7762*; Punta Henry, 1 km NE of Caleta las Palmas, crevice in vertical, sheltered rock, *US 7780*; Johnsons Dock, 20 m from the shore, sheltered crevice in NW-exposed sloping rock, *US 7808*; Lower slopes of Mt. Reina Sofia, crevice in vertical rock, *US 7862*; Lower slopes of Mt. Reina Sofia, moss on exposed rock, *US 7883*. FALSE BAY, Pico Moores, acid, volcanic bedrock, 300–350 m alt., sheltered rock crevice, *US 7794*.

** *Caloplaca isidioclada* Zahlbr.

Widespread in the southern part of the Southern Hemisphere.

SOUTH BAY, Punta Polaca, eutrophicated rock near shore, *US 7592*.

Note: An earlier homonym may be *Caloplaca coralligera* (Hue) Zahlbr., *Cat. Lichenum* 7: 274 (1931); bas.: *Polycauliona coralligera* Hue 1908. However, as the type material is absent and there is no named material in the PC herbarium, it is impossible to typify this taxon.

* *Caloplaca johnstonii* (C. W. Dodge) Søchting & Olech

Antarctic-Subantarctic endemic recorded from South Shetland Is. and Antarctic Peninsula, but also from Bouvetøya and Crozet Is.

SOUTH BAY, Caleta Española, pebbles on raised beach, *US 7603*; Hill between Caleta Española and Johnsons Dock, pebbles on ground, *US 7927*.

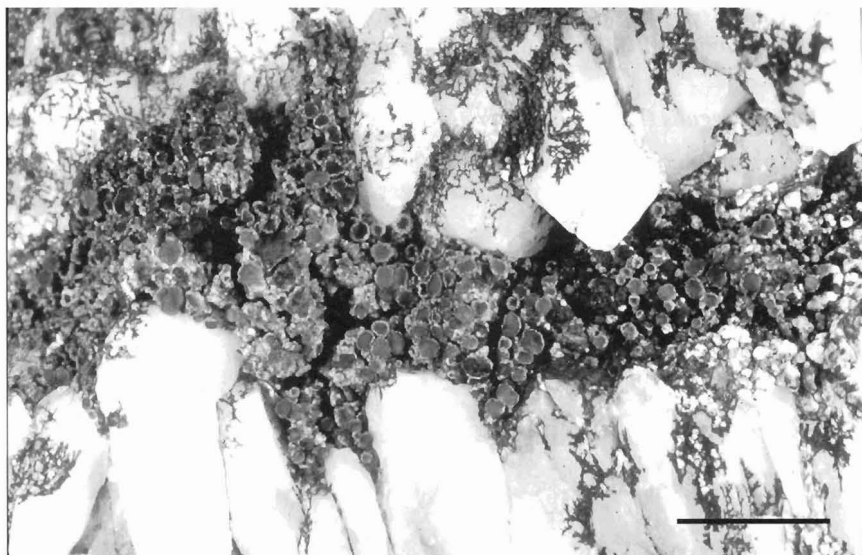


Fig. 6. *Caloplaca insignis*, US 7671. Habitus (bar = 5 mm).

***Caloplaca millegrana* (Müll. Arg.) Zahlbr.**

Antarctic endemic recorded from South Georgia, South Orkney Is., South Shetland Is. and Antarctic Peninsula. Reported from Livingston Island by OLECH (1989b) and SANCHO *et al.* (1999).

SOUTH BAY, Punta Polaca, vertical, E-exposed rock, US 7577.

*** *Caloplaca phaeocarpella* (Nyl.) Zahlbr.**

Bipolar species recorded from South Georgia and South Shetland Is.

SOUTH BAY, Caleta Argentina, on *Sanionia uncinata* over stones in late melting, N-exposed slope, US 7613; Caleta Española, lower slopes of Mt. Reina Sofía, depression in soil, US 7644; Mt. Reina Sofía, on *Andreaea* sp., on horizontal rock, US 7732; Mt. Reina Sofía, moss over rocks, US 7740; Mt. Reina Sofía, on dead *Polytrichastrum alpinum* US 7745; Sally Rocks, drift wood, US 7781; Johnsons Dock, N-side, 5–10 m alt., moribund *Polytrichastrum* on raised beach, US 7856.

Note: This easily overlooked species is very common on extensive moss carpets in late melting depressions. The ecology is rather different from that of Northern Hemisphere *C. phaeocarpella*, which is mainly lignicolous, and occurring more sparsely. Even though we suspect that the Antarctic taxon could be an undescribed species, we have so far not been able to find characters to justify describing it as new.

*** *Caloplaca psoromatis* Olech & Søchting**

Antarctic endemic recorded from South Shetland Is. and Antarctic Peninsula.

SOUTH BAY, Johnsons Dock, 20 m from the shore, 25–50 m alt., on *Psoroma* sp., US 7810.

* *Caloplaca regalis* (Vain.) Zahlbr.

Magellan-Antarctic endemic recorded from Tierra del Fuego, Falkland Is., South Orkney Is., South Shetland Is. and Antarctic Peninsula.

SOUTH BAY, Johnsons Dock, 20 m from the shore, 25–50 m alt., horizontal, eutrophicated rock, US 7820.

Note: Only one individual of *C. regalis* was found, even though the species is very spectacular and abundantly occurring on nearby King George Island (OLECH 1989a), and also occurs on Deception Island (APTROOT & VAN DER KNAAP 1993).

*** *Caloplaca sauronii* Søchting & Øvstedal, sp. nov.

Fig. 7

Caloplacae exsecutae similis, sed parasitica et substantiam 7-chloroemodin continens.

Typus: ANTARCTICA. *South Shetland Islands:* South Bay, lower slopes of Mt. Reina Sofia, 62° 39.7' S, 60° 23.1' W, SW-exposed, vertical rock, with *Usnea* spp. and *Himantormia lugubris*, 20 Jan. 1998, U. Søchting 7654 (C – holotype; BG – isotype).

Etymology: The species is named after the character Sauron, in the Lord of the Rings as described by J. R. Tolkien. It signifies the parasitic nature of the lichen, and the dull, black apothecia with an occasional anthraquinone glow give associations to hordes of dark warriors.

Thallus crustose, effuse, several cm diam., lichenicolous on *Buellia anisomera* and possibly other species, transforming host areoles into whitish or sometimes pink or orange, ± reduced areoles; with dark hypothallus. *Apothecia* numerous, crowded, lecideine, 0.6 mm diam., margin thick, up to 0.08 mm, prominent, flexuose to uneven, black and somewhat shining. Disc concave to plane, dark reddish orange, with increasing age or exposure darker to totally black. On old thalli the apothecia may be congested and very irregular. Amphithecium without algae. Proper excipulum brown to black, inner parts emerald green, K–. *Hypothecium* brown with oil droplets. *Hymenium* 75–80 µm with coarse epipsamma. *Paraphyses* 1.5–2 µm thick, sparingly branched, flexuose or with uneven surface, apical cells hardly thickened, with anthraquinone crystals or diffuse emerald pigment, K–. *Asci* with 8 spores. *Spores* ellipsoid to somewhat inflated at the septum, 12.5–14.5 × 6–8 µm. Septum often poorly developed; when well developed 2.5–3 µm thick.

Chemistry: 7-chloroemodin (major), 7-chloroemodinal, emodinal, 7-chloro-citreosein, 7-chloro-emodic acid, emodin. Conforms with chemosyndrome C₁ of SØCHTING (2001). Medulla I–.

Note: This species resembles superficially *C. exsecuta*, but chemically it belongs to the group of *Caloplaca* with chlorinated anthraquinones as major substances in contrast to *C. exsecuta* that has parietin as its major substance (SØCHTING 2001). *Caloplaca sauronii* is parasitic on other crustose lichens and causes massive destruction of the host thallus, whereas *C. exsecuta* is a pioneer on naked rocks. There are also anatomical differences in the paraphyses and the ascospores. The other lichenicolous *Caloplaca* on *Buellia*, *C. buelliae*, hardly changes the appearance of the host thallus and the brownish orange apothecia are much less

carbonized and without the prominent margin. Furthermore the medulla of *C. sauronii* is not amyloid as is the case with *C. buelliae*. So far, known only from the very well developed type collection.

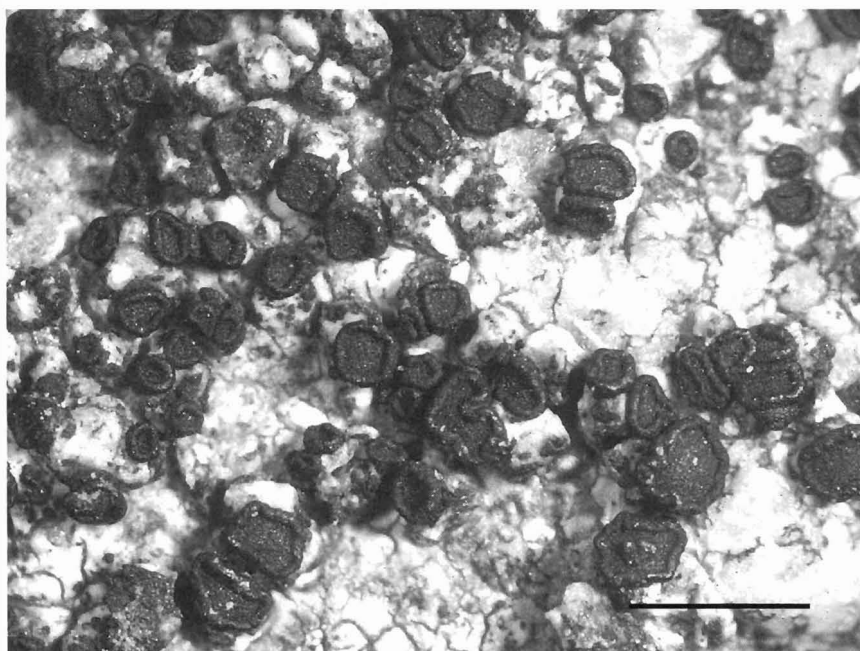


Fig. 7. *Caloplaca sauronii*, holotype. Habitus (bar = 1 mm).

**** *Caloplaca schofieldii* C. W. Dodge**

Antarctic endemic recorded from the Antarctic Peninsula and continental Antarctica.

SOUTH BAY, Punta Polaca, vertical, E-exposed sedimentary rock, *US 7578*; Caleta Argentina, vertical, NE-exposed rock, *US 7623*; Johnsons Peak, 300–350 m alt., sheltered, vertical rock, *US 7837*.

Note: This species superficially belongs to the *Caloplaca holocarpa* aggregate, which is also poorly understood in the Northern Hemisphere. However, we have at present no reason to doubt its status as a separate taxon.

*** *Caloplaca siphonospora* Olech & Söchting**

Antarctic endemic recorded from South Orkney Is. and South Shetland Is.

