

New lichen species from Tristan da Cunha and Gough Island

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Abstract: Seven lichen species from Tristan da Cunha and Gough Islands are described as new to science: *Caloplaca austroatlantica*, *Gyalidea goughensis*, *Massalongia griseolobulata*, *Sticta tessellata*, *Szczawinskia phyllicae*, *Tephromela rimosula*, and *Thelotrema tristanense*.

Kokkuvõte: Uued samblikuliigid Tristan da Cunha ja Goughi saartelt

Kirjeldatakse seitse teadusele uut liiki lihheniseerunud seeni (samblikke) Tristan da Cunha ja Goughi saartelt: *Caloplaca austroatlantica*, *Gyalidea goughensis*, *Massalongia griseolobulata*, *Sticta tessellata*, *Szczawinskia phyllicae*, *Tephromela rimosula* ja *Thelotrema tristanense*.

INTRODUCTION

During the Norwegian Tristan da Cunha expedition 1937/38 (Christophersen, 1947), a number of lichens were collected. The genus *Cladonia* was treated by des Abbayes (1940), and the genus *Placopsis* by Lamb (1940), while the remainder of the foliose and fruticose lichens was treated by Jørgensen (1977), who recognized 84 species. The crustose taxa, however, were not treated by these authors. During a study of this material, we came across two new species, which are described below.

In the past decade, Niek Gremmen made lichen collections during several visits to Gough Island and Tristan da Cunha. The Parmeliaceae in this collection were described by Elix & Gremmen (2002). The remainder of the collections was studied by the senior author, and also yielded a number of previously undescribed species treated below.

The Tristan da Cunha group of islands (37–40°S, 10–12°W; Fig. 1) is situated in the South Atlantic Ocean, about midway between the southern tip of Africa and South America, and is associated with the Mid Atlantic ocean ridge. The group consists of the main island, Tristan da Cunha (96 km², 2060 m high), with two smaller islands (Inaccessible and Nightingale) close by, and a third, Gough Island (65 km², 910 m high) some 300 km to the south-east. The islands are of volcanic origin, and have a temperate, extremely oceanic climate. Major vegetation

types are coastal tussock communities dominated by *Spartina arundinacea*, dense, 3–4 m high, *Phyllica arborea* bush, dense fernbush communities, mires and bogs, dominated by bryophytes, upland heath vegetation and open alpine vegetation. The islands and their vegetation have been described by Wace & Holdgate (1958), Wace & Dickson (1965) and Wace (1961). A general description of all islands of the group can be found in Ryan (2007).

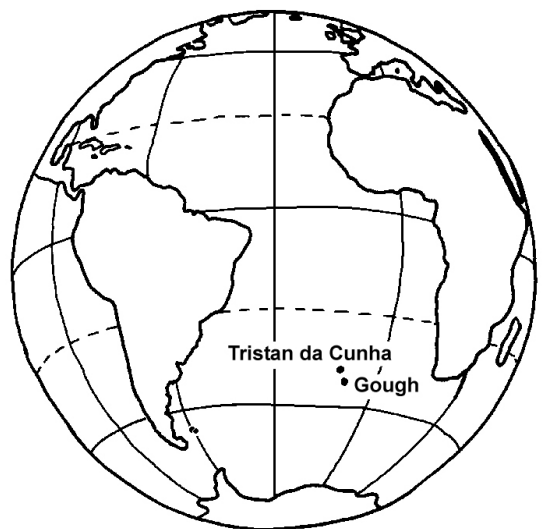


Fig. 1. Geographical position of Tristan da Cunha and Gough Island.

MATERIAL AND METHODS

The specimens studied are deposited in O or BG. The specimens were examined using a Zeiss Stemi 2000C stereo microscope, and a Zeiss Axiolab compound microscope. Chemical constituents were identified by thin layer chromatography (Elix & Ernst-Russell 1993). Geographical positions were determined by Gremmen in the field using GPS. For the Christophersen specimens positions were determined from the location descriptions.

