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NOTES ON BRITISH LICHENICOLOUS FUNGI: V*

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ABSTRACT. Notes on 11 taxa are presented. *Dacampia rufescentis* (Vouaux) D. Hawksw., *Epicladonia stenospora* (Harmand) D. Hawksw., *Lecidea inquinans* (Tul.) Nyl., *Lichenostigma maureri* Hafellner, and *Polycoccum epicrassum* (H. Olivier) R. Sant. are reported from the British Isles for the first time. The remarkable new genus *Weddellomyces* D. Hawksw. is described for *W. epicallopismum* (Weddell) D. Hawksw., a parasymbiont of lobate *Caloplaca* species characterized by ascomata which have a cephalothecoid structure above, breaking up to form an irregular pore through which the ascospores are discharged; the genus belongs to the Dothideales and is tentatively referred to the Pyrenidiaceae. *Nectria indigens* (Arnold) Rehm, *Verrucaria aspiciliicola* R. Sant. and *Weddellomyces epicallopismum* are all confirmed as present in the British Isles. In addition, the new combination *Pyrenidium hetairizans* (Leighton) D. Hawksw. is made, descriptions and illustrations are provided for *Scutula krempelhuberi* Körber and *Stigmidium solorinarium* (Vainio) D. Hawksw., and *Epicymatica thallophila* (Cooke) Sacc. is shown to be a later synonym of *Anisomeridium biforme* (Borrer) R. C. Harris.

Since the publication of the previous part of this series (Hawksworth, 1982), a key for the identification of 218 fungi known to occur on lichens in the British Isles has been published which includes illustrations of the spores of 141 species (Hawksworth, 1983a). Other recent publications pertinent to studies of British lichenicolous fungi are a key to the lichenicolous *Nectriella* species included in Hawksworth (1983b), and the discovery that *Pyrenidium* Nyl. provides an earlier generic name for *Dacampiosphaeria* D. Hawksw. (Hawksworth, 1983c) and that *Plectocarpon* Fée is an earlier name for *Lichenomyces* Trevisan (Hawksworth & Galloway, 1984). Notes on several lichenicolous lichens and fungi are included in the checklist of Santesson (1984a), and all lichenicolous ascomycetes recorded in the British Isles are included in the catalogue of Cannon, Hawksworth & Sherwood-Pike (1985). It is also particularly pleasing to record the start of a most important exsiccate of lichenicolous fungi 'Fungi lichenicoli exsiccati' (Santesson, 1984b), the first two fascicles of which include 50 species; critical notes are included on the labels of many of the specimens included.

Dacampia rufescentis (Vouaux) D. Hawksw., **comb. nov.** Fig. 1.
Syn.: *Pleospora rufescentis* Vouaux in Bull. Soc. mycol. Fr. 29:124 (1913).

Fungus forming decolourized circular necrotic patches 2–3mm diam. on the thallus of the host, centre of the infected area bluish-grey and becoming slightly raised in bullate mounds, margin delimited by a dark brown zone extending to 0·5μm into the thallus. *Ascomata* scattered over the raised centre of the infection spots, up to 30 present in a single spot, tending to be arranged in concentric rings; perithecioid, immersed with

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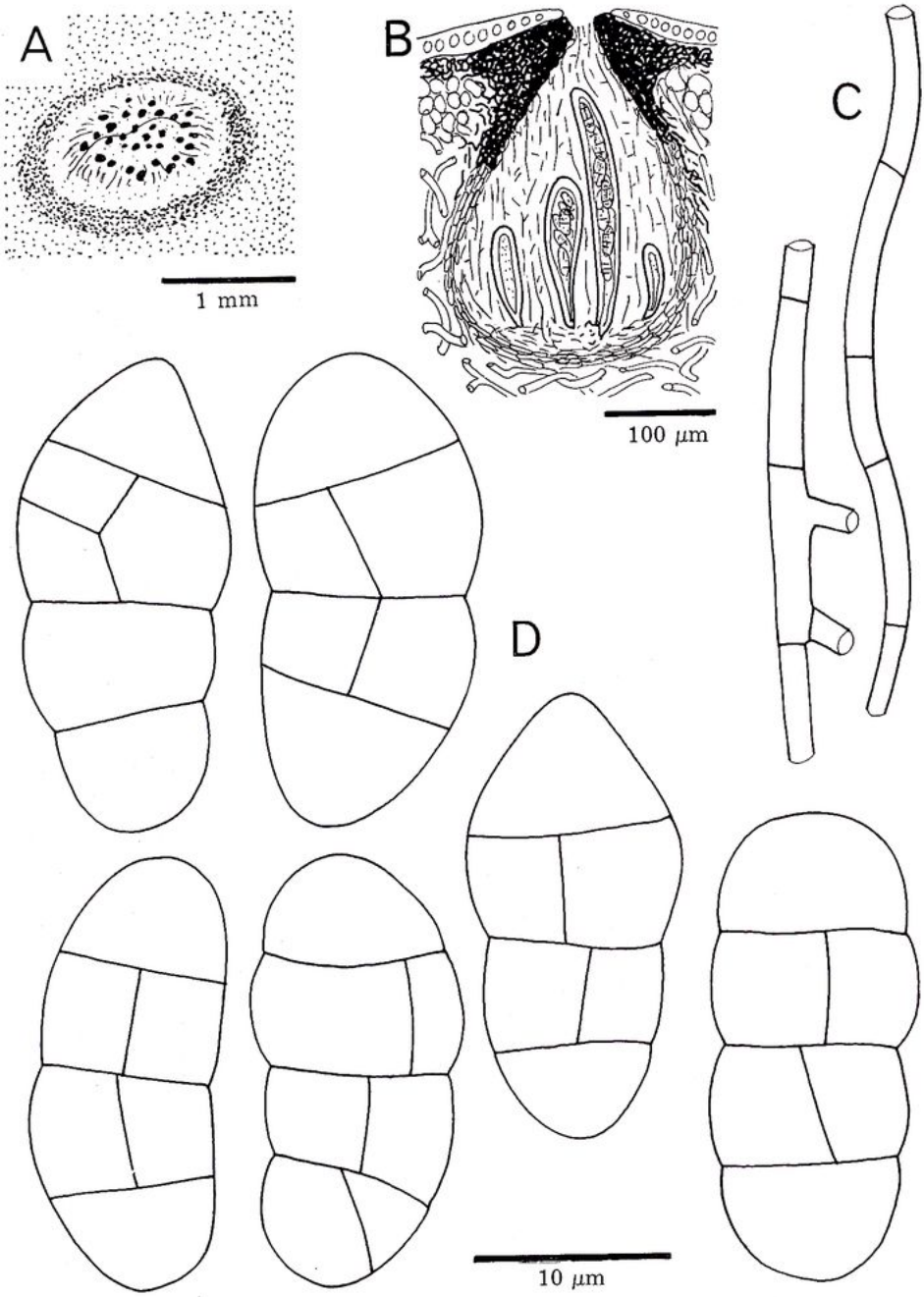

FIG. 1. *Dacampia rufescentis*. A, necrotic infection spot with immersed ascomata on *Peltigera rufescens* thallus; B, vertical section of ascoma; C, cellular pseudoparaphyses; D, ascospore outlines. From IMI 277765.

only the ostiolar region visible, black when viewed from above and the emergent region 50–70μm wide; ascomata in vertical section subglobose to obpyriform, 150–250μm thick but increasing to 40μm in thickness in the immediate vicinity of the ostiole, prosoplectenchymatous, composed of strongly radially compressed cells mainly 8–12 × 3–5μm, ± hyaline to brownish and unevenly pigmented in the lower parts, becoming thick-walled, ± subglobose, dark brown and 5–8μm diam. near the ostiole; centrum not turning blue with iodine. *Hamathecium* consisting of pseudo-paraphyses, branched and anastomosing, frequently septate, 2–2·5(–3)μm wide, extending into the ostiolar canal. *Asci* elongate-clavate to sub-cylindrical, thick-walled, bitunicate in structure, apex strongly thickened in potassium hydroxide but lacking a well-defined internal apical beak, presumably fissitunicate, 100–150 × 20–25μm, 8-spored. *Ascospores* distichously arranged in the asci, broadly ellipsoid, usually broadly rounded at the apices but the upper occasionally slightly attenuated, with 3 transsepta (1 A-transsepta; 2 B-transsepta), 1–2 longisepta, and rarely 0–1 angular septa in the basal cell, usually somewhat constricted at all transsepta, golden brown, smooth-walled, (23–)24·5–27 × 11–13μm.
ENGLAND. North Yorkshire, Swaledale, Keld, on *Peltigera rufescens* (Weis) Humb. thallus, 7 v 1983, *M. C. Clark* (IMI 277765).

This species is a parasite of *Peltigera rufescens* forming distinctive decolourized circular patches. The very full description given by Vouaux (loc. cit.) leaves no doubt that the British collection belongs to the same species, although he did note that ascospores with up to 5 transsepta were rarely seen. Vouaux's material came from a collection of *P. rufescens* made in northern France (Malo-Centre) by Dr Bouly de Lesdain.

Vouaux's fungus was subsumed under the species now called *Leptosphaerulina peltigerae* (Fuckel) Riedl by Keissler (1930: 510). Doubt as to this was expressed by Hawksworth (1980: 376), who illustrated *L. peltigerae*; that fungus has no hamathecial tissues, and hyaline to pale brown ascospores which are much narrower, (18–)20–24 × 6·5–7·5μm. It has not so far been discovered in the British Isles.