SOUTH BAY, Caleta Argentina, moss on late melting snow patch, *US 7616*; Johnsons Peak, acid, sedimentary bedrock, 300–350 m alt., moss on horizontal rock, *US 7834*; Caleta Española, above Base Juan Carlos I, moss on sloping rock, *US 7908*; Punta Hesperides, acid, volcanic bedrock, moss on rock, *US 7935*.

Note: A very common species on moss on rocks where it occupies much the same ecological niche as *Caloplaca nivalis* in the Northern Hemisphere.

***Caloplaca sublobulata* (Nyl.) Zahlbr.**

Syn.: *Lecanora joannae* Hue. – *Caloplaca joannae* (Hue) Zahlbr. – *Typus*: Graham Land, Booth-Wandel Island Gain No. 119 (PC).

Southern Hemisphere distribution, widespread in southern regions. Reported from Livingston Island by OLECH (1989b) and SANCHO *et al.* (1999).

SOUTH BAY, Johnsons Dock, S-side, 10–50 m alt., rock, *US 7843b*.

***Caloplaca tetraspora* (Nyl.) H. Olivier**

Bipolar-montane, recorded from South Orkney Is. and South Shetland Is. Reported from Livingston Island by OLECH (1989b).

SOUTH BAY, Caleta Argentina, moss on rock, *US 7620*; Mt. Reina Sofia, detritus on rock, *US 7744*; Pico Radio, 1 km W of Base Juan Carlos I, 50–130 m alt., moss on N-exposed rock, *US 7979*.

***Caloplaca tirolensis* Zahlbr.**

Bipolar-montane, widespread in Antarctica. Reported from Livingston Island by OLECH (1989b) and SANCHO *et al.* (1999).

SOUTH BAY, Punta Polaca, moss on rock near shore, *US 7591*; Mt. Reina Sofia, moss on rock, *US 7752*; Caleta Española, moribund moss on soil, *US 7887*, *US 7889*.

***Candelaria murrayi* Poelt**

Antarctic endemic recorded from South Shetland Is., Antarctic Peninsula and continental Antarctica. Reported from Livingston Island by OLECH (1989b).

SOUTH BAY, Caleta Argentina, on boulder in penguin rookery, *US 7617*; Johnsons Dock, S-side, 10–50 m alt., bird perching rock, *US 7854*.

***Candelariella aurella* (Hoffm.) Zahlbr.**

Bipolar species recorded from South Orkney Is. and South Shetland Is. Reported from Livingston Island by SANCHO *et al.* (1999).

SOUTH BAY, Johnsons Dock, S-side, 10–50 m alt., crevice in sheltered, vertical rock, *US 7849*.

*** *Candelariella flava* (C. W. Dodge & G. E. Baker) Castello & Nimis**

Antarctic endemic, widespread in Antarctica. Reported from Livingston Island by OLECH (1989b) as *C. hallettensis* (Murray) Øvstedal and by SANCHO *et al.* (1999) as *C. vitellina* (Hoffm.) Müll. Arg.

SOUTH BAY, Mt. Reina Sofia, detritus, *US 7735*; Caleta Española, Lower slopes of Mt. Reina Sofia, detritus on bird perching rock, *US 7760*; Johnsons Dock, N-side, 5–10 m alt., detritus on eutrophicated soil, *US 7858*.

***Carbonea assentiens* (Nyl.) Hertel**

Antarctic-subantarctic endemic, widespread in Antarctica. Reported from Livingston Island by SANCHO *et al.* (1999). All collected specimens belong to a xanthone-deficient chemotype (Hertel, in litt.).

SOUTH BAY, Caleta Española, vertical rock, *US 7630*; Mt. Reina Sofia, rock, *US 7728, 7731*.

***Carbonea vorticosa* (Flörke) Hertel**

Bipolar species, widespread in Antarctica. Reported from Livingston Island by OLECH (1989b) and SANCHO *et al.* (1999).

***** *Catapyrenium cinereum* (Pers.) Körb.**

Bipolar species with closest locality on Tierra del Fuego, South America (O. Breuss, pers. comm.)

SOUTH BAY, Lower slopes of Mt. Reina Sofia, moss on horizontal rock, *US 7639*.

*** *Catapyrenium daedaleum* (Kremp.) Stein**

Bipolar species recorded from South Orkney Is. and South Shetland Is.

SOUTH BAY, Caleta Española, soil in rock crevice, *US 7891*.

*** *Catillaria contristans* (Nyl.) Zahlbr.**

Bipolar species recorded from South Orkney Is., South Shetland Is. and Antarctic Peninsula.

SOUTH BAY, Johnsons Dock, 20 m from the shore, 25–50 m alt., on moss on sloping rock, *US 7828*; Punta Polaca, Pico Radio, over moss in snowbed, *US 7900*; Punta Hesperides, acid, volcanic bedrock, 5–10 m alt., moss on soil, *US 7945*.

***Catillaria corymbosa* (Nyl.) Zahlbr.**

Antarctic endemic, widespread in Antarctica. Reported from Livingston Island by OLECH (1989b) and SANCHO *et al.* (1999).

SOUTH BAY, Punta Polaca, 10 m from the shore, soil in crevice under overhang, *US 7869*.

***Cetraria aculeata* (Schreb.) Fr.**

Bipolar-montane species recorded from South Georgia, South Orkney Is., South Shetland Is. and Antarctic Peninsula. Reported from Livingston Island by OLECH (1989b) and SANCHO *et al.* (1999).

***Cladonia borealis* S. Stenroos**

Cosmopolitan species, widespread in Antarctica. Reported from Livingston Island by SANCHO *et al.* (1999).

SOUTH BAY, Caleta Española near base, *US 7696*; Lower slopes of Mt. Reina Sofia, raised beach, soil on exposed knoll, *US 7873*.

(*Cladonia cariosa* (Ach.) Sprengel)

Reported from Livingston Island by OLECH (1989b).

(*Cladonia carneola* (Fr.) Fr.)

Reported from Livingston Island by OLECH (1989b).

***Cladonia chlorophaea* (Flörke ex Sommerf.) Spreng.**

Cosmopolitan species, widespread in Antarctica. Reported from Livingston Island by SANCHO *et al.* (1999).

SOUTH BAY, Caleta Argentina, 5–50 m from the shore, soil on raised beach, *US 7704*.

(*Cladonia coccifera* (L.) Willd.)

Reported from Livingston Island by OLECH (1989b).

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

Cosmopolitan species, widespread in Antarctica. Reported from Livingston Island by SANCHO *et al.* (1999).

***Cladonia galindezii* Øvstedal**

Antarctic endemic recorded from South Orkney Is., South Shetland Is. and Antarctic Peninsula. Reported from Livingston Island by SANCHO *et al.* (1999).

SOUTH BAY, Punta Polaca, maritime rocks, *US 7580*; Lower slopes of Mt. Reina Sofia, deep crevice in vertical rock, *US 7884*; Punta Hesperides, acid, volcanic bedrock, 5–10 m alt., vertical, N-exposed side of bird-perching rock at shore, *US 7952*.

***Cladonia gracilis* (L.) Willd.**

Bipolar species, widespread in Antarctica. Reported from Livingston Island by OLECH (1989b) and SANCHO *et al.* (1999).

***Cladonia pleurota* (Flörke) Schaer.**

Cosmopolitan species, widespread in Antarctica. Reported from Livingston Island by SANCHO *et al.* (1999).

***Cladonia pocillum* (Ach.) O. J. Rich.**

Cosmopolitan species, widespread in Antarctica. Reported from Livingston Island by OLECH (1989b) and SANCHO *et al.* (1999).

SOUTH BAY, Punta Hesperides, acid, volcanic bedrock, 5–10 m alt., vertical, N-exposed side of bird-perching rock at shore, *US 7953*.

***Cladonia pyxidata* (L.) Hoffm.**

Cosmopolitan species, widespread in Antarctica. Reported from Livingston Island by OLECH (1989b).

SOUTH BAY, Punta Polaca, 10 m from the shore, acid, sedimentary bedrock, soil on rock, US 7871.

***Cladonia sarmentosa* (Hook. f. & Taylor) C. W. Dodge**

Southern Hemisphere species, widespread in Antarctica. Reported from Livingston Island by SANCHO *et al.* (1999).

SOUTH BAY, Lower slopes of Mt. Reina Sofia, soil on exposed knoll with *Stereocaulon*, US 7877.

***Cladonia squamosa* Hoffm.**

Cosmopolitan species, widespread in Antarctica. Reported from Livingston Island by SANCHO *et al.* (1999).

SOUTH BAY, Caleta Argentina, 5–50 m from the shore, soil on raised beach, US 7716.

***Cladonia subulata* (L.) Weber ex F. H. Wigg.**

Bipolar species, widespread in Antarctica. Reported from Livingston Island by SANCHO *et al.* (1999).

***Coelopogon epiphorellus* (Nyl. in Cromb.) Brusse & Kärnefelt**

Southern Hemisphere species, widespread in Antarctica. Reported from Livingston Island by OLECH (1989b) and SANCHO *et al.* (1999).

SOUTH BAY, Lower slopes of Mt. Reina Sofia, moss on exposed rock, US 7882.

**** *Collema tenax* (Sw.) Ach. emend. Degelius**

Widely distributed species recorded from South Orkney Is. and Antarctic Peninsula.

SOUTH BAY, Punta Hesperides, acid, volcanic bedrock, 5–10 m alt., vertical, N-exposed side of bird-perching rock at shore, US 7951.

(*Cystocoleus ebeneus* (Dillw.) Thwaites)

Reported from Livingston Island by OLECH (1989b).

***Dermatocarpon polyphyllizum* (Nyl.) Blomb. & Forssell**

Bipolar species recorded from South Orkney Is., South Shetland Is. and Antarctic Peninsula. Reported from Livingston Island by SANCHO *et al.* (1999) as *D. intestiniforme* (Körb.) Hasse.

SOUTH BAY, Lower slopes of Mt. Reina Sofia, W-exposed, sloping rock, US 7638.

* *Frutidella caesioatra* (Schaer.) Kalb

Bipolar species recorded from South Georgia, South Orkney Is., South Shetland Is. and Antarctic Peninsula.

SOUTH BAY, Lower slopes of Mt. Reina Sofia, moss on horizontal rock, US 7642; Caleta Española at base Juan Carlos I, 10–20 m alt., moss on stones on raised beach, US 7754.

*** *Gyalidea mayaguezensis* var. *antarctica* Søchting & Vězda, var. nov.

Fig. 8

Thallo epilithico, rimoso-diffracto, sordide ochraceo, apotheciis subglobosis, ascis 4–(6)-sporis, ascosporis murali-divisis (25–35 × 10–16 µm), cum *Gyalidea mayaguezensis* var. *mayaguezensis* bene congruit, a qua autem differt apotheciis majoribus (0,3–0,45 mm), ascosporisque multo murali-divisis, marginibus apotheciorum in parte superiore nigris.

Typus: SOUTH SHETLAND ISLANDS. *Livingston Island*: South Bay, Johnsons Dock, 20 m from the shore, 25–50 m alt., acid, sedimentary, sheltered humid rock, in crevice, 7 Feb. 1998, U. Søchting 7819 (C – holotype; hb. Vězda – isotype).