THE SPECIES

***Caloplaca austroatlantica* Øvstedal sp. nov.**

Thallus ochraceus, subplacodioideus vel placodioideus, sorediosus. Apothecia lecanorina, disco flavo-aureo, margine griseo. Ascospores 8nae, polaroblastidae, 9–11×2.5–3 µm. Substantiam incognitam continens.

Mycobank number – MB 516789.

Typus – Tristan da Cunha, above settlement, 37°S, 12°W, alt. 50 m, *E. Christophersen & Y. Mejland*, 26 Jan 1938 (O, holotype).

Illustration – Fig. 2.

Description – Thallus placodioid to subplacodioid, up to 20 mm diam., pale ochre, with cuneate marginal areolae; rimose-areolate in inner part, sorediate. Soralia marginal on areolae in inner

part of thallus, blue-grey, coarse. Apothecia rare, up to 0.5 mm diam., sessile, constricted below, lecanorine, margin distinct, bluish grey; disc flat, orange. Hymenium 50–55 µm high. Ascospores 8 in asci, 9–11×2.5–3 µm, septum 0.5–1 µm. Paraphyses with slightly enlarged end cell. Thalline margin with many algal cells in inner part, cortex pseudoparenchymateous. Chemistry – Undetermined compound in thallus (not anthraquinone); anthraquinones in disc. Ecology – On rock.

Comments – We have found no description that matches this species, therefore we describe it as a new species.

Specimen examined – Only type seen.

***Gyalidea goughensis* Øvstedal sp. nov.**

Thallus corticola, granulatus, griseovirens. Apothecia lecideinea, carnea, urniforma. Ascospores 8nae, incoloratae, 3-septatae, 10×2.5 µm.

Mycobank number – MB 516791.

Typus – Gough Island, inland of The Admiral, 44°20'45"S, 9°52'44"W, 100 m alt., on stem of *Phyllica arborea* tree, *N. J. M. Gremmen* 99-374, 21 Sept 1999 (BG, holotype).

Illustration – Fig. 3.

Description – Thallus crustose, very thin, green-grey. Photobiont trebouxoid, cells 5–7 µm, an-

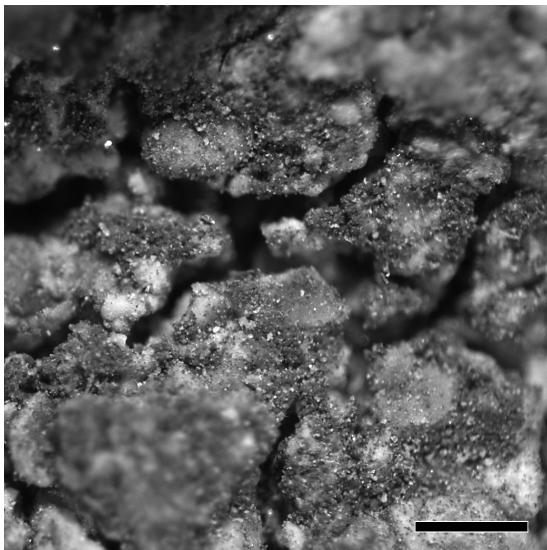


Fig. 2. *Caloplaca austroatlantica*, holotypus (scale 0.5 mm).

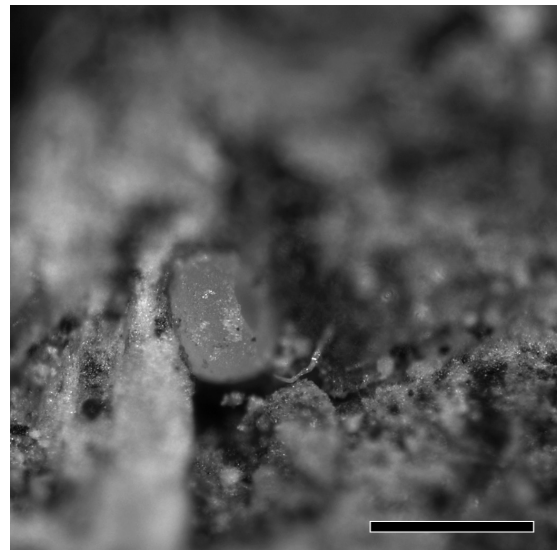


Fig. 3. *Gyalidea goughensis*, holotypus (scale 1 mm).

