

Revision of *Trimmatothele* (Verrucariaceae), and description of *Oevstedalia* for *Trimmatothelopsis antarctica*, a new lichen genus with true ascoconidia

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The type species of *Trimmatothele* is shown to differ from *Verrucaria* only by the multispored asci. *Trimmatothele* is consequently regarded as a younger synonym of *Verrucaria*, and the new combination *Verrucaria perquisita* proposed. The species is just known from Europe, where it is very rare on calcareous rocks and has a boreo-alpine distribution. *Trimmatothelopsis antarctica* is a very distinct lichen, not related with *Verrucaria*, and the new genus *Oevstedalia* is described to accommodate it. *Oevstedalia* is characterized by relatively pale perithecia with a hyphal wall, abundant pseudoparaphyses, sparse, thin, basally branched and anastomosed interascal filaments, an I- and K/I- centre, and very large, subcylindrical, entirely thin-walled, K/I+ blue asci containing in the living state 8 conidial balls filled with numerous ascoconidia. *Oevstedalia* might be related to the Epigloeaceae (family inc. sedis) and represents the first example of a lichenized ascomycete forming true ascoconidia. *O. antarctica* appears to be endemic in Antarctica, where it seems to be widespread and relatively common. No material is available for *Trimmatothele umbellariae* and *Lesdainea maritima*, and no final conclusion can be given for the taxonomic status of these two species.

Taxonomical novelties: *Oevstedalia* Ertz & Diederich, *Oevstedalia antarctica* (Dodge) Ertz & Diederich, *Verrucaria perquisita* (Norman) Ertz & Diederich

The genera *Trimmatothele* Zahlbr. and *Trimmatothelopsis* Zschacke have always been amongst the most poorly known genera of lichens. *Trimmatothele* was described for a species of pyrenolichens similar to *Verrucaria*, but with multispored asci, and *Trimmatothelopsis* was said to differ by the presence of interascal filaments. A total of six species were described or combined in the two genera. The main problem with these species has always been their rarity, the extremely small number of available herbarium specimens, and the missing types. No accurate description was available for the type species of *Trimmatothele*, and thus some specimens were only tentatively attributed to this species, awaiting the rediscovery of the type specimen.

Over ten years ago, P. Diederich received an unidentified Antarctic specimen from A. Aptroot for determination that proved to belong to *Trimmatothelopsis antarctica*. As a great surprise, the living state of the recently collected specimen allowed us to ascertain that the asci are not multispored, as previously considered, but polyconidial, with 8 balls of ascoconidia in each ascus. Six years later, Dag Olav Øvstedal con-

tacted P. Diederich, as he had observed ascoconidial balls in another specimen of the same species. Following that unexpected discovery, we decided to revise both genera *Trimmatothele* and *Trimmatothelopsis*. It took us another five years to locate the type of *Trimmatothele perquisita* through the courtesy of Dag Olav Øvstedal, and only at that moment a revision became possible. In the mean time, NAVARRO-ROSINÉS, ROUX & BELLEMÈRE (1999) and ROUX & NAVARRO-ROSINÉS (2002) were able to examine the type of *Trimmatothelopsis versipellis* and to conclude that that species belongs to *Acarospora* and that *Trimmatothelopsis* is therefore a younger synonym of *Acarospora*.

In this paper we will revise the type of *Trimmatothele* and show that it is a multispored species of *Verrucaria*, and we will demonstrate that *Trimmatothelopsis antarctica* is not related to *Verrucaria* and needs the description of a new genus. For two species, no material is available, and it is impossible to take any decision until new collections are made. Finally, two species are excluded, as they belong to *Acarospora*.

Material and methods

We studied specimens from AAS, BG, C, E, FH, GZU, O and UPS, and from the private collections of A. Aptroot and P. Diederich. Hand-made sections were examined in water, 5% KOH (K), lactophenol with cotton blue, or Lugol's reagent without