Thallus epilithic, areolated, dirty yellow brown; algae spherical, green, about 6–10 µm diam. *Apothecia* mostly single, immersed in the thallus areolae, soon semiglobose, sessile, gyalectoid, 0.3–0.45 mm diam. Margin smooth or with few radiating fissures, in upper part with narrow, black zone, otherwise concolorous with the thallus. *Hymenium* 100–110 µm high, hyaline. *Paraphyses* simple, straight, about 1.5 µm thick. *Asci* mostly with four spores, rarely with six spores. *Ascospores* ellipsoid or with lower half somewhat more narrow, muriform, 25–35 × 10–16 µm. *Hymenium*, *asci* and *ascospores* J+ wine red.

Note: We consider it justifiable to separate the taxon at variety level due to slight morphological and anatomical differences, e.g. slightly larger apothecia and a black pigmentation of the margin. Furthermore, there is a significant climatic difference between the localities of the nominal variety and that described here. When further collections are available and studied it will be possible to fully evaluate this taxon.

Haematomma erythromma (Nyl.) Zahlbr.

Antarctic-Subantarctic endemic, widespread in Antarctica. Reported from Livingston Island by OLECH (1989b) and SANCHO *et al.* (1999).

SOUTH BAY, Punta Polaca, eutrophicated, maritime rock, US 7593b.

Himantormia lugubris (Hue) I. M. Lamb

Antarctic endemic recorded from South Georgia, South Orkney Is., South Shetland Is. and Antarctic Peninsula. Reported from Livingston Island by OLECH (1989b) and SANCHO *et al.* (1999).

SOUTH BAY, Caleta Española, S-exposed rock, US 7609; Pico Radio, 1 km W of Base Juan Carlos I, 50–130 m alt., rock, US 7960.

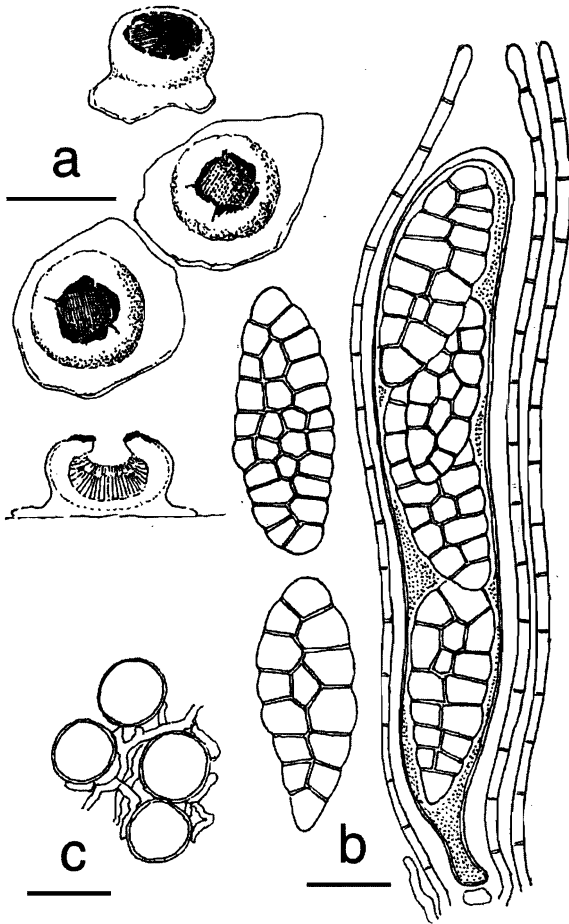


Fig. 8. *Gyalidea mayaguezensis* var. *antarctica*, holotype. **a.** Apothecia, habitus and vertical section (bar = 0.3 mm); **b.** Ascus, paraphyses and ascospores (bar = 10 µm); **c.** Algae (bar = 10 µm).

***Huea cerussata* (Hue) C. W. Dodge & G. E. Baker**

Antarctic endemic recorded from South Sandwich Is., South Orkney Is., South Shetland Is. and Antarctic Peninsula. Reported from Livingston Island by OLECH (1989b) and SANCHO *et al.* (1999) as *H. austroshetlandica* (Zahlbr.) C. W. Dodge and *Caloplaca austroshetlandica* (Zahlbr.) SÖCHTING & OLECH, respectively.

SOUTH BAY, Caleta Española, pebbles on raised beach, *US 7628*. FALSE BAY, Pico Moores, acid, volcanic bedrock, 300–350 m alt., vertical rock under overhang, *US 7789*.

***Huea coralligera* (Hue) C. W. Dodge & G. E. Baker**

Bas.: *Lecidea coralligera* Hue 1915. Deuxième Expédition Antarctique Française. Lichens, p. 102. – *Typus*: Île Booth-Wandel, sur les rochers (diorites) de la colline Jeanne, altitude de 30 à 100 m, IV^e excursion, n^o 115, 30 Dec. 1908 (PC – lectotype, selected here).

Antarctic endemic recorded from Bouvetøya, South Orkney Is., South Shetland Is. and Antarctic Peninsula. Reported from Livingston Island by OLECH (1989b) and SANCHO *et al.* (1999).

SOUTH BAY, Caleta Argentina, eutrophicated rocks near penguin rookery, *US 7612*; Caleta Española, pebbles on raised beach, *US 7627*; Lower slopes of Mt. Reina Sofia, vertical rock, *US 7673*; Caleta Argentina, 5–50 m from the shore, eutrophicated rock, *US 7706*; Johnsons Dock, S-side, 10–50 m alt., sloping, N-exposed rock, *US 7845*; Punta Hesperides, acid, volcanic bedrock, 5–10 m alt., bird-perching rock at shore, *US 7948*.

Note: *Huea coralligera* is here accepted in the genus *Huea* into which DODGE & BAKER (1938) combined it. HANSEN *et al.* (1987) and KÄRNEFELT (1989) questioned the validity of this genus, but it was accepted by ØVSTEDAL & LEWIS SMITH (2001) (see discussion). It appears that the name *Caloplaca coralligera* based on *Lecidea coralligera* Hue 1915 was never formally combined into *Caloplaca* even though this was erroneously attributed to Zahlbruckner (SØCHTING & OLECH 1995). ZAHLBRUCKNER (1931) made the combination *Caloplaca coralligera* (Hue) Zahlbr., but this name was based on *Polycauliona coralligera* Hue 1908. Accordingly the epithet *coralligera* for the taxon is not available in the genus *Caloplaca*. *Caloplaca coralligera* (Hue) Zahlbr. 1931 may be an earlier homonym for *C. isidioclada* Zahlbr. 1924 (see this species).

**** *Hymenelia glacialis* (C. W. Dodge) Øvstedal**

Antarctic endemic also recorded from South Georgia, Antarctic Peninsula and continental Antarctica.

SOUTH BAY, Caleta Española, Peak of Mt. Reina Sofia, W-exposed seepage rock, *US 7914*.

***Lecania brialmontii* (Vain.) Zahlbr.**

Antarctic endemic, widespread in Antarctica. Reported from Livingston Island by OLECH (1989b) and SANCHO *et al.* (1999).

SOUTH BAY, Caleta Argentina, in crevice on boulder in penguin rookery, *US 7619*; Sally Rocks, crevice in vertical rock, *US 7784*; Punta Hesperides, acid, volcanic bedrock, 5–10 m alt., vertical, S-exposed side of bird-perching rock at shore, *US 7947*.

*** *Lecania gerlachei* (Vain.) Zahlbr.**

Antarctic endemic, widespread in Antarctica.

SOUTH BAY, Punta Polaca, eutrophicated, shaded rock crevices, *US 7585*; Punta Polaca, 5–10 m alt., coastal rock, *US 7688*.

***** *Lecania glauca* Øvstedal & Søchting, sp. nov.**

Thallus crustaceus, granulato-sorediatus, glauco-griseus. Apothecia lecanorina. Sporae 8nae, incolores, 4-septatae, ca. $20 \times 4 \mu\text{m}$.

Typus: ANTARCTICA. *South Shetland Islands*: Livingston Island, South Bay, Punta Polaca, U. Søchting 7595 (C).

Thallus crustose, effuse, bluish-grey, to 4 cm diam., granulose-sorediate. Soredia 32–38 μm wide, coalescing to consoredia, surface cells with a bluish pigment. Photobiont trebouxoid. *Apothecia* at first immersed, later emergent, lecanorine, up to 0.8 mm diam. Thalline margin thin, granulose-sorediate, concolorous with thallus. Disc slightly convex, black, rough. Thalline excipulum pseudoparenchymatous, inner part filled with algae. Proper excipulum ca. 5 μm thick, hyaline, indistinctly pseudoparenchymatous. *Hymenium* 50–60 μm high, insperse, pale purple, uppermost part bluish. *Hypothecium* colourless. *Asci* of *Lecania*-type, with 8 spores. *Spores* colourless, 4-septate, ca. $20 \times 4 \mu\text{m}$, with more or less parallel sides. *Paraphyses* simple to branched, apical cell widened to 3.5 μm , with a bluish pigment.

Chemistry: Negative (with TLC).

Ecology: On moss on bird perching stone near shore, 50 m alt., bedrock acid sedimentary rocks, together with *Psoroma cinnamomeum*, *Cladonia pocillum*, *Caloplaca tirolensis*, *Physcia caesia*.

Note: Nowhere in the literature on Arctic or Antarctic lichens, or in the literature on *Lecania* (MAYRHOFER 1988) have we found a description fitting this taxon. Although known only from a single specimen it is here described as a new species.

*** *Lecania racovitzae* Vain.**

Antarctic endemic recorded from South Orkney Is., South Shetland Is., Antarctic Peninsula and continental Antarctica.

SOUTH BAY, Caleta Argentina, boulder in penguin rookery, US 7625.

**** *Lecania subfuscula* (Nyl.) S. Ekman**

Bipolar (Europe and N. America) species, recorded from South Sandwich Is. and South Orkney Is.

SOUTH BAY, Caleta Española by base, detritus in crevice in vertical rock, US 7702.

*** *Lecanora dancoensis* Vain.**

Antarctic endemic, widespread in Antarctica.

SOUTH BAY, Johnsons Dock, 20 m from the shore, 25–50 m alt., sheltered, moist rock crevice, US 7821.

* *Lecanora epibryon* (Ach.) Ach. ssp. *epibryon*

Bipolar species recorded from South Orkney Is., South Shetland Is. and Antarctic Peninsula.

SOUTH BAY, Caleta Argentina, moss on rocks near penguin rookery, US 7624; Caleta Argentina, moss on coastal rocks, US 7896.

Lecanora expectans Darb.

Antarctic endemic recorded from South Shetland Is., Antarctic Peninsula and continental Antarctica. Reported from Livingston Island by OLECH (1989b).

SOUTH BAY, Lower slopes of Mt. Reina Sofia, top of bird perching stone, US 7670; Caleta Argentina, 5–50 m from the shore, bird perching rock, US 7708.

Lecanora flotowiana Spreng.