gular due to compression. Apothecia sessile, up to 0.8 mm diam., flesh-coloured to pink, without thalline margin. True margin thick, rough, disc strongly concave. Hymenium 40–50 μm high, K/I–, uppermost part yellowish. Exciple composed of a network of anastomosing hyphae in a gelatinous network. Ascospores 8 in asci, colourless, 3-septate, ca 10 \times 2.5 μm . Paraphyses simple, distinctly septate, with slightly swollen end cell, up to 1.5 μm wide.

TLC – no lichen substances detected.

Ecology – in fissures in bark of *Phylica arborea*.

Comments – The anatomy of the apothecia of this species is in accordance with that of *Gyalidea* (see Henssen & Lücking 2002), with an excipulum composed of anastomosing hyphae in a gelatinous matrix, simple paraphyses, septated to muriform ascospores and a trebouxoid photobiont. Most of the species of this genus are growing on rock or soil, but there is at least one other corticolous species – *G. parvula* Kalb & Vězda, with muriform ascospores, from Ecuador (Vězda & Poelt 1991).

Specimen examined – Only type seen.

***Massalongia griseolobulata* Øvstedal sp. nov.**

Massalongiae carnosae similis, sed squamulis griseo-ochraceis, sine isidiis et cum ascosporis 6-7-septatis.

Mycobank number – MB 516792.

Typus – Gough Island, lower slopes of Tafelkop, 40°20'35"S, 9°53'21"W, 270 m alt, on the trunk of a treefern (*Blechnum palmiforme*), *N. J. M. Gremmen 2006-91*, 21 Sept 2006 (holotype, BG).

Illustration – Fig. 4.

Description – Thallus squamulose, covering an area of 2–3 cm diam. Squamules pale grey-ochre, dispersed to crowded, 0.3–0.8 mm diam., at margin with \pm crowded, rounded, 0.1–0.2 mm diam. lobules, somewhat paler than surface of squamules. Sometimes the squamules are replaced by an agglomeration of lobules. No hypophothallus. Photobiont *Nostoc*, cells 8–10 μm wide, angular due to compression. In transection the thallus is composed of an upper cortex, ca 25 μm high, of a pseudoparenchymateous tissue, pale brownish to colourless, composed of thick-walled cells, 7–9 μm diam., below that a dense medulla, 50–70 μm high, with cyanobacteria and intricately oriented hyphae, below that a basal

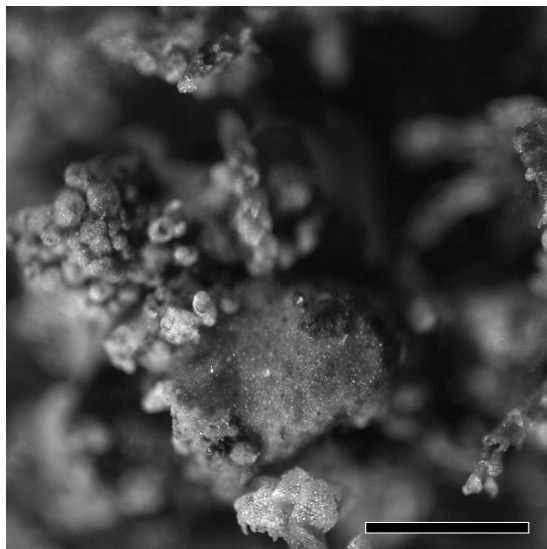


Fig. 4. *Massalongia griseolobulata*, holotypus (scale 0.5 mm).

limiting layer, 20–25 μm high, of a prosoplectenchymateous tissue, yellowish.