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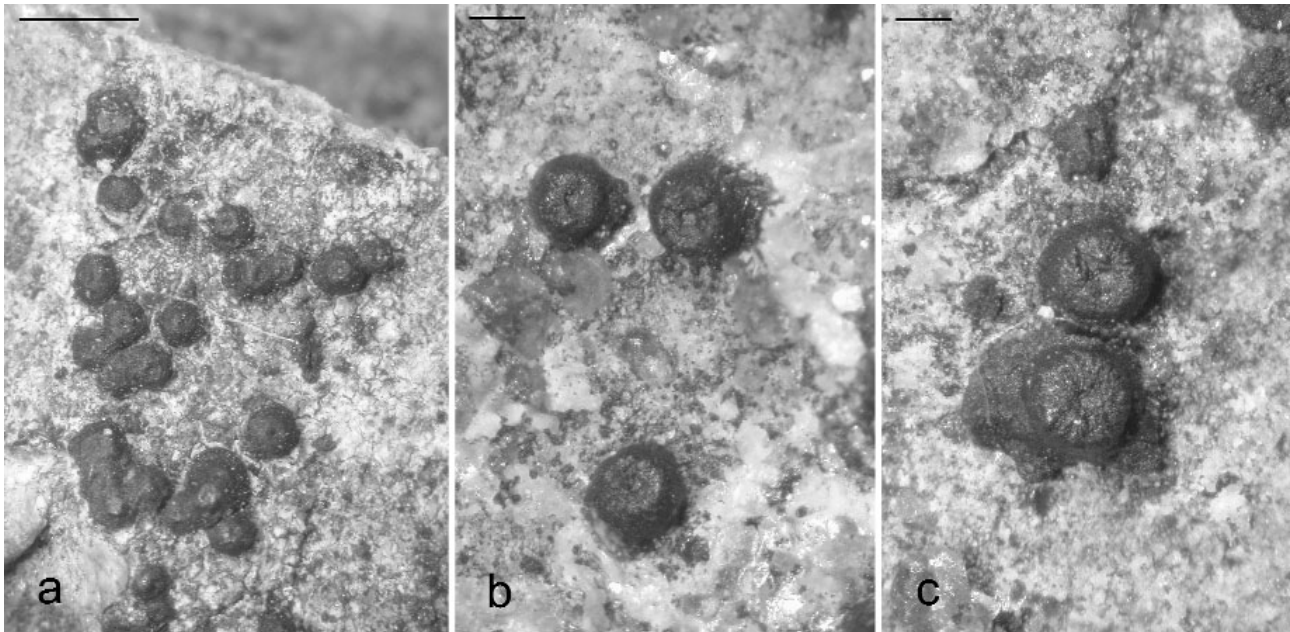


Fig. 1: *Verrucaria perquisita*, perithecia developing over a poorly visible, almost endolithic thallus (a, A. H. Magnusson 6114a [UPS]; b-c, R. Santesson 22598). Scales: a = 1 mm; b-c = 200 μ m.

(I) or with (K/I) KOH pre-treatment. Measurements of macroscopic characters refer to dry herbarium specimens observed under the binocular microscope; those of microscopic characters all refer to material examined in water. The ascospore size of *Verrucaria perquisita* represents average \pm standard deviation, with extreme values added between parentheses. Drawings were done using a drawing tube.

Results

Verrucaria Schrad.

Spic. Fl. Germ.: 108, 1794, nom. cons. – Type species: *Verrucaria rupestris* Schrad.

Trimmatothele Zahlbr., in Engler & Prantl, Natürl. Pflanzenfam. 1 (1): 56, 1907. – *Trimmatothele* Norman, in Blomberg & Forssell, Enum. Plant. Scand.: 100, 1880 [not valid, cf. ICBN, art. 32.1c]. – Type species: *Coniothele perquisita* Norman, lectotype, here designated.

Coniothele Norman, Botaniska Notiser, Lund, 1868: 192, 1869, non DC., Prodr. 5: 531, 1836. – Type species: *Coniothele perquisita* Norman.

The type species of *Trimmatothele* has an endolithic to epilithic thallus, a chlorococcoid photobiont, immersed to erumpent, black perithecia, a dark exciple, a well developed, at least partly carbonized involucrellum surrounding the exciple, a centre that is I+ orange red and K/I+ blue, no paraphyses in mature perithecia, well developed periphyses and short pseudoparaphyses, subcylindrical to clavate, multispored asci of the *Verrucaria* type, and aseptate, hyaline, elliptical, smooth ascospores. Except the multispored asci, all these characters perfectly fit the genus *Verrucaria*, as described for example

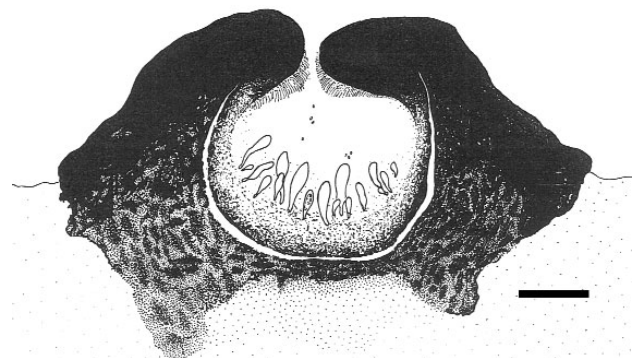


Fig. 2: *Verrucaria perquisita*, section through an ascoma (A. Wilfling 561). Scale = 100 μ m. Reproduced from WILFLING (1998).

in HAWKSWORTH et al. (1992). Also the general aspect of *Trimmatothele perquisita* is typically that of a *Verrucaria*. In modern fungal taxonomy, the number of ascospores per ascus alone does not justify recognition of a distinct genus, as exemplified by many lichenized or lichenicolous genera including both species with 8- and multispored asci (e.g., *Buellia* s. l., *Candelariella*, *Catillaria*, *Dactylospora*, *Gyalideopsis*, *Lecanora*, *Pyrenopsis*). In our opinion, it is not justified to keep *Trimmatothele* as a separate genus, and we propose here its synonymization with *Verrucaria*.