The genus *Dacampia* Massal. was re-instated by Eriksson (1981: 53–54) and included two species as treated by Crivelli (1983: 192–196); *D. engeliana* (Sauter) Massal. and *D. hookeri* (Borrer) Massal. (syn. *Pleospora hookeri* (Borrer) Keissler). In *D. hookeri* the ascospores are 30–36 × 11–16μm and usually have 4–5 transsepta and rather attenuated apices (illustrated in Hawksworth, 1975: 197); this species occurs on an unidentified white crustose lichen in the Scottish Highlands, especially on Ben Alder. The ascospores of *D. engeliana*, which occurs on the thalli of *Solorina saccata* and has not so far been found in the British Isles, are rather similar in size to those of *D. rufescentis* but tend to be slightly narrower (19·5–27 × 8–10μm fide Crivelli, loc. cit.; 24·5–28 × 10–11μm in Rehm, Ascomyceten no. 1516, K), mainly with 4 transsepta, and more attenuated apically (Fig. 2). In addition *D. engeliana* has much larger ascomata (200–600μm diam.) with evenly thickened and pigmented ascoma walls which are to $\frac{1}{3}$-exposed, and appears to be a relatively mild parasite or parasymbiont as it does not form necrotic patches on its host.

It should be noted that records of *D. hookeri* from lichens other than

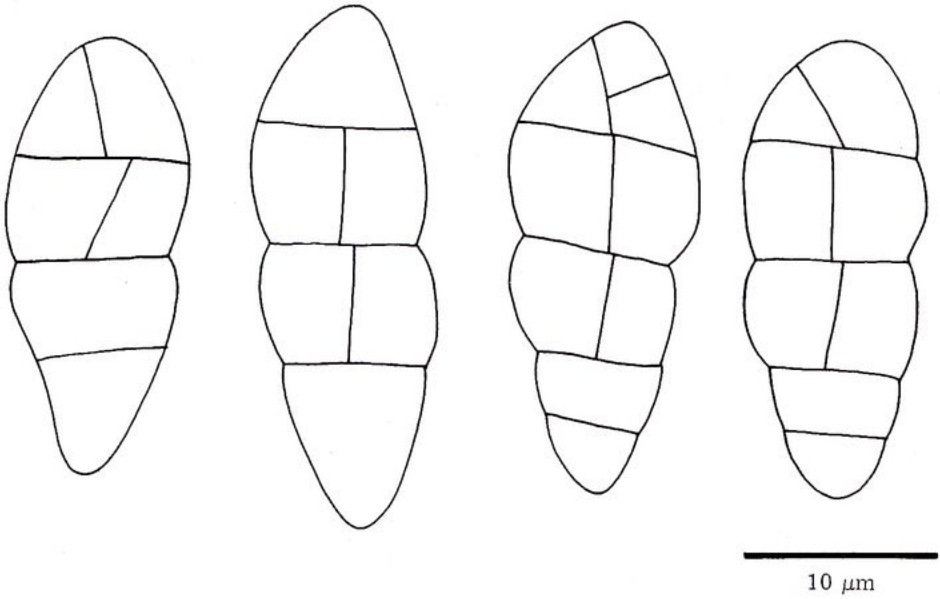

FIG. 2. *Dacampia engeliana*. Ascospore outlines. From Rehm, Ascomyceten no. 1516 (K).

the upland white crustose species require re-examination as this species was evidently much too broadly circumscribed by Wehmeyer (1961).

Epicladonia stenospora (Harmand) D. Hawksw. in Bull. Br. Mus. Nat. Hist. (Bot.) 9:20 (1981).
SCOTLAND. E Sutherland, c.6km NSW of Dornoch, Cuthill Links, on basal squamules of *Cladonia* cf. *chlorophaea*, 21 viii 1983, *B. J. Coppins et al.* 9835 (E).

This species, which was described and illustrated by Hawksworth (1981: 20–22), occurs on *Cladonia* squamules in Austria and France but has not previously been reported from the British Isles.

Epicymatia thallophila (Cooke) Sacc., Syll. Fung. 1:572 (1882).
Syn.: *Sphaeria thallophila* Cooke, Handb. Br. Fungi: 872 (1871).
Psilosphaeria thallophila (Cooke) Stevenson, Mycol. Scot.: 388 (1879).
Sphaerella thallophila (Cooke) Cooke in Grevillea 18:79 (1890).
SCOTLAND. Perthshire, Glenshee, 3 viii 1856, *W. L. Lindsay* (holo. E).

This fungus was said by Cooke to occur on the thallus of '*Lecanora subfusca*' (i.e. *L. chlarotera* Nyl.). Examination of the holotype by Dr B. J. Coppins established that this supposedly lichenicolous fungus is the common corticolous lichen *Anisomeridium biforme* (Borrer) R. C. Harris growing in association with *L. chlarotera* on bark (probably *Fraxinus*).

Uncertainty about Cooke's taxon was expressed by Watson (1948) who summarizes other reports of this fungus, most of which probably refer to *Stigmidium dispersum* (Lahm ex Körber) D. Hawksw.

Lecidea inquinans (Tul.) Nyl. in Actes Soc. linn. Bordeaux 21:391 (1856).
Syn.: *Abrothallus inquinans* Tul. in Ann. Sci. nat. (Bot.), sér. 3, 17:117 (1852).
Nesolechia inquinans (Tul.) Massal., Misc. lich., 43 (1856).
SCOTLAND. E Inverness, Drumnadrochit, SW of Divach, 100ft, on *Baeomyces roseus*, 24 vi 1976, *B. J. Coppins* 3914 (E).

This species, which occurs on the thalli of *Baeomyces roseus* Pers., was subsumed under *Lecidea puncta* (Massal.) Jatta by Keissler (1930: 126), a species inhabiting *Cladonia* squamules and perhaps also present on *Cetraria islandica* (L.) Ach. These two species do, however, differ according to Clauzade & Roux (1976: 48) in that *L. inquinans* has larger apothecia (0·3–0·4mm) and wider ascospores (9–13 × 4–7μm) and a hymenium turning blue (not blue then wine red) with iodine. *L. inquinans* has not previously been reported from the British Isles.

Lichenostigma maureri Hafellner in Herzogia 6:301 (1982).
See Hafellner (1982) for description and illustrations.
SCOTLAND. Easterness, Rothiemurchus Forest, Allt Druidh, on *Pseudevernia furfuracea* (L.) Zopf, 1977, *B. J. Coppins & L. Tibell* (E, S).

This recently published genus and species has minute arthonioid ascomata 70–120μm diam. and brown 1-septate ascospores 9–12 × 4·5–6μm. It occurs on the thalli of *Pseudevernia* and *Usnea* species and can now be reported for the British Isles for the first time. *Lichenostigma maureri* appears to be widespread, particularly in Europe.

Nectria indigens (Arnold) Rehm, Ascomyceten no. 85 (1871). Fig. 3.
Syn.: *Secoliga indigens* Arnold in Flora, Jena 53:121 (1870).
?*Nectria verrucariae* Vouaux in Bull. Soc. mycol. Fr. 28:186 (1912).

Ascomata perithecia, superficial, arising singly or in groups of 2–3 on a whitish subiculum, globose, the ostiole slightly papillate, pale orange to brownish orange, 150–250(–350)μm diam.; ascoma walls composed of compressed pseudoparenchymatous cells mainly 5–8μm wide. *Hamathecium* absent. *Asci* subcylindrical, unitunicate, apex scarcely thickened and lacking any annular structure, 60–70 × 7·5–9μm, 4(–8)-spored. *Ascospores* distichously to almost uniseriately arranged in the asci, broadly ellipsoid, rounded to somewhat attenuated at the apices, hyaline, 1-septate, cells ± equal in size, walls with a minutely verruculose ornamentation, (13–)15–18(–19) × 7·5–9μm.

AUSTRIA. Tirol, Serlos-Wandem, 'auf Kalksteingerolle', on dead pyrenocarpous lichen, viii 1871, *F. G. C. Arnold* [Rehm, Ascomyceten no. 85.] (K).
SCOTLAND. W Sutherland, east side of Loch Eriboll, Ard Neackie, alt. c.20m, on moribund *Polyblastia cupularis* Massal. on limestone, 30 viii 1984, legit. V. Winchester, *Coppins* 10361 (IMI 293874).