Lower side pale brown, with a few pale brown rhizines. Apothecia rare, without thalline margin, convex, up to 0.5 mm diameter, mottled pale brownish-greyish blue. In section the hymenium is 80–90 μm high, epithecium yellowish, composed of short, irregularly arranged hyphae. True exciple composed of swollen, radiating hyphae, colourless. Hypothecium colourless, without photobiont. No photobiont layer below hypothecium. Asci 58–62 \times 17–19 μm , tholus large, K/I + blue, with an indistinct ring structure. Ascospores (4–)6–7 septate, uncoloured, cylindrical, 8 in asci, 25–30 \times 7–11 μm . Paraphyses ca 2 μm diam., straight, somewhat ramified to anastomosing, end cell not enlarged.

TLC – no lichen substances detected.

Ecology – over bryophytes on rock.

Comments – This taxon is not easy to place as to genus. The indistinct ring structure is not in accordance with *Massalongiaceae* where the species have an apical cap-structure (Wedin et al. 2007), however, it lacks the distinct plug-like structure found in *Peltigeraceae* and *Placynthiaceae* (Wedin et al. 2007). Based on thallus and ascospore characters we have decided that *Massalongia* is the most appropriate genus.

Specimen examined – Only type seen.

***Sticta tesselata* Øvstedal sp. nov.**

Thallus foliosus, griseocaeeruleus vel brunneus, supra rimosus, rimae cum isidiis irregularibus. Photobiontes Nostoc. Apothecia laminata, margine hirsuto. Ascosporae 3-septatae, 26–30 x 5–6 µm.

Mycobank number – MB516793.

Typus – Gough Island, inland from The Admiral, 40°20'43"S, 9°52'53"W, 100 m alt., on bark of more or less horizontal stems and thick branches of *Phyllica arborea* trees (single plants, rare), *N. J. M. Gremmen 2005-G505*, 24 Sept 2005 (holotype, BG).

Illustrations – Figs 5 & 6.

Description – Thallus foliose, mottled brownish-pale bluish grey, with limited holdfast which is ovate to irregular, 1×1 to 3×2 mm wide; no stipe. Photobiont *Nostoc* in 20–25 µm wide clumps, individual cells 5–6 µm. Lobes reniform, single or subpalmately lobed, up to 5 cm wide and equally long. Upper side fissured into areolae, areolae ca. 1 mm wide, with wavy outline, and with isidia at margins. Isidia irregular or indistinct coralloid, 0.1–0.2 mm high and equally wide, somewhat darker than thallus, often developing into phyllidia-like structures, 0.2–0.3 mm wide and equally long. Medulla loose, colourless. Lower surface pale ochre, thinly tomentose, rhizines colourless, smooth, ca 5×40–60 µm. Cyphellae white, of unequal

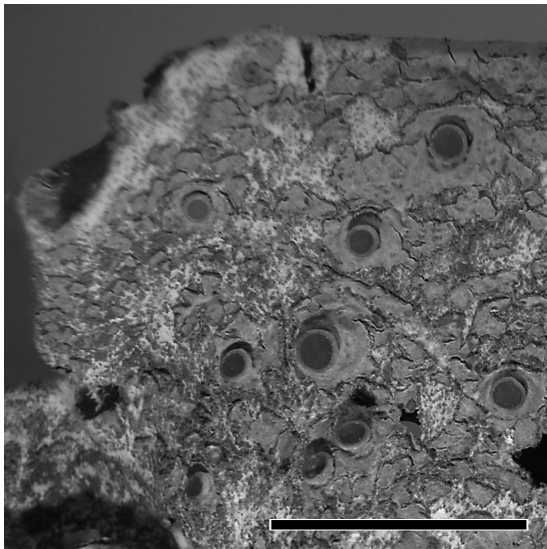


Fig. 5. *Sticta tesselata*, holotypus (scale 1 cm).