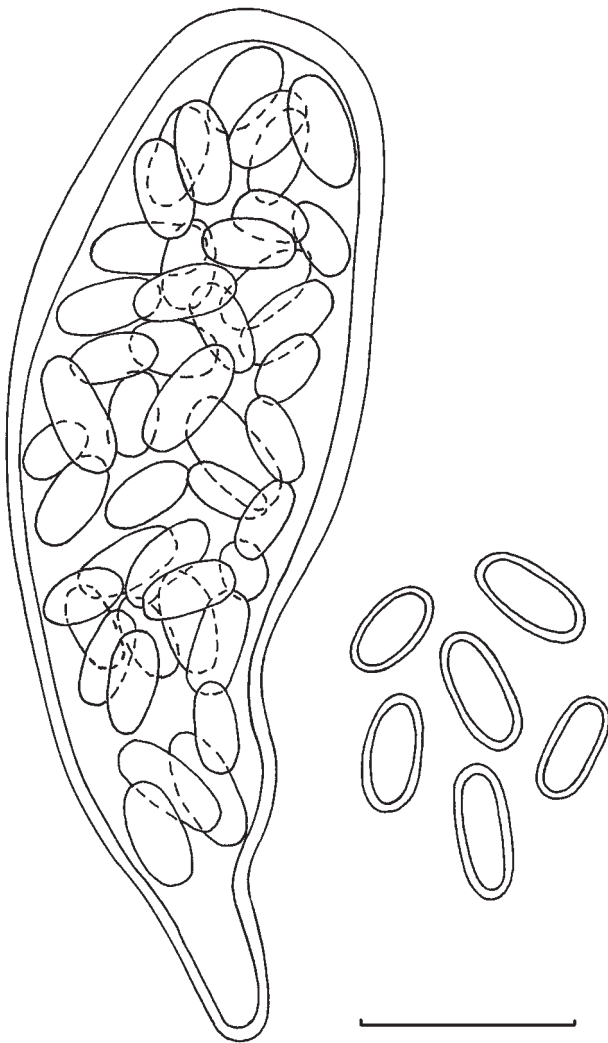


Fig. 3: *Verrucaria perquisita*, ascus and ascospores (lectotype). Scale = 10 μm .

***Verrucaria perquisita* (Norman) Ertz & Diederich comb. nov. Figs. 1–5**

Coniothele perquisita Norman, Botaniska Notiser, Lund, 1868: 192, 1869. – *Trimmatothele perquisita* (Norman) Zahlbr., in Engler & Prantl, Natürl. Pflanzenfam. 1 (1): 56, 1907. – *Trimmatothele perquisita* (Norman) Norman, in Blomberg & Forssell, Enum. Plant. Scand.: 100, 1880 [not valid, cf. ICBN, art. 32.1c]. – Type: Norway, Nordland, Stegen, on calcareous rocks, s. d., J. M. Norman s. n. (O – lectotype, here designated).

Thallus endolithic and inconspicuous, more rarely epilithic and areolate, whitish, pale grey to brownish black. Photobiont chlorococcoid. Perithecia initially entirely or by $\frac{3}{4}$ immersed in the substrate or thallus, later erumpent and only half immersed to almost completely superficial, black, apically often more or less truncate, sometimes slightly to distinctly concave around the ostiole, 250–500 μm diam., 200–300 (400) μm high (Fig. 1). Exciple dark blackish brown, becoming paler towards the centre, basally clearly separated from the involucrellum,

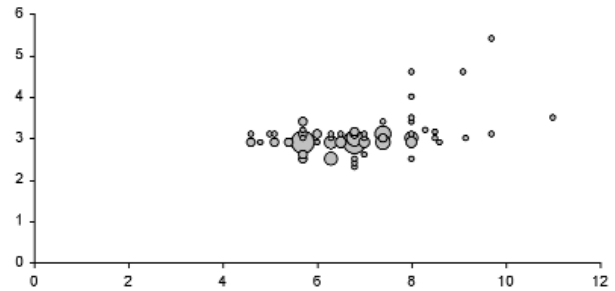


Fig. 4: Ascospore length and width in μm of *Verrucaria perquisita*. The surface of the symbols is proportional to the number of spores observed.

apically continuous with the involucrellum and indistinguishable from it. Involucrellum well developed, entirely surrounding the exciple, laterally up to 200 μm thick, apically slightly thinner (c. 100 μm), basally more reduced, up to 30 μm , in the upper, exposed part entirely carbonized, in the lower, immersed part dark brownish black, but distinctly paler, often irregularly mottled (Fig. 2). Centre I+ orange red, K/I+ blue. Paraphyses absent in mature perithecia. Periphyses and short pseudoparaphyses present, up to 30 μm long and 1–2 μm in diam. Asci of the *Verrucaria* type, subcylindrical to clavate, multispored, 40–65 \times 10–18 μm , wall I-, K/I- (Fig. 3). Ascospores aseptate, hyaline, oblong, more rarely elliptical or subglobose, smooth, without a visible perispore, 36–64 per ascus, (4.5) 5.6–7.9 (11) \times (2.5) 2.6–3.4 (5.5) μm , ratio length/width (1.6) 1.9–2.6 (3.1) (N=114), wall c. 0.5 μm thick (Figs. 3–4). Pycnidia not observed.