Nectria indigens was mentioned from the British Isles by Watson (1948: 316) who reported that 'a specimen with a pale red apothecium which was collected at Dartington, Devon, was placed here by Keissler', but this

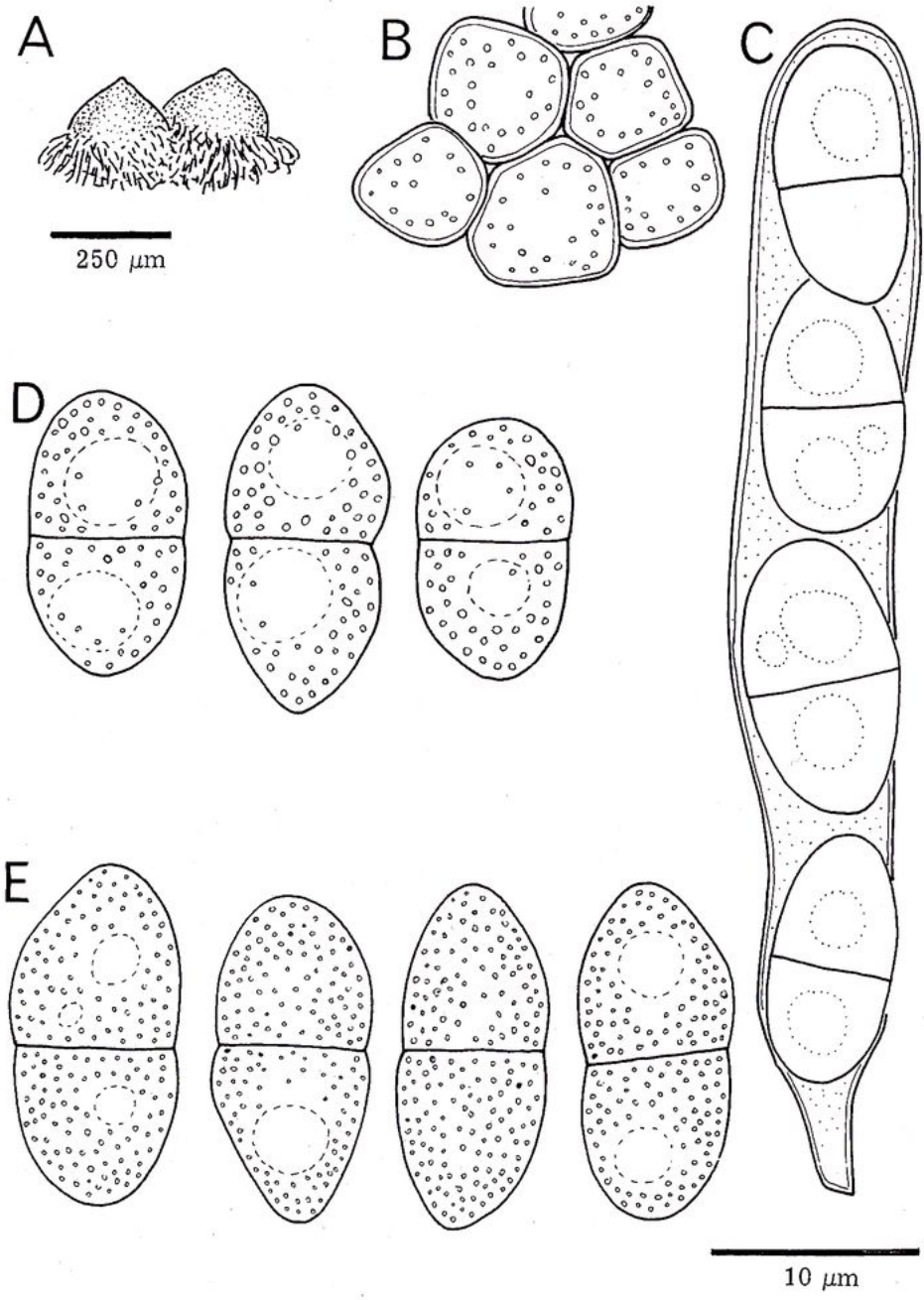

FIG. 3. *Nectria indigens*. A, perithecioid ascomata on the thallus of a pyrenocarpous lichen showing the basal hyphal subiculum; B, surface view of cells of the peridium; C, ascus containing four ascospores; D–E, ascospores. A & E from Rehm, *Ascomyceten* no. 85 (K); B–D from IMI 293874.

specimen has not been traced* and the record was consequently treated as doubtful by Hawksworth (1983a: 11). The species can now be confirmed for the British Isles on the basis of the collection from Sutherland cited above which was compared with authentic material of this species from Austria distributed by Rehm. This species is known to produce 4- and 8-spored asci, the latter illustrated by Vězda (1970: 225) from material growing on an unidentified *Polyblastia* in Czechoslovakia. In the Scottish collection only 4-spored asci could be found, and the verruculose ornamentation of the ascospores was somewhat more pronounced than in the specimen from Austria, the perithecia of which are also a brighter orange. These minor differences scarcely provide grounds for a separation at species level at our present level of knowledge of the lichenicolous *Nectria* species.

Nectria verrucariae is almost certainly a synonym of *N. indigens* as interpreted here as, according to the original description, the perithecia were described as reddish-orange, 150–200μm diam., the asci as (2–)4(–6)-spored and 59–62 × 9–11μm, with ascospores 17–20·5 × 7μm; the taxon was described from *Verrucaria* on calcareous rocks in northern France.

Mention should also be made here of a further as yet not certainly identified and possible undescribed *Nectria*, collected in Westmorland (Hutton Roof, on sterile crustose lichen on limestone under waterfall, 2 iv 1961, *R. Santesson* 15095, IMI 86678). This has almost completely colourless perithecia 250–300μm diam. immersed in a dense whitish subiculum and smooth-walled ascospores 16–22(–26) × 7–9(–9·5)μm developed in 8-spored asci. The collection is of especial interest in that the ascospores occasionally develop 1 or 2 additional septa. Dried cultures prepared from single ascospores by Dr C. Booth are preserved in IMI; over a period of 6 months on potato dextrose agar these produced hyaline subcylindrical non-septate conidia 4·5–7 × 1·5–2·5μm, often arranged in loose chains, typical of the microconidial states of many non-lichenicolous *Nectria* species.

Polycoccum epicrassum (H. Olivier) R. Sant. in Svensk Bot. Tidskr. 54:504 (1960). Fig. 4.

Syn.: *Buellia epicrassa* H. Olivier in Bull. Acad. internat. Géogr. bot. 15:281 (1905).

Didymosphaeria epicrassa (H. Olivier) Vouaux in Bull. Soc. mycol. Fr. 29:108 (1913).

Buellia supercrassa H. Olivier, Paras. Lich. Fr., Suppl.: 24 (1907) n.v.

ENGLAND. Cornwall, Penhale Sands, on *Squamarina cartilaginea* (With.) P. James thallus, viii 1983, *O. L. Gilbert* (IMI 286819).

ITALY. Toscana, Siena prov., Chianti, c.1km NW of Castello di Brolio, on *Squamarina cartilaginea*, 5 v 1985, *B. J. Coppins et al.* 12000 (E, IMI 298196).

*The packet which formerly contained this specimen, collected from a siliceous stone wall by Watson in September 1935, is present in K but includes only Keissler's letter of 9 ii 1939. Notes indicate the perithecia were less than 300μm diam. and the asci 8-spored but no spore measurements were given.

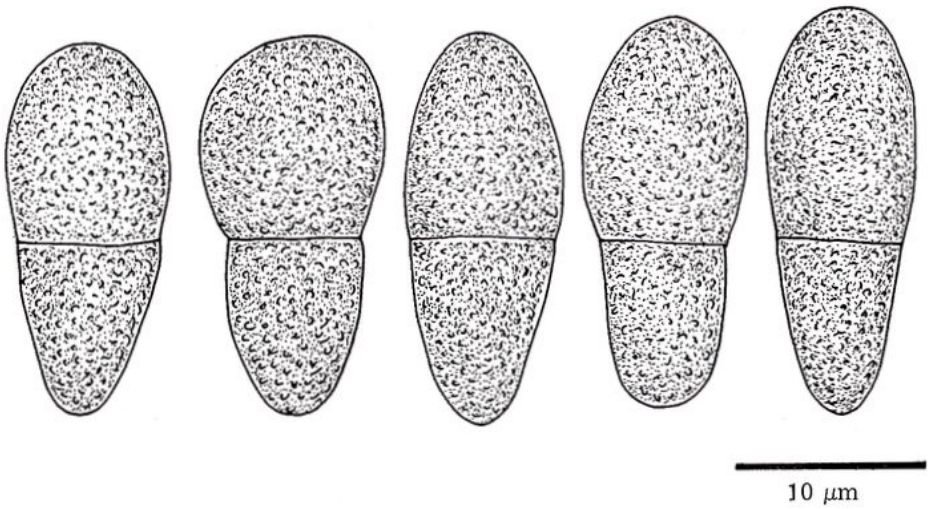

FIG. 4. *Polycoccum epicrassum*. Ascospores. From IMI 286819.

This species, which has not previously been reported from the British Isles, was fully described by Vouaux (loc. cit.) on the basis of two collections on *Squamarina cartilaginea* from France. It has also been found in Morocco (Keissler, 1933), Spain (Santesson, 1960) and Italy (see above). Records from Sweden are errors for *Polycoccum squamarioides* (Mudd) Arnold (Santesson, op. cit.), and a report from Canada on *Placopsis gelida* (L.) Lindsay (Bird *et al.*, 1981) is almost certainly also based on *P. squamarioides* or possibly *P. gelidaria* (Mudd) D. Hawksw.

Polycoccum epicrassum is a parasitic species forming circular necrotic patches to 1·5mm diam. which are delimited by a black ring of tissue, decolourized within the ring, and bearing aggregations of ascomata in the centre of each patch. It can be distinguished from other species in its genus known in the British Isles (see Hawksworth, 1983a) by the rather small ascomata (mainly less than 150μm diam.), 8-spored asci, and especially the very dark olivaceous brown verruculose ascospores with unequal cells; the dimensions of the ascospores in the collection from Cornwall are 19–22·5 × 7–9(–10)μm, but in the Italian collection a few spores up to 26μm long were seen. The species is perhaps closest to *P. squamarioides* which can be distinguished by the relatively longer and narrower ascospores with a more central transseptum and almost completely smooth walls.

Pyrenidium hetairizans (Leighton) D. Hawksw., **comb. nov.** Fig. 5.

Syn.: *Verrucaria hetairizans* Leighton, Lich. Fl. Gr. Br., 462 (1871).
Phaeospora hetairizans (Leighton) Arnold in Flora, Jena 57:151 (1874).
Sphaeria hetairizans (Leighton) M. Olivier, Paras. Lich. Fr., Suppl.: 18 (1907) n.v.