Fig. 6. *Sticta tesselata* growing on a *Phyllica arborea* branch, Gough Island.

diameter, 0.2–2.3 mm wide, margin raised. After a few years, a yellow coloration is developed in the medulla and on the lower surface. Apothecia rare, laminar, when young sessile with concave, brown disc, margin thick, hirsute, grey-brown. Mature apothecia up to 1 mm diam., brown, margin almost excluded and with a few hairs protruding. In transection the apothecia have a thalline margin composed of a pseudoparenchymateous tissue, cells thinwalled, ± isodiametric, 10–12 µm wide. Hymenium 80–85 µm high, epihymenium yellow-brown. Hypothecium yellowish, 55–60 µm high. Ascospores 6–8 in asci, fusiform, hyaline, (1–)3-septate, 26–30×5–6 µm. Paraphyses 1.5 µm diam., little ramified, end cells enlarged to 2 µm.

Chemistry – negative.

Ecology – On bark of *Phyllica arborea* trees.

Comments – According to Aptroot (2008), the most complete current source for identifying *Sticta* species is the internet site 'Pictures of Tropical lichens' (<http://www.tropicallichens.net/>), where 54 species are illustrated, but the present species was not found there. Neither was any description matching this species found in Delise (1825), Galloway (1994a, 1994b, 1995, 2001), Galloway & Pickering (1990) or Yoshimura (1974), consequently it has been described as a new species.

Additional specimens examined – Gough Island. Inland from Transvaal Bay, 40°20'37"S, 9°53'09"W, 137 m alt., on bark of stems and branches of a solitary *Phyllica arborea* tree in fernbrake on lower slope of

mountain, *N. J. M. Gremmen 2006-1827*, 1 Oct 2006; inland from The Admiral, 40°20'44"S, 9°52'45"W, 82 m alt., on stem/branches of *Phyllica arborea* tree, *N. J. M. Gremmen 2006-354*, 24 Sept 2006; inland from Transvaal Bay, 40°20'37"S, 9°53'08"W, 150 m alt., on stems of *Phyllica arborea* tree in very open *Phyllica* bush vegetation, *N. J. M. Gremmen 2000-364*, 23 June 2000; near Meteorological Station (Transvaal Bay), 40°21'S, 9°53'W, 40 m alt., epiphytic on branches of *Phyllica arborea* tree. *N. J. M. Gremmen 99-304*, 12 Sept 1999.

***Szczawinskia phyllicae* Øvstedal sp. nov.**

Szczawinskia tsugae similis, sed pycnidiiis angustis et conidiis minoris.

Mycobank number – MB 518001.

Typus – Tristan da Cunha, above Sandy Point, 36°6'S, 12°13'W, 300 m alt., on *Phyllica*, *E. Christophersen & Y. Mejland*, 30 Dec 1937 (O, holotype).

Illustration – Fig. 7.

Description – Thallus crustose, cracked-rimose, grey-brown, on a blackish hypothallus; prothallus narrow, black. Photobiont green, algal cells 5–7 µm. Pycnidia with stipe 0.97 ± 0.12 mm long, ca 0.05 mm broad; the ellipsoid pycnidia 0.27 ± 0.04 (0.2–0.3) mm × 0.14 ± 0.06 (0.1–0.2) mm (n=15), black, but sometimes with brownish base of stipe; stipe often curved. Pycnidium wall with a red pigment, K⁺ intensifying. Conidia uncoloured, filiform, 35–38 × 1.5 µm, curved,