Cosmopolitan species, widespread in Antarctica. Reported from Livingston Island by OLECH (1989b) as *L. cf. lavae* Darb. *Lecanora dispersa* (Pers.) Sommerf. and *L. albescens* (Hoffm.) Branth & Rostrup reported from Livingston Island by SANCHO *et al.* (1999) may also belong to this taxon.

SOUTH BAY, Johnsons Dock, S-side, 10–50 m alt., vertical, sheltered rock, US 7841.

Note: There is some confusion concerning the *Lecanora dispersa*-group in the Antarctic. POELT *et al.* (1995), who studied this group in the eastern Alps of Europe, interpreted *L. dispersa* s. str. as a species with no or little epilithic thallus, and containing 2,7-dichlorolichexanthone and pannarin. No type has apparently been designated for this species. SLIWA & OLECH (2000) reported *L. dispersa* from South Shetland Islands (King George Island), based on specimens with a Pd+ orange reaction of the thalline excipulum, indicating pannarin, although TLC analyses were negative. ØVSTEDAL & LEWIS SMITH (2001) found no lichen compounds in specimens of the *L. dispersa*-group, and named all specimens *L. flotowiana*, based on FRÖBERG (1997), who claimed that there is a variety of *L. flotowiana* without lichen compounds. However, POELT *et al.* (1995) were of the opinion that *L. flotowiana* has either vinetorin or 7-chloro-3-*O*-methylnorlichexanthone. It seems that also this species has not been typified. Pending a clarification of the nomenclature, we prefer to use the name *L. flotowiana* Spreng. for the present taxon, in which no lichen compounds were detected (TLC).

* '*Lecanora*' *griseosorediata* Øvstedal

Antarctic endemic recorded from South Orkney Is., South Shetland Is. and Antarctic Peninsula.

SOUTH BAY, Johnsons Dock, 20 m from the shore, NW-exposed, coastal rock, US 7799.

Lecanora handelii J. Steiner

Bipolar species, in Antarctica only recorded from South Shetland Is. Reported from Livingston Island by SANCHO *et al.* (1999).

***Lecanora intricata* (Ach.) Ach.**

Bipolar species, recorded from South Shetland Is. Reported from Livingston Island by SANCHO *et al.* (1999).

SOUTH BAY, Lower slopes of Mt. Reina Sofia, SE-exposed, sloping rock, *US 7658*.

(*Lecanora margaritae* Hue)

Reported from Livingston Island by SANCHO *et al.* (1999).

(*Lecanora miranda* Hue)

Reported from Livingston Island by SANCHO *et al.* (1999).

***Lecanora physciella* (Darb.) Hertel**

Antarctic endemic, widespread in Antarctica. Reported from Livingston Island by OLECH (1989b) and SANCHO *et al.* (1999).

SOUTH BAY, Lower slopes of Mt. Reina Sofia, rock, *US 7662*.

***Lecanora polytropa* (Hoffm.) Rabenh.**

Bipolar species recorded from South Georgia, South Orkney Is., South Shetland Is. and Antarctic Peninsula. Reported from Livingston Island by OLECH (1989b) and SANCHO *et al.* (1999).

(**) ***Lecidea cf. andersonii* Filson**

Antarctic endemic recorded from Antarctic Peninsula and continental Antarctica.

SOUTH BAY, Caleta Española, vertical, N-exposed rock, *US 7885*.

***Lecidea atrobrunnea* (Ramond ex Lam. & DC.) Schaer.**

Bipolar species, recorded from South Georgia, South Shetland Is. and Antarctic Peninsula. Reported from Livingston Island by OLECH (1989b) and SANCHO *et al.* (1999).

SOUTH BAY, Caleta Argentina, 5–50 m from the shore, pebbles on late melting slope, *US 7720*; Caleta Española, NE-exposed slope, pebbles in scree, *US 7723*; Johnsons Dock, 20 m from the shore, NW-exposed coastal rock, *US 7797*; Johnsons Dock, N-side, 5–10 m alt., pebbles on eutrophicated raised beach, *US 7859*; Lower slopes of Mt. Reina Sofia, vertical, N-exposed rock, *US 7860*.

***Lecidea lapicida* (Ach.) Ach.**

Cosmopolitan species, widespread in Antarctica. Reported from Livingston Island by OLECH (1989b) and SANCHO *et al.* (1999).

(*Lecidea sciatropha* Hue)

Reported from Livingston Island by OLECH (1989b).

(*Lecidea tessellata* Flörke)

Reported from Livingston Island by OLECH (1989b).

* *Lecidella siplei* (C. W. Dodge & G. E. Baker) Mas. Inoue

Antarctic endemic widespread in Antarctica.

SOUTH BAY, Caleta Argentina, 5–50 m from the shore, old whale bone on raised beach, US 7710.

Lecidella stigmatea (Ach.) Hertel & Leuckert

Bipolar species recorded from South Shetland Is., Antarctic Peninsula and continental Antarctica. Reported from Livingston Island by OLECH (1989b) and SANCHO *et al.* (1999).

Lecidella wulfenii (Hepp) Körb.

Bipolar species recorded from South Orkney Is. and South Shetland Is. Reported from Livingston Island by OLECH (1989b) and SANCHO *et al.* (1999).

SOUTH BAY, Mt. Reina Sofia, on moss, US 7727.

** *Lecidella* sp. A (in ØVSTEDAL & LEWIS SMITH 2001)

Antarctic endemic earlier recorded from South Georgia and South Orkney Is.

SOUTH BAY, Caleta Española by base, rock, US 7697.

** *Lecidella* sp. B (in ØVSTEDAL & LEWIS SMITH 2001)

Antarctic endemic earlier recorded from Antarctic Peninsula and Continental Antarctica.

SOUTH BAY, Punta Hesperides, acid, volcanic bedrock, moss on rock, US 7940.

(**) *Lecidella* cf. sp. C (in ØVSTEDAL & LEWIS SMITH 2001)

Antarctic endemic recorded from Antarctic Peninsula and continental Antarctica.

SOUTH BAY, Punta Polaca, on bryophytes with *Megaspora verrucosa* US 7589.

Thallus crustose, sorediate, yellow-grey. *Apothecia* numerous, sessile, black, up to 0.6 mm diam., proper margin indistinct, disc flat, rough. Proper excipulum margin composed of radiating hyphae, hyaline, except for a thin, blue-green border and radiating golden brown strands from hypothecium. *Hypothecium* golden brown. *Hymenium* 50–60 µm high. Epithecium blue-green. *Asci* with 8 spores. *Spores* ellipsoid, 14–15 × 7–8 µm.

Chemistry: Unidentified xanthone (with TLC).

Note: This sorediate, bryophilous *Lecidella* containing an unidentified xanthone is probably identical with *Lecidella* sp. C in ØVSTEDAL & LEWIS SMITH

(2001), a taxon, which has not previously been found with apothecia. Therefore a description of the species is given above.

*** *Lepraria cacuminum* (A. Massal.) Kümmerl. & Leuckert**

Cosmopolitan species widespread in Antarctica.

SOUTH BAY, Johnsons Dock, 20 m from the shore, moss on NW-exposed sloping rock, *US 7806*; Johnsons Dock, S-side, 10–50 m alt., crevice in vertical rock, *US 7846*; Johnsons Dock, N-side, 5–10 m alt., detritus on raised beach, *US 7857*; Caleta Española, sheltered rock crevice, *US 7888*; Pico Radio, 1 km W of Base Juan Carlos I, 50–130 m alt., soil, *US 7957*.

*** *Lepraria caesioalba* (de Lesd.) J. R. Laundon**

Bipolar species, widespread in Antarctica. Reported from Livingston Island by OLECH (1989b) and SANCHO *et al.* (1999).

SOUTH BAY, Lower slopes of Mt. Reina Sofia, moss, *US 7683*.

(*Lepraria neglecta* (Nyl.) Erichsen)

Reported from Livingston Island by OLECH (1989b) and SANCHO *et al.* (1999). Probably a misidentification.

**** *Lepraria vouauxii* (Hue) R. C. Harris**

Cosmopolitan species recorded from South Georgia, South Orkney Is. and Antarctic Peninsula.

SOUTH BAY, Caleta Española near base, sheltered rock crevice, *US 7698*.

*** '*Lepraria*' *straminea* Vain.**

Antarctic endemic recorded from South Sandwich Is., South Orkney Is., South Shetland Is. and Antarctic Peninsula.

SOUTH BAY, Punta Hesperides, acid, volcanic bedrock, 5–10 m alt., moss on soil, *US 7946*.

(*) *Leptogium cf. imbricatum* P. M. Jørg.**

SOUTH BAY, Caleta Argentina, moss on coastal rocks, *US 7897*.

***Leptogium puberulum* Hue**

Antarctic endemic, widespread in Antarctica. Reported from Livingston Island by OLECH (1989b) and SANCHO *et al.* (1999).

SOUTH BAY, Caleta Argentina, N-exposed seepage slope, *US 7614*; Punta Hesperides, acid, volcanic bedrock, 5–10 m alt., vertical, N-exposed side of bird-perching rock at shore, *US 7950*.

(*) *Lichina* sp.**

This taxon is close to *L. confinis* (O. F. Müll.) C. Agardh, but may be an undescribed species (A. Henssen, pers. comm.). It may prove conspecific with *L.*

antarctica Cromb. described from Iles Kerguelen, but this taxon is at present not well understood.

SOUTH BAY, Johnsons Dock, S-side, 10–50 m alt., vertical, shaded rock, *US 7850*.

***Massalongia carnosa* (Dicks.) Körb.**

Bipolar species, widespread in Antarctica. Reported from Livingston Island by OLECH (1989b) and SANCHO *et al.* (1999).

SOUTH BAY, Punta Polaca, soil on bird perching rock near shore, *US 7599*; Punta Polaca, 10 m from the shore, soil on top of bird perching rock, *US 7866*; Lower slopes of Mt. Reina Sofia, moss on exposed rock, *US 7880*; Punta Hesperides, acid, volcanic bedrock, vertical, N-exposed rock, *US 7931*; Pico Radio, 1 km W of Base Juan Carlos I, 50–130 m alt., moss on rock, *US 7968*.

*** *Massalongia intricata* Øvstedal**

Antarctic endemic recorded from South Georgia, South Orkney Is., South Shetland Is. and Antarctic Peninsula.

SOUTH BAY, Johnsons Peak, 300–350 m alt., horizontal soil on mountain peak, *US 7838*; Peak of Mt. Reina Sofia, soil on horizontal rock, *US 7909*.

***Megaspora verrucosa* (Ach.) Hafellner & V. Wirth**

Widespread in the Northern Hemisphere and recorded from South Georgia, South Orkney Is., South Shetland Is. and Antarctic Peninsula. Reported from Livingston Island by OLECH (1989b) and SANCHO *et al.* (1999).

SOUTH BAY, Caleta Argentina, moss on rock with *Usnea aurantiaco-atra*, *US 7621*; Caleta Argentina, 5–50 m from the shore, old whale bone on raised beach, *US 7709*; Johnsons Dock, 20 m from the shore, detritus on NW-exposed sloping rock, *US 7804*.