Ascomata arising single, ± immersed, perithecioid, erumpent only in the vicinity of the ostiole, black, 75–100μm diam.; peridium composed of brown subglobose to angular pseudoparenchymatous cells mainly 5–8μm

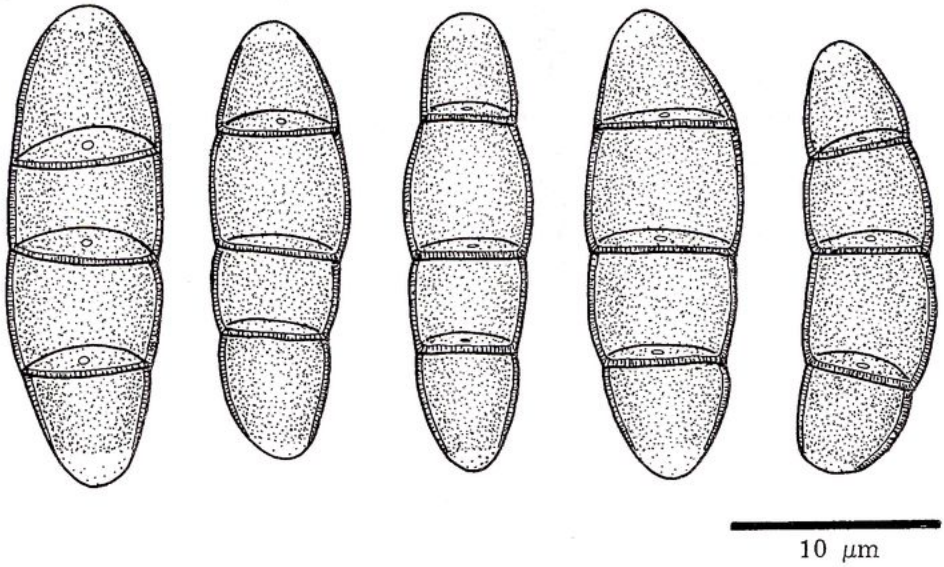

FIG. 5. *Pyrenidium hetairizans*. Ascospores. From the holotype (K—Borrer).

diam. *Hamathecium* consisting of pseudoparaphyses, branched and anastomosing, regularly septate, 2–3 μm thick. *Asci* elongate-clavate, thick-walled, bitunicate in structure, 6–8-spored. *Ascospores* broadly fusiform, rounded at the apices, with 3 transsepta, somewhat constricted at the septa, each septum with a distinct central pore c.1 μm wide, dark reddish brown except at the apices which are ± hyaline, smooth-walled, thick-walled but thinning at the apices, 24–26 × 6·5–9 μm.
ENGLAND. Sussex, on *Verrucaria hydrela* Ach. thallus ['*Verrucaria submersa* E.B.S.' = English Botany Supplement], *W. Borrer* (K-Borrer, holotype of *Verrucaria hetairizans* Leighton).

This species has been retained in *Phaeospora* Hepp ex B. Stein but the discovery of persistent pseudoparaphyses (Hawksworth, 1983a: 8) excludes it from that genus. Further studies on the type material have established that this fungus belongs to *Pyrenidium* Nyl.

This species, first illustrated by Leighton (1851: tab. 26, fig. 3E), is close to *Pyrenidium actinellum* Nyl. (see Hawksworth, 1980, 1983b; Eriksson, 1981: 141), which can be distinguished by the relatively broad ascospores ((19–)20–30(–34) × (7–)8–11(–12) μm), consistently 4-spored asci and larger ascomata ((100–)150–250 μm). In addition, *P. actinellum*, although it has a wide host range, is not known to occur on any member of the Verrucariaceae or in habitats subject to regular submersion.

Pyrenidium hetairizans is known to me only from the original collection and a more complete description must await the discovery of further material.

Attention is also drawn here to the central pores in the transsepta of the ascospores of both *P. actinellum* and *P. hetairizans*. This is a further character supporting the retention of the genus as distinct from *Dacampia*, which Crivelli (1983) mistakenly believed to differ only in ascospore septation.

Scutula krempelhuberi Körber, Parerg. Lich.: 455 (1865). Fig. 6.

Syn.: *Biatorina krempelhuberi* (Körber) Arnold in Flora 57:101 (1874).
Lecidea krempelhuberi (Körber) Stizenb. in Ber. Tät. St. Gall. naturw. Ges. 1880–81: 414 (1882).
Lecidea solorinicola Vainio in Medd. Soc. Fauna Fl. fenn. 10(2):30 (1883).
Scutula solorinaria var. *solorinicola* (Vainio) P. Karsten in Acta Soc. Fauna Flora fenn. 2(6):150 (1885).
Scutula solorinicola (Vainio) Rehm in Rabenh. Krypt.-Fl. 1(3):324 (1890).

Ascomata apothecia, arising singly or in small groups, sessile, slightly constricted at the base, pale fawn at first, becoming darker with age and eventually almost black, plane with a paler exciple when young but

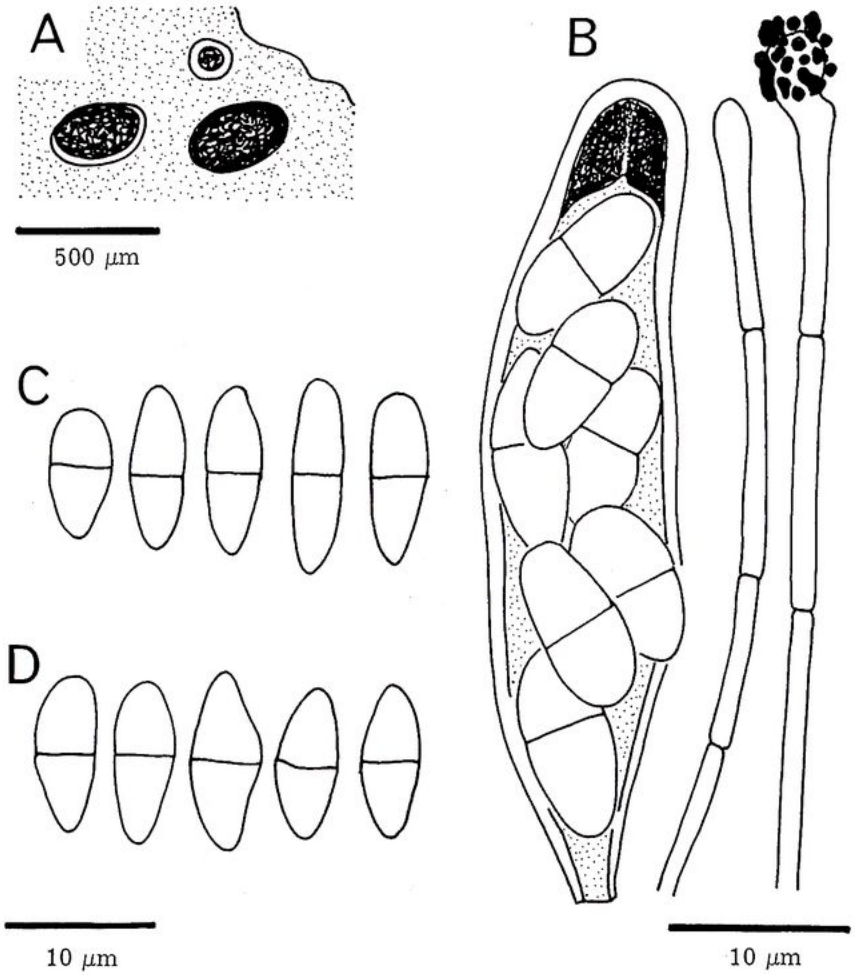

FIG. 6. A–C, *Scutula krempelhuberi*. A, apothecioid ascomata on the thallus of *Solorina saccata*; B, ascus mounted in Lugol's iodine after pre-treatment with potassium hydroxide (tholus turning blue indicated in black) and paraphyses with encrustations; C, ascospores. D, *S. solorinaria*, ascospores. A & C from IMI 253554; B from Vězda, s.n. (BM); D from the holotype (H-NYL 10986).

becoming strongly convex with the exciple ± excluded when mature, (0·25–)0·3–0·5(–0·6)mm diam.; exciple variable in width, hyaline to subhyaline, composed of regularly radiating thick-walled conglutinated hyphae with large lumina, mainly 5–8μm wide; epithecium irregular in development, formed by adherence of tips of the paraphyses, hyaline to brown in parts, mainly 10–15μm tall; thecium hyaline, turning deep blue and then slowly orange-red in iodine, 40–65μm tall; hypothecium hyaline, very variable in height, to 150μm tall, composed of irregularly orientated thick-walled hyphae, mainly 4–6μm wide. *Hamathecium* consisting of paraphyses, erect, filiform, not or sparsely branched near the base or tip, septate, slightly constricted at the septa, hyaline below, mainly 2–3μm wide, the tip expanded and sometimes reddish-brown, 4–6(–9)μm thick, occasionally with dark brown encrustations. *Asci* elongate-clavate to subcylindrical, short-stalked, lecanoralean, the apex thickened, lacking a distinct internal apical beak, the tholus turning blue in iodine, 35–45 × 9–12μm, 8-spored. *Ascospores* irregularly distichously arranged in the asci, narrowly ellipsoid to short-ellipsoid or subfusiform, apices usually rounded but sometimes slightly attenuated, hyaline, 1-septate, not constricted at the septum, cells ± equal in size, smooth-walled, (10·5–)11–14(–14·5) × 3·5–4·5μm.

CZECHOSLOVAKIA. Tatra Minor, Velký Gapel, alt. 1600m, on *Solorina saccata* (L.) Ach. thallus, 10 iv 1958, *A. Vězda* (BM).