Verrucaria perquisita is a rarely collected, but widespread European lichen. As the type specimen has never been critically re-examined recently, and the characterisation and the variability of the species poorly known, some authors hesitated to include their specimens in this species. E. g., COPPINS (1992, sub *Trimmatothele*) observed that the ascospores in the Scottish material are longer than in other published descriptions.

Two different specimens collected by Norman in the type locality have been examined, both obviously on different types of rocks. The specimen from O is annotated “*Coniothele perquisita* Norm.”, whilst that from BG is annotated “*Trimmatothele posterior* Norm.”. Norman surely believed that two species were involved, but he never published the epithet “*posterior*”. Both specimens belong to the same species.

Distribution and ecology. The species is known only from Europe, where it has a boreo-alpine distribution. It is known from Austria, France, Great Britain (Scotland), Norway and Sweden, always on calcareous rocks (Fig. 5). In addition to the specimens examined by us, the species has been reported from a second Austrian locality (Nordtirol, Oberinntal) (HOFMANN et al. 1995: 225) and from southern France (massif de la Vanoise) (ASTA, CLAUZADE & ROUX 1976). Both specimens could not be located in GZU and in MARSSJ.



Fig. 5: Known world distribution of *Verrucaria perquisita*.

Additional specimens examined: AUSTRIA: Steiermark, Niedere Tauern, Wölzer Tauern, Kasofen 2 km N von Pusterwals, W-exponierte Marmorwand direct unter dem Gipfel („Stinkmarmor“), MTB 8652/3, 1860-1890 m, auf recht trockenem vertikalem Fels, 17 Sept. 1993, A. Wilfling 561 & M. Möslinger (GZU). – GREAT BRITAIN: Scotland: VC 97, Westernness, Ben Alder Forest, Aonach Beag, Coire Cheap, c. 1000 m, July 1981, O. L. Gilbert, B. Fox & O. W. Purvis (E); VC 98, Argyll Main, Loch Creran, E ridge of Ben Sgulaire on mica-schist/metamorphosed limestone, grid 27/027.450, 525 m, 9 July 1994, A. M. Fryday 6098 & R. Leishman (E). – NORWAY: Nordland, Korsakselven: Stegen, s. d., J. M. Norman s. n. (BG L-54088, as “*Trimmatothele posterior* Norm.”). – SWEDEN: Härjedalen, Tännäs par., Mt Mittåkläppen, on the steep eastern slope, 1100-1200 m, regio alpina, 2 Sept. 1970, R. Santesson 22598 (UPS); Torne Lappmark, Jukkasjärvi par., Kopparåsen, 650 m, regio alpina, on calcareous slate, 1 Aug. 1921, A. H. Magnusson 6114a (BG, UPS).

Oevstedalia Ertz & Diederich gen. nov.

Thallus gelatinosus, translucens, nitens, homoiomerus, sine cortice aut medulla. Perithecia rufa, immersa, erumpescentia, nitida, subglobosa, ostiolata, pariete hyalino ad pallide rufo, e textura intricata. Centrum I-, K/I-. Pseudoparaphyses numerosae, longae, ramosae, anastomosantes. Paraphyses sparsae, tenuissimae, ramosae et basim anastomosantes, apicaliter non amplificatae. Asci subcylindrici, grandes, tenuitunicati, I-, K/I+ caerulei. Ascospores octonae, ascoconidia numerosa procreantes. Ascoconidia hyalina, aseptata, oblonga ad ellipsoidea, levia, tenuitunicata.

Type species: *Oevstedalia antarctica* (C. W. Dodge) Ertz & Diederich.

Etymology: The new genus is dedicated to Dag Olav Øvstedal (Bergen), explorer of the lichens of Antarctica and author of the recent *Lichens of Antarctica and South Georgia: A Guide to Their Identification and Ecology* (ØVSTEDAL & LEWIS-SMITH 2001), who kindly sent us his material of *O. antarctica*, together with notes on the ascoconidia, and helped us to rediscover the type of *Trimmatothele perquisita*.

Thallus gelatinous, translucent, shiny, homoiomerous, without a differentiated cortex or medulla. Photobiont a unicellular alga. Perithecia pale to medium reddish brown, immersed to erumpent, shiny, subspherical or slightly taller than wide, ostiole poorly differentiated. Perithecial wall hyaline to pale reddish brown, of textura intricata, ostiolar canal indistinct. Centrum I-, K/I-. Periphyses indistinct. Pseudoparaphyses developing on the upper and lateral perithecial wall, numerous, relatively long, branched, anastomosed. Interascal filaments present at maturity, but often sparse, very thin, branched and anastomosed in the lower part, more or less straight and unbranched above, apically not enlarged. Asci subcylindrical, very large; wall thin, including at the apex, without any visible apical structures, I-, K/I+ blue. Ascospores 8 per ascus, producing numerous ascoconidia at a very early stage of development, resulting in 8 conidial “balls” surrounded by a thin membrane, only visible in living asci of recently collected specimens; membrane disintegrating in K, absent in dead asci; conidiogenesis not observed. Ascoconidia hyaline, aseptate, oblong to ellipsoidal, smooth, thin-walled, filling the entire dead ascus. Pycnidia not observed.