***** *Micarea incrassata* Hedl.**

Recorded previously only from Europe.

SOUTH BAY, Lower slopes of Mt. Reina Sofia, moribund moss on rock, *US 7770*; Lower slopes of Mt. Reina Sofia, on moss, *US 7680*. Both identified by Brian Coppins.

Thallus crustose, 1–2 cm wide, areolate; areoles ± circular, flat to slightly convex, grey, 0.2–0.4 mm across; cephalodia present, red-brown. *Apothecia* black, semiglobose, up to 1 mm diam., immarginate. *Hypothecium* red-brown. *Hymenium* 80–90 µm high, uppermost part blue-green; *paraphyses* end cells slightly inflated, to 2 µm thick. *Asci* with 8 spores that are simple to 1-septate, *ca.* 12 × 4 µm.

Chemistry: Negative (with TLC).

**** *Myxobilimbia sabuletorum* (Schreb.) Hafellner coll.**

Bipolar species recorded from Antarctic Peninsula.

SOUTH BAY, Pico Radio, 1 km W of Base Juan Carlos I, 50–130 m alt., moss in snow bed, *US 7980*.

* *Notolecidea ochyrae* Hertel ined.

Antarctic endemic also recorded from Signy Island (Moraine Valley fellfield, 60° 43' S, 45° 37' W, 1981, *R. I. L. Smith 7101* (AAS), and from King George Island [Admiralty Bay area, unnamed hills between Italia Valley and Ornithologists Creek, W of Arctowski Station, eastern slope, 170 m alt., 1980, *R. Ochyra 97/80a* (M)] (H. Hertel, pers. comm.). The taxon is closely related to *N. subcontinua*.

SOUTH BAY, Peak of Mt. Reina Sofia, rock and soil in sheltered crevice, *US 7918*. Identified by Hannes Hertel.

Ochrolechia frigida (Sw.) Lyngby

Bipolar species widespread in Antarctica. Reported from Livingston Island by OLECH (1989b) and SANCHO *et al.* (1999).

SOUTH BAY, Punta Polaca, moss on rock near shore, *US 7590*; Pico Radio, 1 km W of Base Juan Carlos I, 50–130 m alt., soil, *US 7955*.

Ochrolechia parella (L.) A. Massal.

Bipolar species, widespread in Antarctica. Reported from Livingston Island by OLECH (1989b) and by SANCHO *et al.* (1999) as *O. antarctica* (Müll. Arg.) Darb.

SOUTH BAY, Caleta Española, lower slopes of Mt. Reina Sofia, boulder, *US 7641*.

Pannaria caespitosa P. M. Jørg.

Widespread Antarctic-Subantarctic species, previously reported as *P. hookeri* (Borr. ex Sm.) Nyl. Reported from Livingston Island by OLECH (1989b) and SANCHO *et al.* (1999) as *P. hookeri*.

SOUTH BAY, Lower slopes of Mt. Reina Sofia, vertical seepage rock, *US 7663*; SOUTH BAY, Johnsons Dock, 20 m from the shore, moss on NW-exposed coastal rock, *US 7803*; SOUTH BAY, Johnsons Peak, 300–350 m alt., rock, *US 7833*; SOUTH BAY, Peak of Mt. Reina Sofia, soil in crevice, *US 7915*, *US 7916*.

Parmelia saxatilis (L.) Ach.

Cosmopolitan species recorded from South Georgia, South Orkney Is., South Shetland Is. and Antarctic Peninsula. Reported from Livingston Island by OLECH (1989b) and SANCHO *et al.* (1999).

SOUTH BAY, Caleta Española, vertical rock, *US 7632*; Caleta Española by Base Juan Carlos I, rock, *US 7984*.

*** *Parmeliella austroshetlandica* Øvstedal & Søchting, sp. nov. Fig. 9

Parmeliellae neozelandicae similis, sed apotheciis immarginatis et sporis globosis.

Typus: ANTARCTICA. *South Shetland Islands*: Livingston Island, South Bay, Caleta Española, lower slopes of Mt. Reina Sofia, sedimentary bedrock, 100 m alt., 30 Jan. 1998, *U. Søchting 7765* (C – holotype).



Fig. 9. *Parmeliella austroshetlandica*, holotype. Habitus (bar = 1 mm).

Thallus foliose, as 2–3 cm wide placodioid rosettes, lobes \pm imbricate, 0.4–0.6 mm wide, mottled grey-brown, with some longitudinal striations; hypothallus absent. *Apothecia* up to 0.5 mm diam., dark brown, convex, immarginate. In section the thallus is ca. 300 μ m thick, heteromerous, upper cortex composed of a 4–5 μ m thick layer, colourless, apparently pseudoparenchymatous, but with very compressed, thick-walled cells so that the lumina appear lens-formed (layer not always evident). Below that, hyphae in a *textura intricata*, with *Scytonema* in curved chains. Lower cortex composed of a loose and often indistinct colourless prosoplectenchymatous layer, with colourless hyphal bundles reaching downwards. True *excipulum* composed of radiating hyphae. *Hymenium* ca. 100 μ m high, epithecium yellow-brown. *Hypothecium* colourless, 80–120 μ m high, composed of short, irregularly oriented, densely adglutinated hyphae. Below that a pseudoparenchymatous tissue, composed of isodiametric, thin-walled cells, tissue ca. 100 μ m high, downwards merging into medulla. *Paraphyses* simple, end cell enlarged to ca. 3 μ m thick, embedded in yellow-brown mucilage. *Asci* cylindrical, apex with inner and outer wall stained by K/I, with 8 uniseriate spores. *Spores* globose, 7–8 μ m diam., smooth. *Pycnidia* not seen.

Chemistry: Pannarin (with TLC)

Ecology: On soil and over bryophytes.

Note: This new species appears to be most closely related to *Parmeliella neozelandica* (C. W. Dodge) Galloway & P. James, which is known from mountains of Australia and New Zealand, but that species has a thalline margin on the apothecia and ellipsoid ascospores (12–14 \times 4–5 μ m). *Parmeliella austroshetlandica* also occurs on Deception Island [R. I. Lewis Smith 11252 (AAS)] and King George Island [*Ochyra* 1757/80 (H)].

Additional specimens studied: SOUTH BAY, Caleta Española, vertical rock, *US 7636*; Lower slopes of Mt. Reina Sofia, moss on vertical rock, *US 7765*; Johnsons Dock, 20 m from the shore, moss on NW-exposed coastal rock, *US 7803*; Johnsons Dock, S-side, 10–50 m alt., crevice in shaded, vertical rock, *US 7851*; Punta Polaca, 10 m from the shore, soil in crevice under overhang, *US 7868*; Caleta Española, soil in rock crevice, *US 7890*.

***Peltigera didactyla* (With.) J. R. Laundon**

Cosmopolitan species, widespread in Antarctica. Reported from Livingston Island by OLECH (1989b) and SANCHO *et al.* (1999).

SOUTH BAY, Caleta Española, soil in rock crevice, *US 7631*; Lower slopes of Mt. Reina Sofia, soil on exposed knoll with *Stereocaulon*, *US 7878*.

*** *Pertusaria corallophora* Vain.**

Antarctic endemic recorded from South Georgia, South Orkney Is., South Shetland Is. and Antarctic Peninsula.

SOUTH BAY, Lower slopes of Mt. Reina Sofia, rock, *US 7685*; Punta Polaca, 5–10 m alt., coastal rock, *US 7691*; Johnsons Dock, 20 m from the shore, 25–50 m alt., vertical, sheltered rock, *US 7811*; Caleta Española by Base Juan Carlos I, boulder on shore, *US 7989*.

(*Pertusaria epibryon* Redón)

Reported from Livingston Island by SANCHO *et al.* (1999). Probably a mis-identification.

*** *Pertusaria erubescens* (Hook. f. & Taylor) Nyl.**

Southern Hemisphere species recorded from South Georgia, South Shetland Is. and Antarctic Peninsula.

SOUTH BAY, Johnsons Dock, 20 m from the shore, NW-exposed coastal rock, *US 7800*.

*** *Pertusaria excludens* Nyl.**

Bipolar species, widespread in Antarctica.

SOUTH BAY, Johnsons Dock, 20 m from the shore, 25–50 m alt., sheltered, moist rock crevice, *US 7823*.

***Pertusaria isidioides* (Schaer.) Arnold**

Bipolar species, in Antarctica only recorded from South Shetland Is. Reported from Livingston Island by SANCHO *et al.* (1999).

***** *Pertusaria oculae-ranae* Øvstedal & Søchting, sp. nov.**

Fig. 10

Pertusariae corallophorae similis, sed sporae 4nae et substantiam ignotam continens.

Typus: ANTARCTICA. *South Shetland Islands:* Livingston Island, South Bay, Johnsons Dock, 20 m from the shore, 25–50 m alt., vertical sheltered rock. 7 Feb. 1998, *U. Søchting 7812* (C – holotype; BG – isotype).

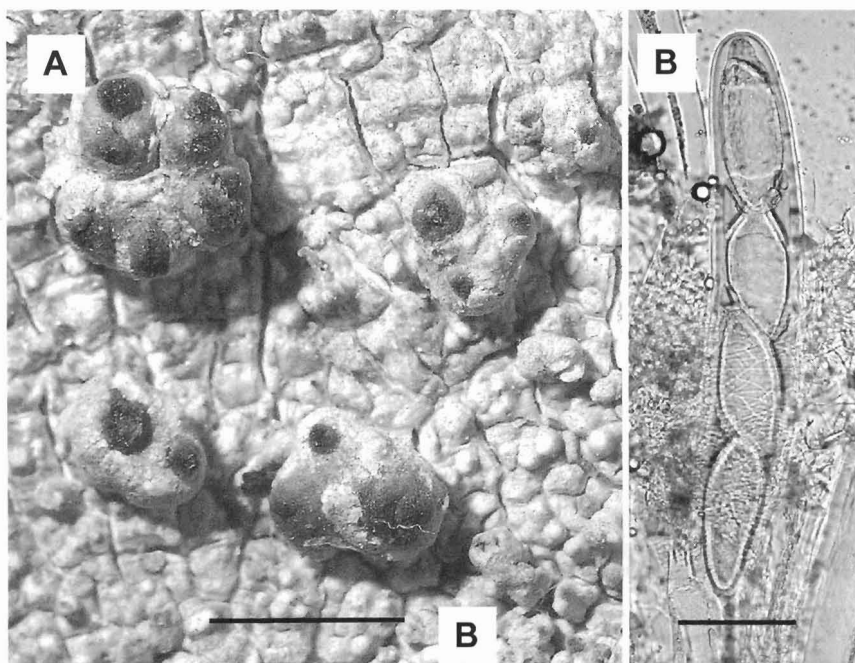


Fig. 10. *Pertusaria oculae-ranae*, holotype. **A.** Habitus (bar = 2 mm); **B.** Ascus (bar = 100 µm).