FINLAND. Lapponia inarensis, near Köngäs, on *Solorina saccata*, 1878, *E. A. Vainio,* hb. Vainio 22538 (TUR 23871, holotype of *Lecidea solorinicola* Vainio).

GERMANY. Berchtesgaden, on *Solorina saccata, A. von Krempelhuber* (L 910, 213-1087, holotype of *Scutula krempelhuberi* Körber; L 910, 213-1088, isotype).

SCOTLAND. Mid-Perth, Blair Atholl, Tulloch Hill, alt. 410m, on *Solorina saccata* on limestone exposures, 22 viii 1980, *P. B. Topham* (hb. Topham; IMI 253554).

SWEDEN. Härjedalen, Tännäs parish, Mt Hamrafjallet, alt. 800–850m, on *Solorina saccata*, 14 viii 1958, *R. Santesson* 12532 [Santesson, Fungi Lich. exs. no. 38.] (IMI 292410).

Scutula krempelhuberi was first mentioned from the British Isles in the key of Hawksworth (1983a: 23). The species appears to be parasitic, causing the infected areas of the host thallus to become almost bleached. As noted by Santesson (1960: 512), the taxonomy and nomenclature of this species is complex. The species was confused by Keissler (1930: 156–158) who treated all *Scutula*-like fungi on *Solorina* under the name *S. solorinaria* (Nyl.) P. Karsten. In fact *S. solorinaria* is a separate species as already pointed out by Vainio (1934: 477). Examination of the holotype of the last species (FRANCE. 'Alp. Delphinatus, altit. 1300 metr., supra La Grave', on *Solorina bispora* Nyl. thallus, 1860, *W. Nylander*, H-NYL 10986; Fig. 6D) showed *Scutula solorinaria* to differ in the smaller apothecia, 0·15–0·25(–0·35)mm diam., which are entirely black from an early stage, with a more prominent red brown exciple, a less convex disc, the epithecial pigment dense and extending into the thecium, greenish black (not reddish brown), and generally shorter and

broader ascospores with more strongly attenuated apices 10·5–11(–13) × (3·5–)4–5·5μm.

The pigment in the apices of the paraphyses in both *Scutula solorinaria* and *S. krempelhuberi* does not form a neat dark cap on only the upper part of the swollen apical cell such as that seen in *S. episema* (Nyl.) Zopf, a species currently retained in *Catillaria* Massal. and perhaps conspecific with the lichenized *C. athallina* (Hepp) Arnold (Kilias, 1981: 294). *S. krempelhuberi* is consequently best retained in *Scutula* Tul. for the moment, even though that generic name is threatened (Hawksworth, 1980: 382). *Scutula krempelhuberi* also has a strong resemblance to *S. tuberculosa* (Th. Fr.) Rehm, which occurs on *Peltigera* species. In that species the apothecia are black, smaller (mainly 100–150μm diam.) and the ascospores (7–10(–13) × 3–3·5μm) are generally shorter and narrower; the ascospore apices are less attenuated than in *S. solorinaria* which also has larger apothecia.

It is conceivable that *Lecidea epiphorbia* Stirton, described from a *Solorina* collected on Ben Lawers (Stirton, 1873: 108) is a later synonym of either *Scutula solorinaria* or *S. krempelhuberi* but no material of this taxon has been located in recent years (Hafellner, 1979: 215). Some doubt must remain as Stirton did not provide any measurements of either ascomata or ascospores, although he did note that the hymenium turned wine red in iodine.

Stigmidium solorinarium (Vainio) D. Hawksw. in Lichenologist 15:14 (1983). Fig. 7.

Syn.: *Pharcidia conoides* var. *solorinaria* Vainio in Acta Soc. Fauna Flora fenn. 49(2):135 (1921).

Mycelium immersed, composed of pale brown smooth-walled hyphae, uneven in thickness, 2–3μm wide, spreading and irregularly branching through the photobiont layer. *Ascomata* perithecia, immersed, only the ostiole and upper part of the ascomata visible in surface view, black, subglobose to obpyriform, (45–)50–75(–100)μm wide and 50–75μm tall; ostiole distinct, sometimes with a distinct neck to 20μm tall, 15–20μm wide; ascoma walls mainly 4–7μm thick, to 10–12μm thick in the upper parts adjacent to the ostiole, composed of dark brown pseudoparenchymatous cells becoming somewhat olivaceous in potassium hydroxide, individual cells radially compressed, strongly so in the lower parts, mainly 3–5 × 4–8μm, walls of cells unevenly strongly thickened, the lumina becoming almost invisible in the upper parts; centrum tissues not turning blue in iodine. *Hamathecium* absent. *Asci* broadly obclavate, bitunicate, apex strongly thickened, discharge not seen, contents turning somewhat orange in iodine, 25–30 × 11–12μm, (6–)8-spored. *Ascospores* irregularly arranged in the asci, elongate-ellipsoid, apices rounded or somewhat attenuated below, hyaline, 1(–3)-septate, the lower cell tending to be more smaller, smooth-walled, (9–)10–11(–12) × (2·5–)3–3·5(–4)μm.

ENGLAND. Derbyshire, Monyash, Lathkill Dale, on *Solorina saccata* (L.) Ach. on limestone crags, 13 iv 1979, *D. L. Hawksworth* 4917 (IMI 237624).

FINLAND. Kuusamo, Kuoppaoja, ad Paanajärvi, on *Solorina saccata*,

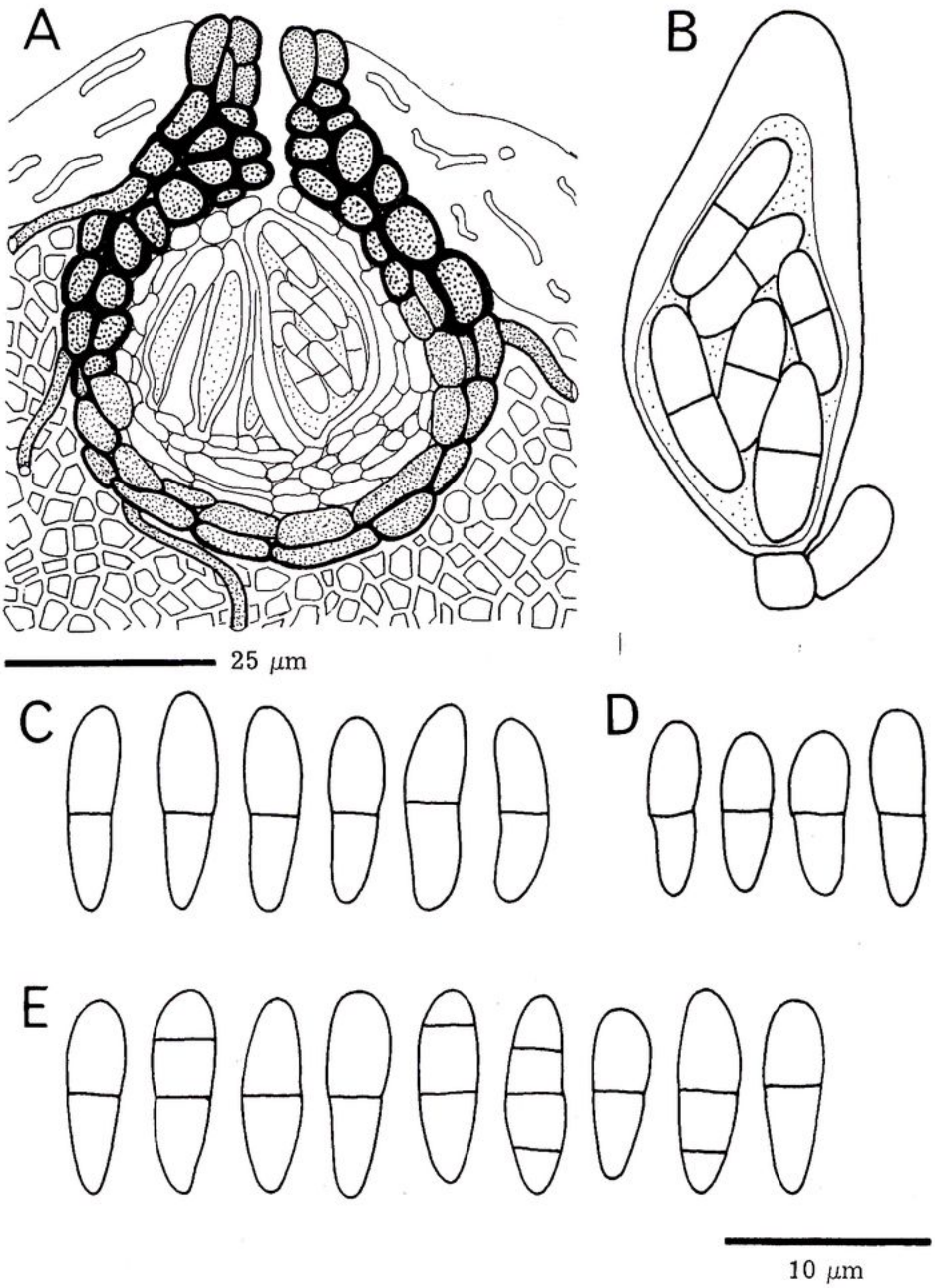

FIG. 7. *Stigmidium solorinarium*. A, vertical section of ascoma immersed in the thallus of *Solorina saccata*; B, ascus; C–D, ascospores. A–C from the holotype (TUR 32633). D from IMI 237624; E from IMI 293867.