The new genus is clearly distinguished from *Verrucaria* by a different photobiont, pale perithecia without an involucrellum, a differently organized perithecial wall, the presence of sparse interascal filaments at maturity, a different ascus type, different iodine reactions and the formation of ascoconidia. Both definitely belong to different orders of ascomycetes.

We wondered if the type species of *Oevstedalia* could be included in *Thelocarpon* Nyl., a genus with very variable ascomatal characters, and with multispored asci (POELT & VĚZDA 1977). We studied fresh material of a number of *Thelocarpon* species and concluded that that genus is distinct. Examination of living asci of these *Thelocarpon* species convinced us that they are truly multispored, and that the ascospores do not represent ascoconidia accumulated in “balls”. Furthermore, ascomata of *Thelocarpon* are considered to be apothecia with a sometimes very reduced and punctiform disc, resulting in perithecioid ascomata; those of *Oevstedalia* appear to be true perithecia; according to KIRK et al. (2001), *Thelocarpon* is now included in the Acarosporaceae, an apothecioid family comprising some species with a punctiform disc. However, some specialists of this group have clearly demonstrated that the genus belongs to a distinct family, the Thelocarpaceae (HAFELLNER 1995, NAVARRO-ROSINÉS, ROUX & BELLEMÈRE 1999). There are other differences between both genera. Perithecioid ascomata of *Thelocarpon* species are typically less than 200 µm diam., much smaller than those of *Oevstedalia*. *Thelocarpon* species are usually non-lichenized or lichenized with chlorococcoid algae and their thallus is extremely reduced, often represented by a few algal cells surrounding the ascoma; some species of *Thelocarpon* preferentially overgrow cyanobacterial films or crusts, without forming with them a stable relationship; *Oevstedalia* is lichenized with unicellular algae, forming a large and relatively thick thallus.

We compared *Oevstedalia* with *Epigloea* Zukai (Epigloeaceae, family inc. sed.) (DAVID 1987, DÖBBELER 1984). Species of *Epigloea* all grow over algal films, but are not considered to be lichenized. Asci of *Epigloea* are typically thin-walled, 8-, 16- or 32-spored, some having even a larger number of spores per ascus; the asci have been studied in detail by DAVID (1987). Interascal filaments are present, very thin, basally branched and anastomosed. The genus *Epigloea* is distinguished from *Oevstedalia* by the presence of distinct, large ostioles that are easily visible under the binocular microscope, the absence of pseudoparaphyses, the septate ascospores, the absence of ascoconidia, and many of them have ascospores with apical appendages. We consider that most of these differences are of a minor importance at family level, and for some time we wondered if we should include the new genus *Oevstedalia* within the Epigloeaceae. However, the poorly differentiated ostiole and the presence of abundant pseudoparaphyses in *Oevstedalia* led us to regard the genus as of uncertain affinities. Molecular studies of both genera would be most welcome to support or reject the inclusion in that family.

Interestingly, *Oevstedalia* is the first known genus of lichens producing ascoconidia. The term ascoconidia has often been used for different kinds of situations, and many authors did not distinguish multispored asci from “polyconidiate” asci (MARTENS 1937). HAWKSWORTH et al. (1995) defined ascoconidia as ‘a conidium formed directly from the ascospore, esp. when still within the ascus’. BARAL (1999) realized that two sharply distinct cases can occur, but that they can only be distinguished within living asci. Case 1 refers to ‘conidia produced from ascospores within the living premature asci; each ascospore together with its ascoconidia is surrounded by a delicate membrane, forming more or less distinct “balls” when the ascus attains maturity. These balls are violently ejected as single entities, but they disintegrate when the asci are killed prior to discharge’. Case 2 refers to conidia produced on ejected ascospores or rarely on ascospores within dead asci; they are never arranged as “balls”. BARAL (1999) redefined the term ascoconidia to refer only to case 1. The recognition of true ascoconidia sensu BARAL (1999) is impossible with dead herbarium material. During the preparation of this paper, we did not have any fresh material of *Oevstedalia antarctica* at our disposal. However, one of us (P. Diederich) was lucky to receive a 12 month old collection of the species from A. Aptroot in 1991, and a subsequent examination showed that the asci were still alive and contained each 8 conidial balls. After adding 5 % KOH to the microscopical preparation, the membrane surrounding the balls disintegrated, and the asci were entirely filled with ascoconidia. Recent re-examination of the specimen resulted exclusively in the observation of dead asci without any conidial balls. In 1997, Dag Olav Øvstedal contacted P. Diederich, as he made the same observation in another specimen (R. I. Lewis-Smith 10133), and he kindly put the material at our disposal. His draft drawings accompanying the specimen indicate asci filled with eight 1-2-seri-

ate conidial balls, and also a conidial ball with the membrane disintegrating and releasing the ascoconidia; his discovery was shortly mentioned in ØVSTEDAL & LEWIS-SMITH (2001). Unfortunately, we are not able to present any photograph or accurate drawing of this situation, but the independent discovery of the conidial balls in *O. antarctica* by two persons leaves no doubt about that observation. True ascoconidia were known in a number of non-lichenized species of ascomycetes (BARAL 1999, BARAL & MARSON 2001), some within genera also including species without ascoconidia, but have never been observed in other lichens yet.