Thallus crustose, 5–6 cm wide, thin, grey, glossy, with a distinct zonation, isidiate; isidia scattered, 0.1–0.2 mm thick and equally high, often with a minute black papilla on the top. *Apothecia* 2–7 together in more or less circular, somewhat flattened areolae, which are concolorous with the thallus. Apothecia with slightly protruding dark margin; disc minute. *Asci* with 4 spores. *Spores* 130–143 × 46–49 µm.

Chemistry: One unidentified compound, found by HPLC.

Ecology: Vertical, sheltered, acid rock, 25–50 m above sea level.

Note: This taxon is very similar to *P. corallophora*, but that species has 1-spored asci about 140 × 30 µm large and contains protocetraric acid.

Additional specimen studied: SOUTH BAY, Johnsons Dock, 20 m from the shore, 25–50 m alt., vertical, shaded rock, *US 7809*.

*** *Pertusaria signyae* Øvstedal**

Antarctic endemic recorded from South Orkney Is., South Shetland Is. and Antarctic Peninsula.

SOUTH BAY, Punta Polaca, Rock crevice, *US 7588*; Johnsons Dock, 20 m from the shore, NW-exposed, sloping rock, *US 7807*.

***** *Phyllisciella marionensis* Henssen**

Formerly only recorded from Marion and Prince Edward Is. (HENSSSEN & BÜDEL 1984).

SOUTH BAY, Peak of Mt. Reina Sofia, W-exposed seepage rock, *US 7920*, det. *M. Schultz*.

***Physcia caesia* (Hoffm.) Fürnr.**

Cosmopolitan species, widespread in Antarctica. Reported from Livingston Island by OLECH (1989b) and SANCHO *et al.* (1999).

SOUTH BAY, Punta Polaca, bird perching rock few m from shore, *US 7584*; Punta Polaca, 5–10 m alt., coastal bird perching rock, *US 7690*; Lower slopes of Mt. Reina Sofia, horizontal rock, *US 7773*; Pico Radio, 1 km W of Base Juan Carlos I, 50–130 m alt., bird perching rock, *US 7958*.

***Physcia dubia* (Hoffm.) Lettau**

Bipolar species, widespread in Antarctica. Reported from Livingston Island by OLECH (1989b) and SANCHO *et al.* (1999).

SOUTH BAY, Johnsons Dock, 20 m from the shore, NW-exposed coastal rock in sheltered crevice, *US 7801*; Punta Polaca, 10 m from the shore, bird perching rock, *US 7870*; Caleta Española, vertical, sheltered rock, *US 7892*; Caleta Argentina, maritime rocks, *US 7895*.

(*Physcia wainioi* Räsänen)

Reported from Livingston Island by OLECH (1989b).

***Physconia muscigena* (Ach.) Poelt**

Bipolar species recorded from South Orkney Is., South Shetland Is., Antarctic Peninsula and possibly continental Antarctica. Reported from Livingston Island by OLECH (1989b) and SANCHO *et al.* (1999).

SOUTH BAY, Lower slopes of Mt. Reina Sofia, horizontal rock, *US 7678*; Lower slopes of Mt. Reina Sofia, horizontal rock, *US 7772*; Hill between Caleta Española and Johnsons Dock, moss on bird perching stone, *US 7925*; Pico Radio, 1 km W of Base Juan Carlos I, 50–130 m alt., bird perching rock, *US 7966*.

*** *Placidium lachneoides* (Breuss) Breuss**

South American-Antarctic species recorded from South Orkney Is., South Shetland Is. and Antarctic Peninsula.

SOUTH BAY, Punta Polaca, 10 m from the shore, soil in crevice under overhang, *US 7867*.

***Placopsis contortuplicata* I. M. Lamb**

South American-Antarctic species widespread in Antarctica. Reported from Livingston Island by OLECH (1989b) and SANCHO *et al.* (1999).

SOUTH BAY, Caleta Argentina, rock and soil in stone stripe, *US 7610*.

* *Placopsis parellina* (Nyl.) I. M. Lamb

South American-Antarctic species recorded from South Georgia, South Orkney Is., South Shetland Is. and Antarctic Peninsula.

SOUTH BAY, Caleta Argentina, on stone and soil in solifluction slope, *US 7618*; Pico Radio, 1 km W of Base Juan Carlos I, 50–130 m alt., stone in snow bed, *US 7962*.

Poeltidea perusta (Nyl.) Hertel & Hafellner

Antarctic endemic, widespread in Antarctica. Reported from Livingston Island by OLECH (1989b).

SOUTH BAY, Lower slopes of Mt. Reina Sofia, SW-exposed, sloping rock, *US 7651*; Lower slopes of Mt. Reina Sofia, top of bird perching stone, *US 7668*. FALSE BAY, Pico Moores, acid, volcanic bedrock, 300–350 m alt., exposed, vertical rock, *US 7785*.

* *Polyblastia gothica* Th. Fr.

Bipolar species, recorded from South Shetland Is.

SOUTH BAY, Johnsons Dock, S-side, 10–50 m alt., moss in crevice, *US 7842*.

*** *Porocyphus coccodes* (Flot.) Körb. s. l.

Previously recorded only from the Northern Hemisphere.

SOUTH BAY, Johnsons Dock, 20 m from the shore, 25–50 m alt., sheltered, humid rock in crevice, *US 7815*.

Apothecia perithecioid. Disc pink. Inner diameter of apothecia *ca.* 0.25 mm. Thalline excipulum brownish, *ca.* 40 μm wide, composed of photobiont colonies in an irregular hyphal web. Proper excipulum hyaline, *ca.* 15 μm wide, composed of long, strongly glutinized hyphae running parallel with the paraphyses. *Hypothecium* hyaline. *Paraphyses* thin, flexuose, simple. *Asci* cylindrical with well developed tholus, uniformly pale blue in Lugol after pretreatment with KOH. *Ascospores* globose to subglobose, 10–12 \times 8–10 μm . *Photobiont* probably *Chroococcidiopsis*.

(*Porpidia austroshetlandica* Hertel)

Reported from Livingston Island by OLECH (1989b).

** *Porpidia skottsbergiana* Hertel

Antarctic endemic recorded from South Georgia and South Orkney Is.

SOUTH BAY, Lower slopes of Mt. Reina Sofia, vertical rock, *US 7647*.

* *Protopannaria austro-orcadensis* (Øvstedal) P. M. Jørg.

Antarctic endemic recorded from South Georgia, South Orkney Is., South Shetland Is. and Antarctic Peninsula (as *Pannaria austro-orcadensis* in ØVSTEDAL & LEWIS SMITH 2001).

SOUTH BAY, Mt. Reina Sofia, crevice in rock, *US 7743*; Caleta Española at base Juan Carlos I, 10–20 m alt., stone on raised beach, *US 7753*; Johnsons Peak, 300–350 m alt., rock, *US 7835*; Johnsons Peak, soil on rocks on mountain peak, *US 7839*; Punta Polaca, Pico Radio, moss in late snowbed, *US 7901*; Punta Hesperides, acid, volcanic bedrock, moss on horizontal rock, *US 7944*.

* ***Protoparmelia loricata* Poelt & Vězda**

Bipolar species recorded from Bouvetøya, South Orkney Is. and South Shetland Is.

SOUTH BAY, Punta Hesperides, acid, volcanic bedrock, rock, *US 7936*.

***Pseudephebe pubescens* (L.) M. Choisy**

Bipolar species recorded from South Georgia, South Orkney Is., South Shetland Is. and Antarctic Peninsula. Reported from Livingston Island by OLECH (1989b) and SANCHO *et al.* (1999). Records of *Pseudephebe minuscula* (Nyl. ex Arnold) Brodo & Hawksw. by these authors are probably *P. pubescens*.

SOUTH BAY, Lower slopes of Mt. Reina Sofia, rock, *US 7677*; Punta Hesperides, acid, volcanic bedrock, rock, *US 7938*.

* ***Psoroma buchananii* (C. Knight) Nyl.**

Southern Hemisphere species recorded from South Orkney Is., South Shetland Is. and James Ross I.

SOUTH BAY, Punta Polaca, soil on bird perching rock near shore, *US 7598*; Mt. Reina Sofia, soil in crevice, *US 7738*; Mt. Reina Sofia, moss in rock crevice, *US 7750*; Punta Hesperides, acid, volcanic bedrock, moss on soil, *US 7942*.

(*Psoroma* cf. *ciliatum* (Ach. ex Fr.) Nyl. ex Hue)

Reported from Livingston Island by OLECH (1989b)

* ***Psoroma cinnamomeum* Malme**

South American-Antarctic species recorded from South Georgia, South Orkney Is., South Shetlands Is. and Antarctic Peninsula.

SOUTH BAY, Caleta Española, NE-exposed slope, detritus on rock, *US 7725*.

***Psoroma hypnorum* (Vahl) Gray**

Cosmopolitan species, widespread in Antarctica. Reported from Livingston Island by OLECH (1989b) and SANCHO *et al.* (1999).

SOUTH BAY, Caleta Argentina, on moss among rocks, *US 7615*; Caleta Española, NE-exposed slope, detritus on rock, *US 7724*; Hill between Caleta Española and Johnsons Dock, 100–110 m alt., soil on hill top, *US 7923*; Pico Radio, 1 km W of Base Juan Carlos I, 50–130 m alt., soil in snow bed, *US 7967*; *ibid.*, moss on rock, *US 7969*, *US 7970*, *US 7971*.

*** *Psoroma saccharatum* Scutari & Calvelo**

South American-Antarctic endemic recorded from Tierra del Fuego and South Shetland Is.

SOUTH BAY, Lower slopes of Mt. Reina Sofia, SE-exposed seepage rock, *US 7656*; Peak of Mt. Reina Sofia, rock and soil in sheltered crevice, *US 7921*.

Thallus squamulose, brownish. Squamules irregularly round and convex to flattened and with crenulate margin, scattered to continuous, pale ochre, up to 1 mm diam. *Apothecia* sessile, with thin, crenulate and slightly incurved margin, concolorous with thallus, disc concave to flat, black (dark brown in protected places). Cephalodia 1–1.5 mm wide, placodioid, striate, pinkish-grey. *Hymenium* 110–120 µm high, uppermost part blue-green. *Paraphyses* little ramified, end cells not enlarged. *Ascospores* 8 in asci, globose to subglobose, uniseriate, 8–10 µm diam. *Pycnidia* very rare, black, subglobose, up to 0.5 mm diam. *Conidia* not found.

Chemistry: No compounds or porphyrylic acid with accessories (TLC).

Ecology: On rock.

Note: This taxon was mentioned as a saxicolous form of *P. tenue* in ØVSTEDAL & LEWIS SMITH (2001), but as more material has become available it is clear that it is a good species (SCUTARI & CALVELO 1995), differing from *P. tenue* in the saxicolous growth, the smaller and globose to subglobose ascospores (lemon-shaped and 15–18 µm long in Antarctic *P. tenue*) and the black pycnidia (observed in *Söchting 7656* (BG) from Livingston Island). A paratype and two specimens from Tierra del Fuego, *Poelt* (GZU) were also studied. A comprehensive description is given above.