1877, *E. A. Vainio*, hb. Vainio 32621 (TUR 32663, holotype of *Pharcidia conoides* var. *solorinaria*).
SCOTLAND. Sutherland, Loch Assynt, Ardvrech Castle, on *Solorina saccata*, 12 vi 1977, *C. J. B. Hitch* (hb. Hitch, IMI 293867). Perthshire, Ben Lawers, Creag an Lochan, 25 iv 1954, *D. M. Henderson* (E).

This species was first mentioned from the British Isles in the key of Hawksworth (1983a: 14) but no description or illustrations were provided. *Stigmidium solorinarium* occurs on the thallus of *Solorina saccata* and is probably a parasite as infected tissues are finally discoloured brown. The British collections agree in all microscopical details with the holotype from Finland but the ascomata occasionally reach 100μm in width (the maximum width seen in the holotype was 75μm) and in the specimen from Sutherland a few 2- and 3-septate ascospores occurred in the same ascoma and often the same ascus as 1-septate ones.

Species concepts in the genus *Stigmidium* Trevisan require a thorough re-appraisal as the taxonomy is currently largely host-based. *S. solorinarium* is rather close to *S. peltideae* (Vainio) R. Sant. (Hawksworth, 1975), which occurs on *Peltigera* species, but the asci in that fungus are relatively elongate (28–35 × 7–8μm wide) and the cells of the ascospores are more equal in size with the lower cell less conspicuously attenuated. The ascospores of *S. schaereri* (Massal.) Trevisan are also occasionally up to 3-septate but in that fungus, which is found on crustose lichens, the ascospores are generally broader (9·5–14 × (2–)4–5μm).

Verrucaria aspiciliicola R. Sant., Lich. Sweden Norway, 320 (1984). Fig. 8.
Syn.: *Verrucaria aspiciliae* Zehetl. in Nova Hedwigia 29:710 (1978), nom. illegit. (Art. 64.1)—non *Verrucaria aspiciliae* (Lahm) Stizenb. in Ber. Tät. St. Gall. naturw. Ges. 1880/81: 511 (1882).

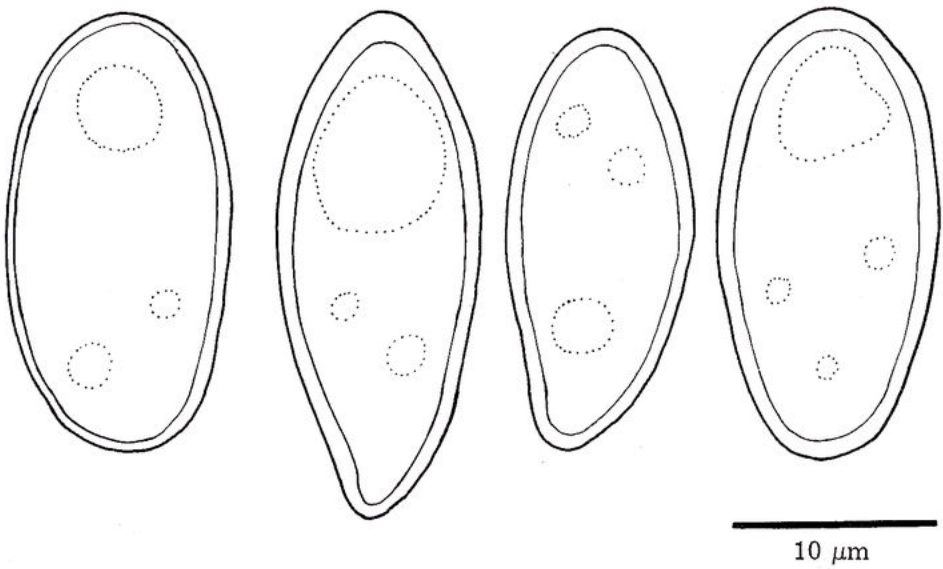

FIG. 8. *Verrucaria aspiciliicola*. Ascospores. From IMI 293871.

See Zehetleitner (1978) for a description and illustrations of this species. ENGLAND. Somerset, Mendip Hills, Churchill, Dolebury Warren, on *Aspicilia calcarea* (L.) Mudd, 10 iii 1984, *B. J. Coppins* 10112 (E). SCOTLAND. Clackmannanshire, Ochil Hills, Menstrie Burn, alt. 90–150m, on *Aspicilia caesiocinerea* (Nyl. ex Malbr.) Arnold, 29 iv 1984, *B. J. Coppins* 10269 (E, IMI 293871).

Zehetleitner (1978: 713) cited a single British collection of this species (Somerset, Bristol, Yatton, 1864, M) but no recent specimens were known. The occurrence of this lichenized lichen-inhabiting species can now be confirmed as present in the British Isles on the basis of the recent collections cited above.

Verrucaria aspiciliicola has an areolate lead-brown thallus and forms neat rosette-like patches on its hosts. It is easily distinguished from the other lichenicolous members of the genus on the basis of its large ascospores (19–26 × 6–8μm, *fide* Zehetleitner, 1978). The doubtfully British *V. insularis* (Massal.) Jatta, which is also reported from *Aspicilia calcarea*, for example, has ascospores measuring 7–11 × 6–8μm. The collection of *V. aspiciliicola* on *A. caesiocinerea* has somewhat broader ascospores (22–25 × 9–11·5μm) than given by Zehetleitner (see above) but it would be premature to treat it as distinct when so little is known of the variability in spore sizes of the species when growing on *A. calcarea*.

Weddellomyces D. Hawksw., **gen. nov.**

Genus lichenicola ad Dothideales (?Pyrenidiaceae) pertinens. *Ascomata* subglobosa, nigra, pseudoparenchymatica, irregulariter aperienta, supra distincte cephalothecoidea sed infra e cellulis irregulariter orientibus. *Hamathecium* e pseudoparaphysibus compositum. *Asci* subcylindrici ad elongato-clavati, bitunicati, 8-spori. *Ascosporae* ellipsoideae, (1–)3-septatae, aureo-brunneae, verruculosae.

Species holotypica, adhuc unica, est *Weddellomyces epicallopismum* (Weddell) D. Hawksw.

Genus lichenicolous, belonging to the Dothideales (?Pyrenidiaceae). *Ascomata* subglobose, black, pseudoparenchymatous, opening irregularly, upper part distinctly cephalothecoid but the lower formed of irregularly orientated cells. *Hamathecium* of pseudoparaphyses. *Asci* subcylindrical to elongate-clavate, bitunicate, 8-spored. *Ascospores* ellipsoid, (1–)3-septate, golden brown, verruculose.

This new genus is named in honour of Dr Hugh-Algeron Weddell (b. 1819—d. 1877), original collector of its type species, in recognition of his discovery of several remarkable lichenicolous fungi, his contributions to French lichenology, and to the dual-hypothesis debate.

Weddellomyces is a distinctive genus which perhaps most strongly recalls *Zopfiofoveola* D. Hawksw., introduced for the single species *Z. punctata* (D. Hawksw. & C. Booth) D. Hawksw. which is known only from earthworm excrements in Sweden (Hawksworth & Booth, 1974: 23–24; Hawksworth, 1979: 98). However, in *Zopfiofoveola* the ascomata appear to be cephalothecoid throughout, the asci are obovate, and the ascospores are ± symmetrical, more fusiform, with distinctly paler apices which appear to have apical germ pores, and have only a single transseptum. I am not aware of any other lichenicolous fungus which has a cephalothecoid peridium, but the large brown spores recall *Dacampia*

Massal. and *Pyrenidium* Nyl. However, in addition to the differences in the structure of the ascoma, both these genera have entirely smooth ascospore walls. Further, in *Dacampia* the ascus structure is much more complex (see Crivelli, 1983: 195), and the ascospores are muriform, while in *Pyrenidium* the transsepta have distinctive central pores.

The fungus also shows some superficial similarities to *Melanomma* Nitschke ex Fuckel but that genus has paraphysoids (trabeculate pseudoparaphyses) and not true pseudoparaphyses (cellular pseudoparaphyses). The structure of the ascoma wall, i.e. cephalothecoid above and pseudoparenchymatous below, recalls that seen in certain species of *Cercophora* Fuckel; that genus belongs to the Sordariales (Lasiosphaeriaceae) with quite different types of asci, hamathecial tissues and caudate ascospores (Lundqvist, 1972: 80–118).

The most appropriate recognized family to which *Weddellomyces* might be referred is probably the Pyrenidiaceae Zahlbr., used by Eriksson (1981: 141–142) for 'a group of lichen parasymbionts with dark septate ascospores in bitunicate cylindric to clavate asci without stainable ring structures in the top and with pseudoparaphyses'. Future critical ontogenetic studies may, however, show that the true affinities of *Weddellomyces* lie elsewhere in the Dothideales.

Weddellomyces epicallopismum (Weddell) D. Hawksw., **comb. nov.** Figs 9–12.

Syn.: *Verrucaria epicallopisma* Weddell in Mém. Soc. natn. Sci. nat. Cherbourg 17 [sér. 2, 7]: 372 (1873).

Phaeospora epicallopisma (Weddell) Arnold in Flora, Jena 57:152 (1874).

Didymosphaeria epicallopisma (Weddell) Sacc., Syll. Fung. 17:682 (1905).

Sphaeria epicallopisma (Weddell) H. Olivier in Bull. Acad. internat. Géogr. bot. 17:169 (1907).