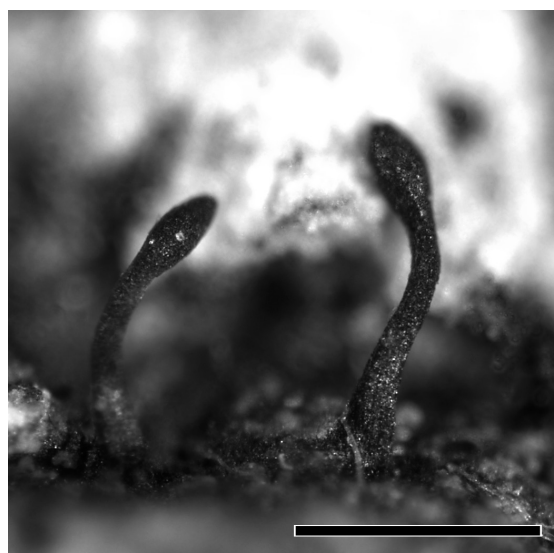


Fig. 7. *Szczawinskia phyllicae*, holotypus (scale 0.5 mm).

with 7–8 indistinct septa. Apothecia not seen.

Chemistry – Negative.

Ecology – On bark of *Phyllica arborea*, together with *Polychidium* sp.

Comments – Four species of *Szczawinskia* are known today, viz. *S. tsugae* A. Funk, *S. leucopoda* Holien & Tønsberg, *S. foliicola* Holien & Tønsberg and the present one. *S. tsugae*, which is found on *Tsuga heterophylla* in NE North America, has a shorter stipe, larger pycnidia, longer conidia and lacks the red pigment in the pycnidium wall (Funk 1983, Brodo & Tønsberg 1994). *S. leucopoda*, found mainly on *Picea* in Central Norway and Newfoundland, has a short, pale stipe and contains norstictic acid (Holien & Tønsberg 2002), while *S. foliicola*, found on leaves of unidentified trees in Papua New Guinea (Aptroot et al. 1997), has much larger conidia and contains a C⁺ red, unidentified compound (Holien & Tønsberg 2002).

Specimen examined – Only type seen.

***Tephromela rimosula* Øvstedal sp. nov.**

Thallus crustaceus, rimosus, albus. Apothecia lecideinea, nigra. Ascosporae 12–13 × 6–7 µm. *Atranorinum* et *acidum perlatolicum* continens.

Mycobank number – MB 518004.

Typus – Tristan da Cunha, just S of Sandy Point, 37°07'1"S, 12°13'04"W, 34 m alt., on rocks in grass vegetation near the beach., *N. J. M. Gremmen T07- 1217*, 10 Jan 2008 (holotypus, BG).

Illustration – Fig. 8.

Description – Thallus crustaceous, dirty white, 3–4 mm wide, strongly rimose, rimae zig-zag-formed. Apothecia sessile, adnate, black, without thalline margin, up to 1 mm diam., slightly convex; when young with thin true margin, when old margin excluded. Hymenium faint bluish, 95–105 µm, uppermost part with two pigments, one blue and one brownish-violet. Hypothecium pale brown, often only spotwise coloured. True exciple composed of thick, radiating hyphae. Asci of *Bacidia*-type (?). Ascospores 8 in asci, bean-formed to straight, 11–13 × 6–7 µm. Paraphyses stout, little ramified, end cells 3–3.5 µm diam. Pycnidia not seen.

Chemistry – Atranorin and perlatolic acids.

Ecology – On lava rock.

Comments – The only other *Tephromela* known

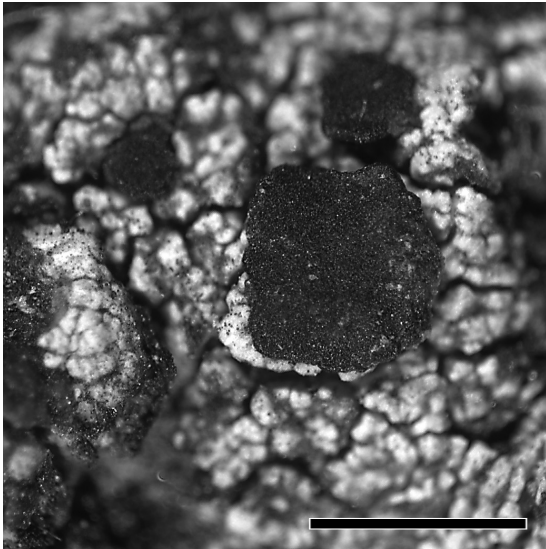


Fig. 8. *Tephromela rimulosa*, holotypus (scale 1 mm).