***Ramalina terebrata* Hook. f. & Taylor**

Antarctic-Subantarctic endemic recorded from Falkland Is., South Georgia, South Orkney Is., South Shetland Is. and Antarctic Peninsula. Reported from Livingston Island by SANCHO *et al.* (1999).

SOUTH BAY, Caleta Argentina, vertical coastal cliffs, *US 7649*.

**** *Rhizocarpon copelandii* (Körb.) Th. Fr.**

Bipolar species recorded from Antarctic Peninsula. *Rhizocarpon badioatrum* Flörke ex Spreng., which was reported from Livingston Island by OLECH (1989b) and SANCHO *et al.* (1999), is probably this species.

SOUTH BAY, Mt. Reina Sofia, rock, *US 7729*.

*** *Rhizocarpon disporum* (Hepp) Müll. Arg.**

Bipolar species recorded from South Orkney Is., South Shetland Is., Antarctic Peninsula and continental Antarctica. Reported from Livingston Island by SANCHO *et al.* (1999) as *R. geminatum* Körb.

SOUTH BAY, Mt. Reina Sofia, sloping rock, *US 7747*.

***Rhizocarpon geographicum* (L.) DC.**

Cosmopolitan species widespread in Antarctica. Reported from Livingston Island by OLECH (1989b) as *R. flavum* C. W. Dodge & G. E. Baker, and by SANCHO *et al.* (1999).

SOUTH BAY, Lower slopes of Mt. Reina Sofia, vertical rock, *US 7648*.

***Rhizocarpon grande* (Flörke) Arnold**

Bipolar species recorded from South Orkney Is., South Shetland Is., and Antarctic Peninsula. Reported from Livingston Island by SANCHO *et al.* (1999).

SOUTH BAY, Lower slopes of Mt. Reina Sofia, rock, *US 7661*, *US 7676*; Lower slopes of Mt. Reina Sofia, boulder, *US 7757*.

***Rhizocarpon polycarpum* (Hepp) Th. Fr.**

Bipolar species recorded from South Georgia, South Orkney Is., South Shetland Is. and Antarctic Peninsula. Reported from Livingston Island by OLECH (1989b) and SANCHO *et al.* (1999).

SOUTH BAY, Caleta Española, NE-exposed slope, pebbles in scree, *US 7722*.

**** *Rhizocarpon superficiale* (Schaer.) Vain.**

Bipolar species recorded from Antarctic Peninsula.

SOUTH BAY, Lower slopes of Mt. Reina Sofia, S-exposed sloping rock, *US 7664*. FALSE BAY, Pico Moores, acid, volcanic bedrock, 300–350 m alt., rock, *US 7791*.

***Rhizoplaca aspidophora* (Vain.) Redón**

Antarctic endemic, widespread in Antarctica. Reported from Livingston Island by OLECH (1989b) and SANCHO *et al.* (1999).

SOUTH BAY, Hill between Caleta Española and Johnsons Dock, bird perching stone, *US 7924*; Pico Radio, 1 km W of Base Juan Carlos I, 50–130 m alt., bird perching rock, *US 7965*; Caleta Española by Base Juan Carlos I, soil on shore, *US 7988*.

***Rhizoplaca melanophthalma* (Ramond in Lam. & DC.) Leuckert & Poelt**

Bipolar species, widespread in Antarctica. Reported from Livingston Island by OLECH (1989b) and SANCHO *et al.* (1999).

(*Rinodina convoluta* Lindsay)

Reported from Livingston Island by OLECH (1989b).

***** *Rinodina mniaraea* (Ach.) Körb.**

Bipolar species, widespread in North America, Europe, Asia.

SOUTH BAY, Caleta Española, moss on rock near shore, *US 7607*; Caleta Española at base Juan Carlos I, 10–20 m alt., moss on stones on raised beach, *US 7756*; Punta Polaca, Pico Radio, over moss in late snowbed, *US 7899*, det. *H. Mayrhofer*.

(*Rinodina nimbosa* (Fr.) Th. Fr.)

Reported from Livingston Island by SANCHO *et al.* (1999). Probably a mis-identification.

***Rinodina olivaceobrunnea* C. W. Dodge & G. E. Baker**

Bipolar species, widespread in Antarctica. Reported from Livingston Island by SANCHO *et al.* (1999).

SOUTH BAY, Lower slopes of Mt. Reina Sofia, moss in depression in soil, *US 7645*; Mt. Reina Sofia, moss on horizontal rock, *US 7736*; Lower slopes of Mt. Reina Sofia, moss on rock, *US 7763*; Caleta Argentina, moss on coastal rocks, *US 7898*.

(*Rinodina turfacea* (Wahlenb.) Körb.)

Reported from Livingston Island by OLECH (1989b).

***Sphaerophorus globosus* (Huds.) Vain.**

Bipolar species recorded from South Georgia, South Orkney Is., South Shetland Is. and Antarctic Peninsula. Reported from Livingston Island by OLECH (1989b) and SANCHO *et al.* (1999).

SOUTH BAY, Lower slopes of Mt. Reina Sofia, horizontal soil, *US 7640*; Lower slopes of Mt. Reina Sofia, soil on exposed knoll with *Stereocaulon*, *US 7875*.

**** *Sporastatia polyspora* (Nyl.) Grumann**

Bipolar species recorded from South Georgia and South Orkney Is.

SOUTH BAY, Lower slopes of Mt. Reina Sofia, vertical rock, *US 7674*; Pico Radio, 1 km W of Base Juan Carlos I, 50–130 m alt., vertical, N-exposed rock, *US 7981*.

***Sporastatia testudinea* (Ach.) A. Massal.**

Bipolar species recorded from South Georgia, South Shetland Is. and Antarctic Peninsula. Reported from Livingston Island by SANCHO *et al.* (1999).

SOUTH BAY, Lower slopes of Mt. Reina Sofia, rock, *US 7771*; Caleta Española, above Base Juan Carlos I, sloping rock, *US 7905*; Pico Radio, 1 km W of Base Juan Carlos I, 50–130 m alt., rock, *US 7963*. FALSE BAY, Pico Moores, acid, volcanic bedrock, 300–350 m alt., vertical rock, *US 7790*.

**** *Staurothele aff. frustulenta* Vain.**

Fig. 11

Bipolar species, recorded in Antarctica only from Alexander Island.

SOUTH BAY, Caleta Española, above Base Juan Carlos I, sloping rock with seepage, *US 7904*; Peak of Mt. Reina Sofia, W-exposed seepage rock, *US 7913*.

Note: It differs from the North European *S. frustulenta* in having 1-spored asci, and may therefore be a distinct species.

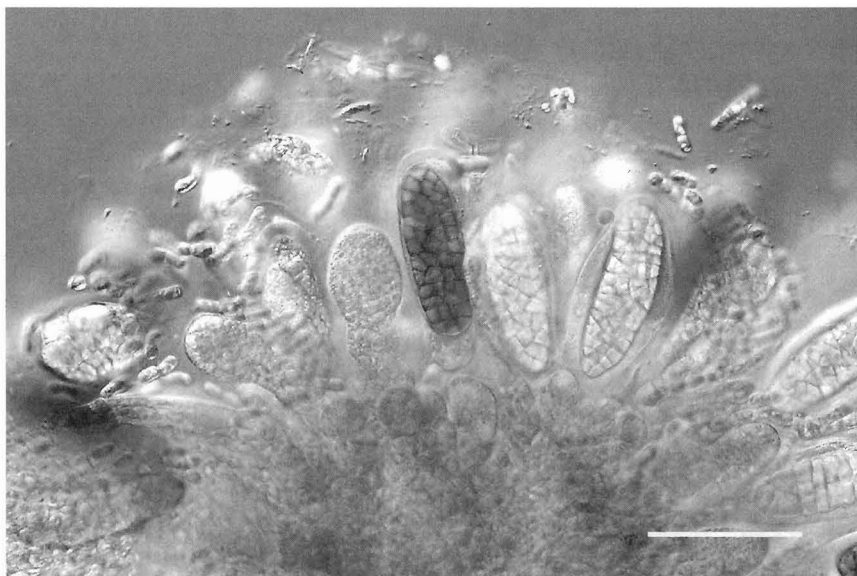


Fig. 11. *Staurothele* aff. *frustulenta*. Hymenium (bar = 50 μ m).

***Staurothele gelida* (Hooker f. & Taylor) I. M. Lamb**

South American-Antarctic species recorded from South Georgia, South Orkney Is., South Shetland Is. and Antarctic Peninsula. Reported from Livingston Island by OLECH (1989b) and SANCHO *et al.* (1999).

SOUTH BAY, Lower slopes of Mt. Reina Sofia, shaded, vertical rock, US 7672; Johnsons Dock, 20 m from the shore, 25–50 m alt., sheltered, moist rock in crevice, US 7816.

***Stereocaulon alpinum* Laurer**

Bipolar species recorded from South Georgia, South Orkney Is., South Shetland Is. and Antarctic Peninsula. Reported from Livingston Island by OLECH (1989b) and SANCHO *et al.* (1999).

SOUTH BAY, Lower slopes of Mt. Reina Sofia, soil, US 7684; Pico Radio, 1 km W of Base Juan Carlos I, 50–130 m alt., soil, US 7954.

*** *Stereocaulon antarcticum* Vain.**

South American-Antarctic species recorded from South Shetland Is., Antarctic Peninsula and continental Antarctica.

SOUTH BAY, Mt. Reina Sofia, horizontal rock, US 7730; Peak of Mt. Reina Sofia, soil in crevice, US 7912.

***Stereocaulon glabrum* (Müll. Arg.) Vain.**

South American-Antarctic species recorded from South Georgia, Bouvetøya, South Orkney Is., South Shetland Is. and Antarctic Peninsula. Reported from Livingston Island by OLECH (1989b) and SANCHO *et al.* (1999).

SOUTH BAY, Lower slopes of Mt. Reina Sofia, soil, *US 7655*; Lower slopes of Mt. Reina Sofia, rock on exposed hilltop, *US 7874*; Caleta Española, above Base Juan Carlos I, sloping rock, *US 7907*; Pico Radio, 1 km W of Base Juan Carlos I, 50–130 m alt., moss, *US 7973*, *US 7974*.

(*Stereocaulon vesuvianum* Pers.)

Reported from Livingston Island by OLECH (1989b).

***Tephromela atra* (Huds.) Hafellner**

Cosmopolitan species recorded from South Georgia, South Orkney Is., South Shetland Is. and Antarctic Peninsula. Reported from Livingston Island by OLECH (1989b) and SANCHO *et al.* (1999).

SOUTH BAY, Lower slopes of Mt. Reina Sofia, SW-exposed, sloping rock, *US 7652*; Caleta Española by base, vertical rock, *US 7695*.

***** *Tephromela parasitica* Øvstedal & Søchting, sp. nov.**

Fig. 12

Tephromelae campestricolae similis, sed ascosporis angustioribus, hymenio humiliore et paraphysibus angustioribus.