Ascomata arising singly or in groups of 2–3, erumpent, the cortical layers splitting and often becoming reflexed as teeth-like flaps, black, subglobose, (150–)200–300(–350)μm diam. in surface view, mainly 250–350μm tall; opening at the apex by an irregularly shaped gaping pore to 50μm wide, evidently formed by blocks of cephalothecoid plates breaking away; upper part of the peridium cephalothecoid in surface view, comprising plates of radiating elongated pseudoparenchymatous polyhedral cells, plates mainly quadrangular to pentangular, 35–80μm wide, dark brown to almost black centrally, paler in the region adjacent to other plates, individual cells polyhedral, thick-walled, reddish-brown, mainly 4–6μm diam. near the centre of the plates, cells linking adjacent plates 9–14 × 2–4μm, walls thinner and paler centrally and tending to fracture; lower part of the peridium not cephalothecoid, pseudoparenchymatous in surface view, individual cells subglobose to polyhedral, ± evenly thick-walled, red-brown, 5–10μm diam., not arranged in well-defined plates; peridium in vertical section dark brown, mainly 10–15μm thick below, increasing to 35μm in the upper parts, cells in the lower part not strongly compressed, layer 3–4 cells thick, cells in the upper part similar but the walls less strongly pigmented to subhyaline at junctions

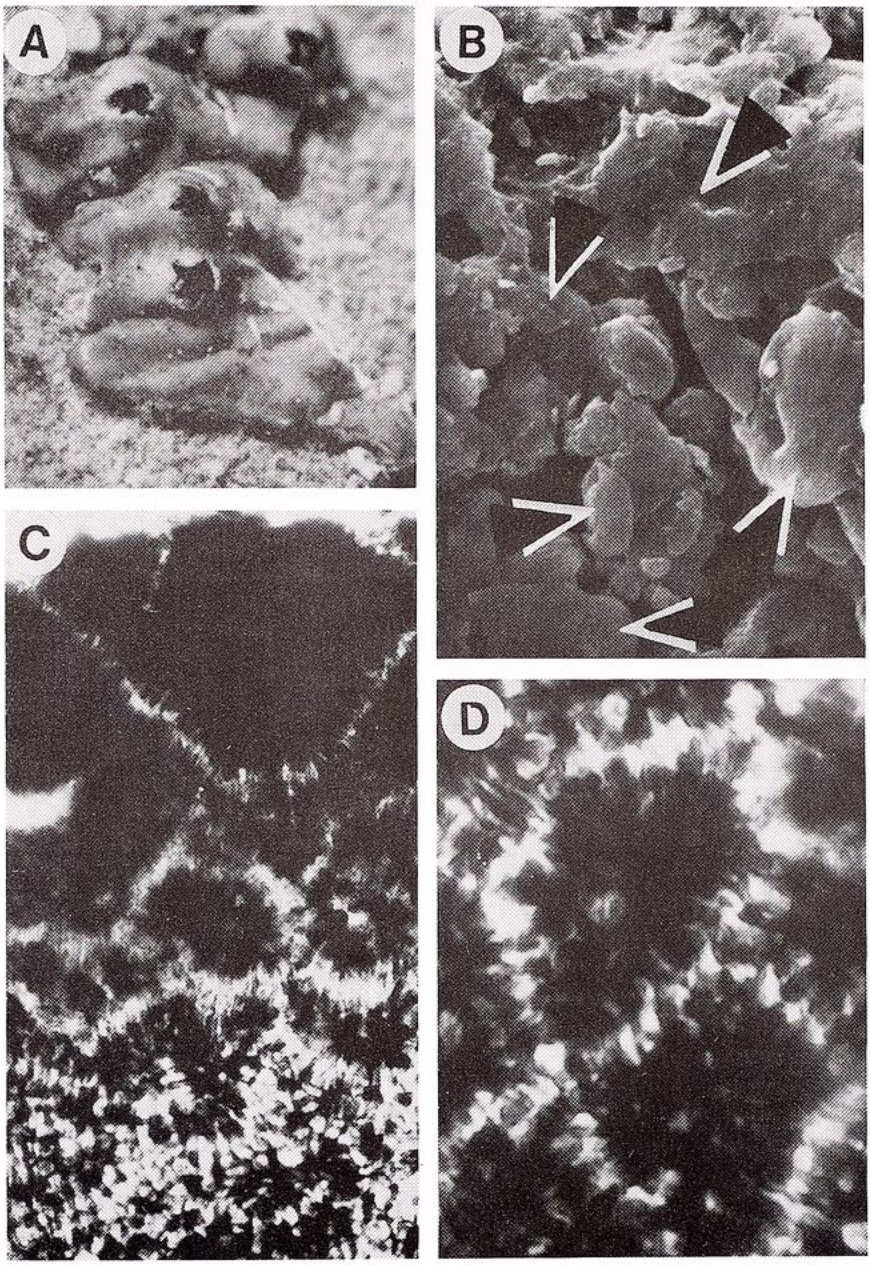

FIG. 9. *Weddellomyces epicallopismum*. A, ascomata bursting through the cortex of *Caloplaca flavescens* (×25); B, margin of the opening of ascoma in surface view showing pieces of the peridium breaking away in angular blocks, arrowed (SEM, ×350); C, surface view of peridium showing the cephalothecoid plate-like structure towards the ascoma opening (top) and pseudoparenchymatous structure towards the base (×400); D, cephalothecoid plates in the upper part of the peridium (×800). From IMI 293873.

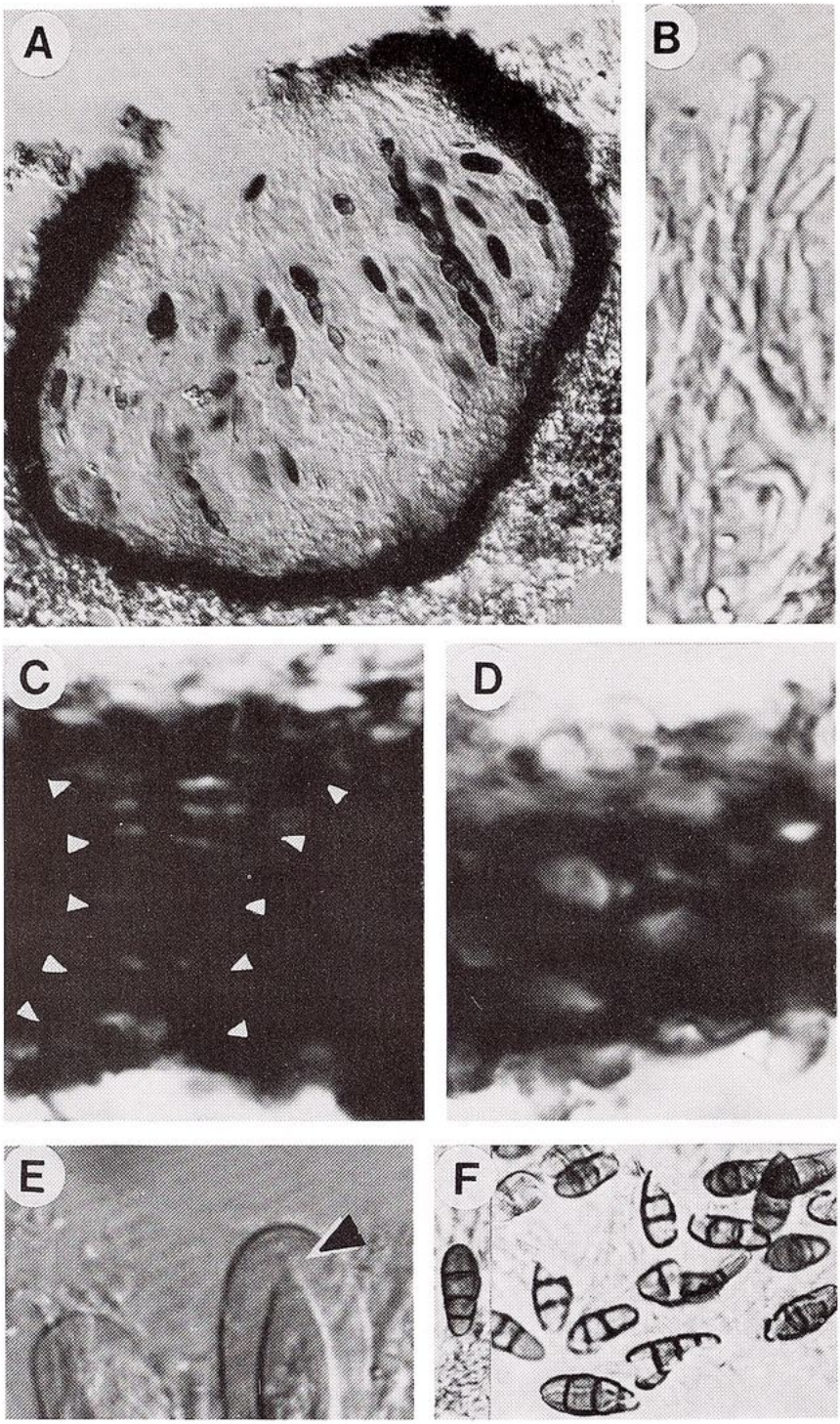

FIG. 10. *Weddellomyces epicallopismum*. A, vertical section of ascoma showing the irregular opening (×25); B, cellular pseudoparaphyses (×800); C, vertical section of the upper part of the peridium showing an area of less-thickened cells at the junction of two cephalothecoid plates, arrows (×800); D, vertical section of the lower part of the peridium showing the even pseudoparenchymatous structure (×800); E, ascus apices showing the internal apical beak, arrowed (×800); F, ascospores (×400). A–B & E Nomarski differential interference contrast. From IMI 293873.