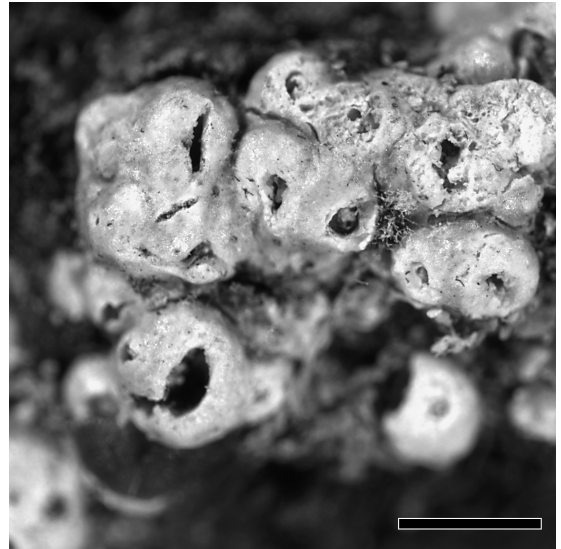


Fig. 9. *Thelotrema tristanense*, holotypus (scale 1 mm).

with perlatolic acid is *T. arafurensis* Rambold (Rambold 1989) from tropical Australia. That is a different species with lecanorine apothecia, and also with glomelliferic and anziaic acids in addition.

Specimen examined – Only type seen.

***Thelotrema tristanense* Øvstedal sp. nov.**

T. lepadino similis, sed apotheciis aggregatis et sporis minoribus.

Mycobank number – MB 518007.

Typus – Tristan da Cunha, Sandy Point area, slopes inland of lower plateau, 37°07'07"S, 12°13'18 W, 140 m alt., on stems and branches of old *Phyllica arborea* tree in fernbush, N. J. M. Gremmen T07-1142, 12 Jan 2008 (holotypus, BG).

Illustration – Fig. 9.

Description – Thallus crustose, ivory-coloured, smooth, shining, 1–4 mm diam. Apothecia single or mostly aggregated, barrel-shaped, 0.4–0.6 mm high and 0.4–1.0 mm wide, ostiole 0.3–0.4 mm wide, margin sometimes scabrose-decorticated. True exciple free (as in *T. lepadinum*), uncoloured, non-striated. Hymenium 140–160 µm high, non-inspers, colourless. Ascospores 1–2 in asci, uncoloured, muriform, 15–15×2–3-septate, 36–38×9–11 µm, K/I-. Periphysoids 5–7×1 µm.

Chemistry – Negative.

Ecology – On stems and branches of *Phyllica arborea* trees.

Comments – This species is related to *T. lepadinum*, but differs in the smaller ascospores [60–125 µm in *T. lepadinum*, according to Frisch (2006), Purvis et al. (1995) and Hale (1981)], the shorter periphysoids (25 µm or more in *T. lepadinum*) and the tendency to agglomeration of the apothecia. *T. lepadinum* is widely distributed, a pantemperate species according to Hale (1981), in Europe found from the Iberian peninsula to Balkan and Russia and north to central Norway (Purvis et al. 1995).

Additional specimens seen – **Tristan da Cunha.** Sandy Point area, slope inland of lower plateau, 37°07'07"S, 12°13'18 W, 140 m alt., on stems and branches of old *Phyllica arborea* tree in fernbush, N. J. M. Gremmen T07-1152, 12 Jan 2008; Sandy Point area, slope inland of lower plateau, 37°07'07"S, 12°13'18 W, 140 m alt., on stems and branches of old *Phyllica arborea* tree in fernbush, N. J. M. Gremmen T07-1137, 12 Jan 2008.

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