***Oevstedalia antarctica* (C. W. Dodge) Ertz & Diederich comb. nov.**

Figs. 6–7

Trimmatothelopsis antarctica C. W. Dodge, Nova Hedwigia 15: 302, 1968. – Type: Adelaide Island, 67°46' S, 68°54' W, lignicole, at coast, 1963, G. Follmann 14173 (FH-Dodge – lectotype, here designated).

Thallus pale reddish brown, gelatinous, translucent, shiny, continuous or areolate, with an uneven surface, homoiomerous, without a differentiated cortex or medulla, hyphae I- (Fig. 6a-b). Photobiont an unicellular alga, with subspherical cells of 6.5–14 µm diam., in colonies of c. 4–8 cells surrounded by a gelatinous sheath, cells I+ red, K/I+ red, gelatinous sheath I-, K/I- (Fig. 6c-d); sometimes accompanied by other species of algae and cyanobacteria. Perithecia pale to medium reddish brown, initially immersed, erumpent, semi-immersed when mature, shiny, subspherical or slightly taller than wide, (250)300–400 µm diam. (Fig. 6b). Perithecial wall pale reddish brown in the upper, exposed part, almost hyaline below, basally and laterally 40–80 µm thick, apically up to 110 µm, of textura intricata with cells of 0.7–1 µm diam., K-, I+ red, K/I- (Fig. 6c, e). Pseudoparaphyses up to 35 µm long, 0.8–1 µm diam. (Fig. 6e). Asci subcylindrical, variable in length, when mature up to 250 µm in length and 20–33 µm in diam.; wall usually not more than 1.5 µm thick, including at the apex, I-, K/I+ blue; epiplasm I+ red, K/I- (Fig. 6c, f-g); living asci with 8 conidial “balls” filled with ascoconidia. Ascoconidia I-, K/I-, 3.7–4.5 × 2–2.5 µm (Fig. 6h).

Distribution and ecology. The species is known only from Antarctica where it appears to be endemic (Fig. 7). It has been collected on wood, rocks, detritus and whale bones, and seems to be not rare, and widespread.

Additional specimens examined: SOUTH SHETLAND ISLANDS: Deception Island, Whalers Bay, abandoned Norwegian whaling station on terrace, 150–200 m SSE of explosives hut and 25 m from sea, 60°33'30"W, 62°59'01"S, on whale bones, 29 Dec. 1990, W. O. van der Knaap 32-04 (hb Aptroot, hb Diederich); Livingston Island, South Bay, Caleta Espanola by base, 62°39.7' S, 60°23.3' W, 50 m, sedimentary bedrock, detritus in vertical shaded rock crevice, 25 Jan. 1998, U. Søchting US 7699 (C). – CONTINENTAL ANTARCTICA: Victoria Land, Edmonson Point, valley below glacier in North Valley, 74°20' S, 165°08' W, 50 m, 9 Jan. 1996, R. I. Lewis-Smith 10133 (AAS).