Typus: ANTARCTICA. *South Shetland Islands*: Livingston Island, South Bay, Punta Polaca, sedimentary bedrock, 5–10 m alt., 23 Jan. 1998, *U. Søchting 7686* (C – holotype).

Thallus crustose, lichenicolous on *Lecidella*, bluish-grey, up to 15 mm wide, granulose-areolate, thick. *Apothecia* at first immersed in thallus, later emerging, ± lecideine, but sometimes with a thin, white thalline margin, which appears to be remnants of the thallus. Proper margin thin, indistinct, black. Disc black, up to 1.6 mm diam. *Hypothecium* golden yellow-brown. *Hymenium* ca. 180 µm high, pale burgundy red, with minute oil droplets. *Paraphyses* stout, not or little ramified; end cells ca. 6 µm wide, lumina 1.5–2 µm wide. *Asci* with 8 spores. *Ascospores* 10–13 × 8–9 µm. *Pycnidia* not seen.

Chemistry (TLC): Atranorin, unidentified compound (Rf: A:3, B:3).

Ecology: Parasitic on *Lecidella* sp. A (in ØVSTEDAL & LEWIS SMITH 2001)

Notes: This is clearly a species in the vicinity of *Tephromela atra* (Huds.) Hafellner, but it differs in a number of characters, viz: lichenicolous lifeform, more reddish hymenium, hymenium with oil droplets, smaller ascospores, narrower paraphyses apical cells and different chemistry. It has some resemblance to the likewise parasitic *T. campestricola* (Nyl.) Rambold & Triebel that also has a thallus of its own and lecideine apothecia. We have studied an isotype (O) of this species, which was collected in the Pyrenees. However, the latter species has a hymenium, which is 40–50 µm high and unpigmented except for the violet-brown paraphyses with ca. 4 µm thick apical cells, and ascospores ca. 12 × 6 µm. It is found on *Lecanora* spp. and is clearly a different species.

Specimens seen: only holotype.

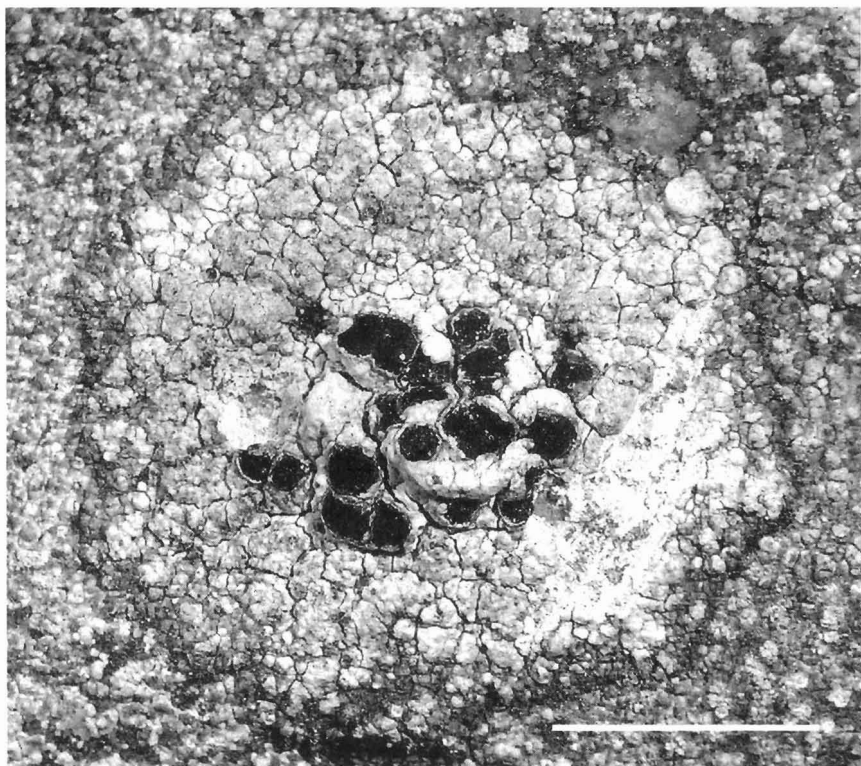


Fig. 12. *Tephromela parasitica*, holotype. Habitus (bar = 5 mm).

***Thelenella antarctica* (I. M. Lamb) O. E. Erikss.**

Antarctic endemic recorded from South Orkney Is. and South Shetland Is. Reported from Livingston Island by OLECH (1989b) and SANCHO *et al.* (1999).

SOUTH BAY, Caleta Española, bird perching rock near shore, US 7606; Johnsons Dock, S-side, 10–50 m alt., sheltered, vertical rock, US 7848.

***Tremolecia atrata* (Ach.) Hertel**

Cosmopolitan species recorded from South Orkney Is., South Shetland Is. and Antarctic Peninsula. Reported from Livingston Island by OLECH (1989b) and SANCHO *et al.* (1999).

FALSE BAY, Pico Moores, acid, volcanic bedrock, 300–350 m alt., sloping rock, US 7786.

*** *Trimmatothelopsis antarctica* C. W. Dodge**

Antarctic endemic recorded from South Shetland Is., Antarctic Peninsula and continental Antarctica.

SOUTH BAY, Caleta Española by Base Juan Carlos I, detritus in vertical, shaded rock crevice, *US 7699*.

***Turgidiusculum complicatulum* (Nyl.) Kohlm. & E. Kohlm.**

Bipolar species, widespread in Antarctica. Reported from Livingston Island by OLECH (1989b) and SANCHO *et al.* (1999).

SOUTH BAY, Caleta Española, bird perching rock, *US 7605*.

***Umbilicaria africana* C. W. Dodge & G. E. Baker**

Southern Hemisphere species recorded from South Georgia, South Shetland Is. and continental Antarctica. Reported from Livingston Island by SANCHO *et al.* (1999).

SOUTH BAY, Caleta Española, vertical rock; *US 7634*; Mt. Reina Sofia, N-facing, sloping rock, *US 7726*; Mt. Reina Sofia, vertical rock, *US 7748*; FALSE BAY, Pico Moores, acid, volcanic bedrock, 300–350 m alt., vertical rock, *US 7793*; Punta Hesperides, acid, volcanic bedrock, sloping rock, *US 7941*.

*** *Umbilicaria antarctica* Frey & I. M. Lamb**

Antarctic endemic, widespread in Antarctica. Reported from Livingston Island by OLECH (1989b) and SANCHO *et al.* (1992) as *U. rufidula* (Hue) Filson.

(*Umbilicaria aprina* Nyl.)

Reported from Livingston Island by OLECH (1989b).

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

Cosmopolitan species recorded from South Orkney Is., South Shetland Is., Antarctic Peninsula and continental Antarctica. Reported from Livingston Island by OLECH (1989b) and SANCHO *et al.* (1999).

SOUTH BAY, Caleta Española, vertical rock, *US 7635*; Caleta Española, Low hills of Mt. Reina Sofia, vertical rockside, *US 7774*.

***Umbilicaria kappenii* Sancho, B. Schroet. & Vallad.**

Antarctic endemic recorded from South Orkney Is., South Shetland Is. and Antarctic Peninsula. Reported from Livingston Island by SANCHO *et al.* (1999).

SOUTH BAY, Caleta Española, Vertical rock, *US 7633*.

***Umbilicaria krascheninnikovii* (Savicz) Schol.**

Bipolar species recorded from South Shetland Is. and Antarctic Peninsula. Reported from Livingston Island by SANCHO *et al.* (1999).

FALSE BAY, Pico Moores, acid, volcanic bedrock, 300–350 m alt., vertical rock, *US 7788*.

***Umbilicaria nylanderiana* (Zahlbr.) H. Magn.**

Bipolar species recorded from South Orkney Is., South Shetland Is. and Antarctic Peninsula. Reported from Livingston Island by SANCHO *et al.* (1999).

SOUTH BAY, Caleta Española, Lower slopes of Mt. Reina Sofia, sloping, N-exposed rock-side, *US 7776*, *US 7777*.

(*Usnea acromelana* Stirt.)

Reported from Livingston Island by OLECH (1989b).

***Usnea antarctica* Du Rietz**

Southern Hemisphere species, widespread in Antarctica. Reported from Livingston Island by OLECH (1989b) and SANCHO *et al.* (1999).

SOUTH BAY, Punta Polaca, exposed rocks, *US 7587*; Punta Henry, 1 km NE of Caleta las Palmas, rock outcrop, *US 7779*.

***Usnea aurantiaco-atra* (Jacq.) Bory**

South American-Antarctic endemic recorded from South Georgia, Bouvetøya, South Orkney Is., South Shetland Is. and Antarctic Peninsula. Reported from Livingston Island by OLECH (1989b) and SANCHO *et al.* (1999).

SOUTH BAY, Punta Polaca, exposed rocks, *US 7586*; Pico Radio, 1 km W of Base Juan Carlos I, 50–130 m alt., rock, *US 7959*.

***Verrucaria ceuthorcarpa* Wahlenb.**

Bipolar species recorded from South Georgia, Kerguelen, South Orkney Is., South Shetland Is. and Antarctic Peninsula. Reported from Livingston Island by OLECH (1989b).

SOUTH BAY, Punta Polaca, maritime rocks, *US 7582*.

(*Verrucaria dispartita* Vain.)

Reported from Livingston Island by OLECH (1989b) and SANCHO *et al.* (1999).

***Verrucaria elaeoplaca* Vain.**

Antarctic endemic, widespread in Antarctica. Reported from Livingston Island by SANCHO *et al.* (1999).

SOUTH BAY, Johnsons Dock, 20 m from the shore, 25–50 m alt., vertical, shaded rock, *US 7827*.

(*Verrucaria maura* Wahlenb.)

Reported from Livingston Island by SANCHO *et al.* (1999).

(*Verrucaria psychrophila* I. M. Lamb)

Reported from Livingston Island by OLECH (1989b) and SANCHO *et al.* (1999).

***Verrucaria tessellatula* Nyl.**

Falkland Is.-Antarctic endemic, widespread in Antarctica. Reported from Livingston Island by OLECH (1989b).

SOUTH BAY, Punta Polaca, maritime rocks, *US 7581*.

***Xanthoria candelaria* (L.) Th. Fr.**

Cosmopolitan species recorded from South Georgia, South Sandwich Is., South Orkney Is., South Shetland Is. and Antarctic Peninsula. Reported from Livingston Island by OLECH (1989b) and SANCHO *et al.* (1999).

SOUTH BAY, Punta Polaca, bird perching rock near shore, *US 7596*; Lower slopes of Mt. Reina Sofia, eutrophicated rock, *US 7766*; Johnsons Dock, 20 m from the shore, 25–50 m alt., top of bird perching stone, *US 7826*.

***** *Zahlbrucknerella marionensis* Henssen**

Subantarctic-Antarctic endemic formerly recorded from Marion I.

SOUTH BAY, Johnsons Dock, S-side, 10–50 m alt., sheltered, vertical rock, *US 7847*, det. *M. Schultz*.

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