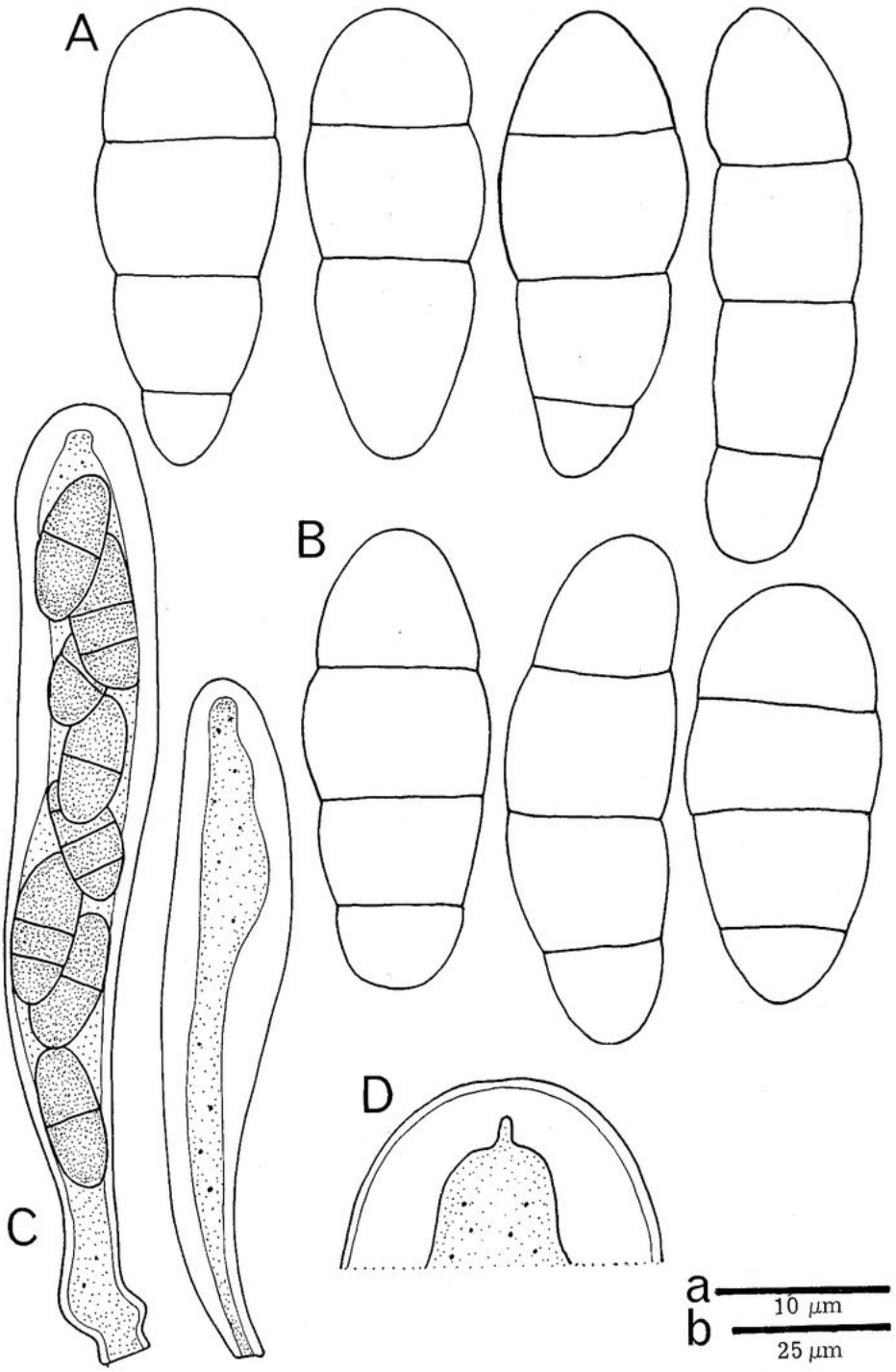

FIG. 11. *Weddellomyces epicallopismum*. A–B, ascospore outlines; C, developing asci; D, ascus tip showing the bitunicate structure and internal apical beak. A–B & D scale a; C scale b. A from the isotype (H-NYL 391); B–D from IMI 293873.

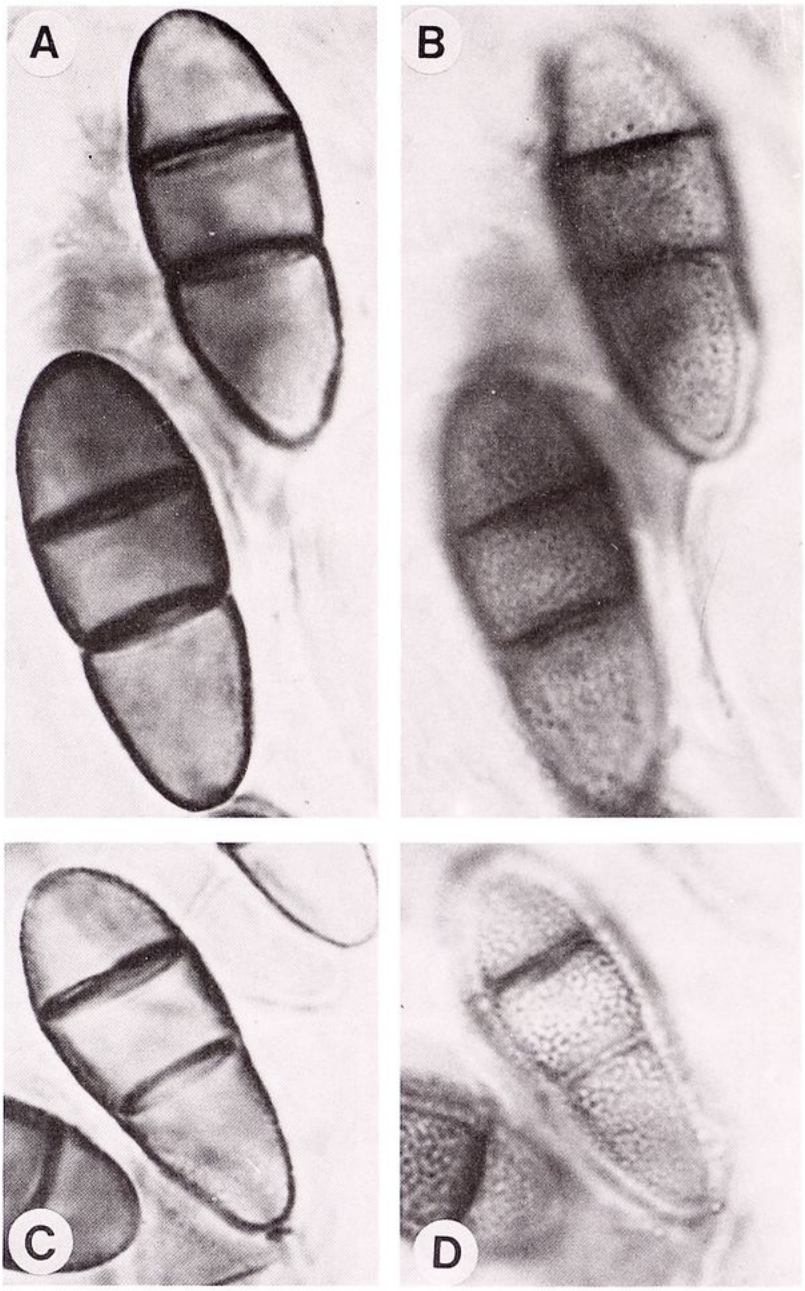

FIG. 12. *Weddellomyces epicallopismum*. Ascospores. A & C optical sections; B & D surface views showing verruculose ornamentation in the same ascospores (×2200). Nomarski differential interference contrast. From IMI 293873.

between cephalothecoid plates. *Hamathecium* consisting of pseudoparaphyses, persistent, branched and anastomosing, cellular, 2·5–3μm wide; centrum not turning blue with iodine. *Asci* subcylindrical to elongate-clavate, bitunicate, with a small internal apical beak, discharge probably fusitunicate, 95–130 × 15–18μm, 8-spored. *Ascospores* distichously arranged in the asci, ellipsoid, swollen above and tending to taper towards the base, (1–)3-septate, constricted at the septa, septa lacking a central pore, golden-brown, minutely and evenly verruculose (ornamentation within the wall layers), lacking a distinct gelatinous sheath, 24–28(–30) × (8–)9·5–11μm.

ENGLAND. North Somerset, Mendip Hills, Charterhouse, Ubley Warren, on *Caloplaca flavescens* (Huds.) Laundon thallus, 10 iii 1984, *B. J. Coppins* 10250 (IMI 293873).

FRANCE. Portiers, on *Caloplaca* cf. *aurantia* (Pers.) Steiner thallus, 1873, *Weddell* (H-NYL 391, isotype of *Verrucaria epicallopisma* Weddell).

WALES. Brecknock, Llangattock, Craig y Cilau, on *Caloplaca flavescens* thallus, 4 viii 1984, *B. J. Coppins & R. G. Woods*, C10920 (E).

Watson (1948: 323) referred a collection on *Caloplaca saxicola* (Hoffm.) Nordin from Taunton to this fungus and gave the spores as 3-septate and 24–36 × 8–12μm; however, he stated that 'paraphyses' were absent so some uncertainty must remain as to the identity of Watson's collection. This fungus can, however, be confirmed as present in the British Isles on the basis of the recent collections from Ubley Warren and Brecknock.

The species appears to be confined to placodioid species of *Caloplaca*. In the isotype studied the infected thallus was bleached suggesting that the fungus was a parasite, while in the two recent collections the host retains its normal orange colour and the fungus appears to be parasymbiotic. It is possible that it is initially parasymbiotic but eventually becomes parasitic, but more extensive collections are needed to clarify this.

Acknowledgements

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