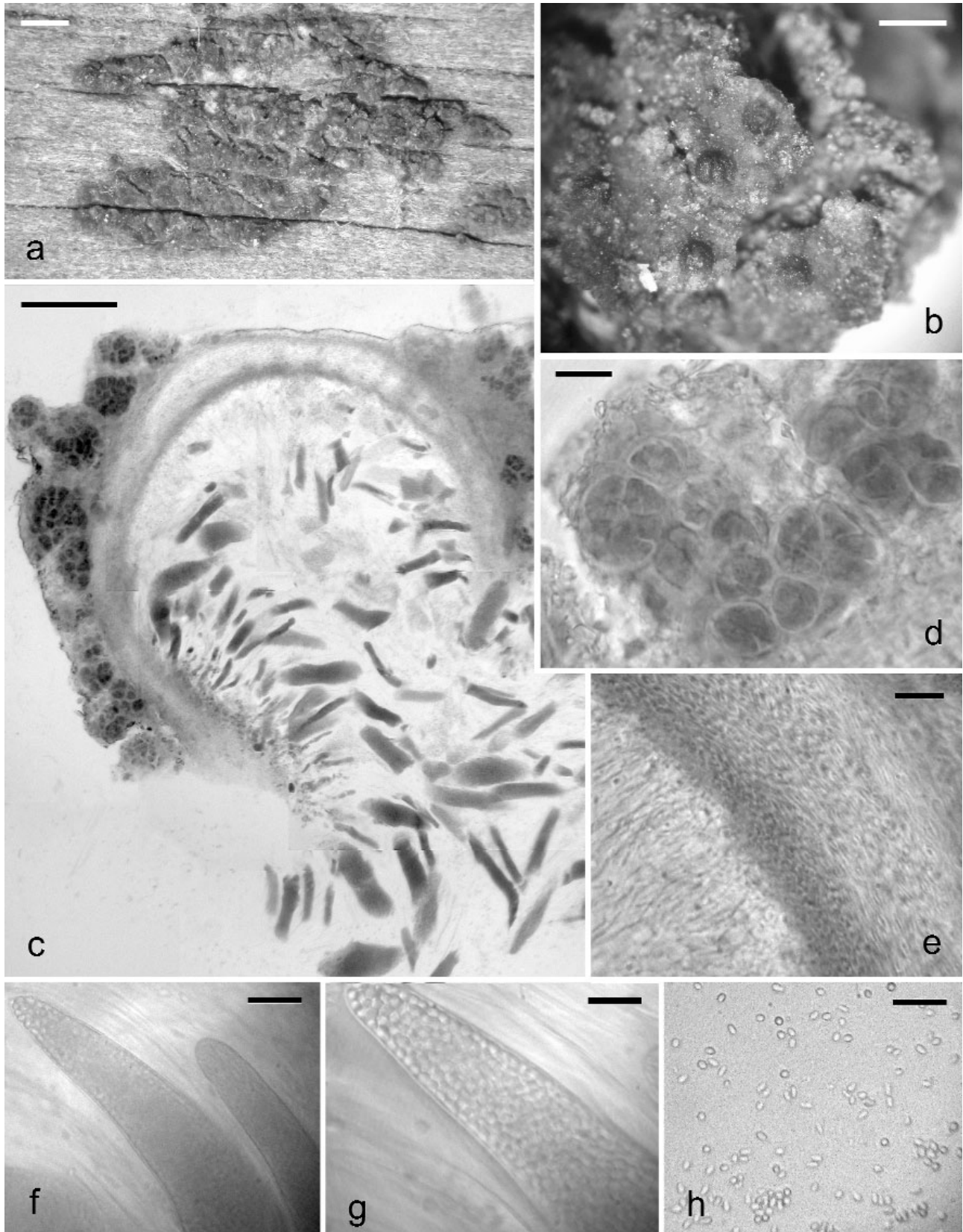


Fig. 6: *Oevstedalia antarctica*. **a**, thallus with immersed perithecia growing on wood; **b**, thallus with several perithecia at a higher magnification; **c**, section through a perithecium, showing the surrounding thallus with the phycobiont (absent in the ostiolar region), the subhyaline wall, and numerous asci [note that the perithecial wall is broken in the lower right part]; **d**, photobiont; **e**, detail of upper part of perithecial wall, and pseudoparaphyses; **f-g**, dead asci filled with numerous ascoconidia, showing the entirely thin ascus wall, and indistinctly interascal filaments; **h**, ascoconidia. (A, lectotype; B-H, W. O. van der Knaap 32-04). Scales: a = 1 mm; b = 0.5 mm; c = 100 μ m; d-e = 20 μ m; f-h = 10 μ m.



Fig. 7: Known world distribution of *Oevstedalia antarctica*.

Doubtful and excluded taxa

Acarospora fuscata f. *glacialis* (Nilson) Kajanus

Arkiv för Botan. 10 (4): 22, 1911. – *Trimmatothele glacialis* Nilson, Die Flechtenveget. des Sarekgebirges, p. 51, 1907. – Type: not examined.

Following KAJANUS (1911), the type represents a poorly developed specimen of *Acarospora fuscata*. Consequently, we did not study this taxon further.

Acarospora versipellis (Nyl.) Cl. Roux & Nav.-Ros.

Bull. Soc. linn. Provence 53: 152, 2002. – *Verrucaria versipellis* Nyl., Flora 60: 230, 1877. – *Trimmatothelopsis versipellis* (Nyl.) Zschacke, Rabenh. Krypt.-Fl. II, 9 (1:1): 593, 1934. – *Trimmatothele versipellis* (Nyl.) Zahlbr., in Engler & Prantl, Natürl. Pflanzenfam. 1 (1): 56, 1907. – *Endocarpon versipellis* (Nyl.) H. Olivier, Expos. Lich. Ouest France 2: 237, 1902. – *Endopyrenium versipelle* (Nyl.) Boistel, Nouv. Flore Lich. 2: 267, 1903. – Type: France, Maine-et-Loire, La Renaudière, sur un toit abandonné, 1876, Brin (H – holotype, not seen).

The type of this species has recently been studied by NAVARRO-ROSINÉS, ROUX & BELLEMÈRE (1999) and ROUX & NAVARRO-ROSINÉS (2002) who concluded that it belongs to the group of *Acarospora smaragdula*, and that the genus *Trimmatothelopsis* Zschacke (type species: *T. versipellis*) has consequently to be considered as a synonym of *Acarospora* A. Massal. A new generic name, *Polysporinopsis* Vězda has recently been introduced for the *A. smaragdula* group (VĚZDA 2002). If this genus is accepted as distinct from *Acarospora*, then the earlier name *Trimmatothelopsis* should replace *Polysporinopsis*.

Lesdainea Harm., in Bouly de Lesdain

Rech. Lich. de Dunkerque, p. 259, 1910. – Type species: *L. maritima* B. de Lesd.

This name was often said to be a synonym of *Trimmatothele*. However, as the species of *Trimmatothele* and *Trimmatothelopsis* proved to be a heterogeneous assemblage of several non-related taxa, and as the type of *Lesdainea* differs considerably from the type of *Trimmatothele* (see below), it is not wise to synonymize both genera as long as no new collections of *L. maritima* become available. Likewise, the genus is not a synonym of *Oevstedalia* (see below).

Lesdainea maritima B. de Lesd.

Rech. Lich. de Dunkerque, p. 259, 1910. – *Trimmatothele maritima* (B. de Lesd.) Zahlbr., in Engler, Natürl. Pflanzenfam., ed. 2, 8: 67, 1926. – Type: France, Nord, ‘Dunkerque près le port, sur un morceau de merne’ (type: destroyed; MARSSJ –).

Lesdainea maritima var. *nigricans* B. de Lesd.

Rech. Lich. de Dunkerque, p. 260, 1910. – Type: France, Nord, ‘Malo, dunes, sur une brique, en compagnie de *Bacidia inundata*’ (type: destroyed; MARSSJ –).

The variety *nigricans* was said to differ from *L. maritima* s. str. by a blackish thallus (versus brownish black) and black ascomata (versus brown) (BOULY DE LESDAIN 1910). As both taxa were collected very close to each other, it is evident that they both represent the same species, and that the small differences noted by the author just reflect the variability of the species, possibly due to the growth on different substrates or in different conditions of luminosity.

BOULY DE LESDAIN (1910) gave a relatively complete description of the species: Thallus thin, indeterminate, brownish black to black; photobiont unicellular; ascomata globose, 0.3–0.4 mm, not or slightly papillate, with a pore-like opening, brown to black; hymenial gel I-; paraphyses absent; asci numerous, inflated in the middle, attenuated towards the base and the apex, 174–178 μm long; ascospores very numerous, aseptate, hyaline, oblong, apically rounded, 2-guttulate, 3.5–4 \times 2 μm .

This is not *Verrucaria perquisita*, as the asci are 174–178 μm long (versus 40–60 μm in *V. perquisita*) and inflated in the middle, and the ascospores 3.5–4 \times 2 μm (larger in *V. perquisita*) and very numerous. It is also very unlikely that *L. maritima* belongs to *Verrucaria*.

Moreover, *Lesdainea maritima* is unlikely to belong to *Oevstedalia*, as the perithecia of *L. maritima* are said to be brown to black (instead of pale to medium reddish brown in *Oevstedalia*), paraphyses are absent (present, but sparse in *Oevstedalia*), and the hymenial gel is said to be I-, and thus it is likely that the asci observed by Bouly de Lesdain were also I- (asci K/I+ blue in *Oevstedalia*).

Rediscovery of new material will allow to assess the taxonomic position of this lichen.

Trimmatothele umbellulariae Herre

The Bryologist 15: 82, 1912. – Type: USA, California, in the hills of Berkeley, alt. c. 125 m, on bark of living *Umbellularia californica*, Herre ? (type lost [‘Type in the author’s herbarium.’]: ASU-, B-, F-, H-, MIN-, PH-, UPS-, W-).

HERRE (1912) stated that ‘the specimens of this almost unnoticeable lichen are very scanty’. Unfortunately, the type specimen could not be located, and the species has never been recollected after its description. Following this description, the thallus forms a very thin, greyish, dusky, very obscure, effuse patch; perithecia are 0.1–0.3 mm, black, conical to hemispherical, dimidiate; paraphyses absent; asci ‘not plainly evi-

dent'; ascospores 'exceedingly numerous', aseptate, oval to shortly ellipsoid, hyaline, I- (yellowish), $2.5-3 \times 2-2.5 \mu\text{m}$.

This species surely doesn't belong to *Oevstedalia*, because of the black, dimidiate perithecia, and the absence of paraphyses s.l. The inclusion in *Verrucaria* is also unsure in the absence of any specimen, and as the 'exceedingly numerous' ascospores give the impression of a much larger number of ascospores per ascus than in *Verrucaria perquisita*. Furthermore, *T. umbellulariae* is corticolous, a habitat rarely occupied by members of the Verrucariaceae.

Acknowledgements

We wish to thank very warmly Dag Olav Øvstedal for putting at our disposal his material of *Oevstedalia antarctica*, for communicating us his discovery of ascoconidia in this material, and for helping us to locate the type of *Coniothele perquisita*, the curators of the herbaria mentioned under Material and Methods for the loan of specimens in their care, the curators of ASU, F, H, MARSSJ, MIN and W for searching for additional specimens and lost types, Lucien Hoffmann and Pierre Com-père for checking the photobiont of *Oevstedalia antarctica*, Alois Wilfling for allowing us to publish his excellent drawing of a perithecial section of *Verrucaria perquisita*, and Orvo Vitikainen for helping us with a nomenclatural problem.

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Accepted: 29.3.2004