

NOTES ON BRITISH LICHENICOLOUS FUNGI: VII*

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Abstract: *Phoma everniae* sp.nov. (on *Evernia prunastri* and *Polycoccum slaptoniense* sp.nov. (on *Xanthoria parietina*) are described as new to science. Three further species are reported from the British Isles for the first time: *Dactylospora microspora* Etayo, *Monodictys anaptychia* (Lindau) D. Hawksw., and *Sphaerellothecium araneosum* (Arnold) Zopf. Notes are also presented on *Bispora lichenum* Diederich, *Opegrapha physciaria* (Nyl.) D. Hawksw. & Coppins, *Polycoccum kernerii* Steiner, *Pronectria xanthoriae* Lowen & Diederich, *Stigmidium degelii* R. Sant., and *S. hagenii* (Rehm) Hafellner.

Introduction

Since the last instalment of this series of Notes (Hawksworth 1990), our knowledge of the fungi growing on lichens has continued to rise exponentially. This contribution provides notes on eleven lichenicolous fungi that have not previously or recently been reported from Great Britain and Ireland. Information on species from the region already published elsewhere, and taxonomic and nomenclatural changes, are not compiled here owing to the volume of the task. Those data will be incorporated into an updated checklist and second edition of the key to these fungi (Hawksworth 1983) to be compiled in collaboration with Dr B. J. Coppins.

Notes

Bispora lichenum Diederich

Mycotaxon 37: 302 (1990).

For description and illustrations see Diederich (1990: 302–4).

Observations: This somewhat cryptic species is close to *Bispora christiansenii* D. Hawksw., from which it is distinguished by the conidia being predominantly unicellular rather than 1-septate. This fungus, like *B. christiansenii*, appears to have a wide host range. It has not previously been reported from the British Isles, apart from the citation of the Scottish specimen listed below but without further details in Brightman (1991: 34).

Specimens examined: **England:** South Devon, Slapton Ley National Nature Reserve, in apothecia of *Strangospora moriformis* on fencepost, 1992, D. L. Hawksworth (IMI 358927b).—**Scotland:** Aberdeenshire, Ellon, nr Hilton, alt. 250 m, on *Trapelia placodioides* on rock outcrop, 1990, B. Abbott (IMI 344187).

*VI in *Notes from the Royal Botanic Garden Edinburgh* 46: 391–403 (1990).

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Dactylospora microspora Etayo

Candollea 46: 391 (1991).

Ascomata apothecia, superficial, black, 0.3–0.7 mm diam., disc plane to concave; true exciple slightly raised; hymenium 40–60 µm tall, colourless; hypothecium dark brown, well-developed, 30–45 µm tall; epithecium brown, composed of conglutinated paraphyses tips, 7–10 µm tall. *Hamathecium* of paraphyses, sparsely branched, apices capitate and brown, 3–5 µm wide. *Asci* broadly clavate, thickened at the apex, walls I – with an I+ blue outer apical cap, 25–45 × 7–10 µm, 24–40(–80)-spored. *Ascospores* narrowly ellipsoid, 1-septate, apices rounded, brown, smooth, lacking a distinct perispore, (4–)5–7(–8) × 2–3(–3.5) µm.

Observations: This distinctive species with multispored asci and minute ascospores was originally to have been described in the first instalment of this series of Notes in 1975. However, as the material comprised only three apothecia and the biology was uncertain it was eventually omitted from that contribution. The U.K. material agrees in most significant details with the description provided by Etayo (1991), who found this fungus on the thallus of *Catillaria atropurpurea* in Spain. However, the ascomata reached only 0.4 mm diam. in the Spanish collection and the asci were mainly 60-spored rather than 24–40(–80)-spored. No *Catillaria* ascomata were found in the U.K. collection but the *Dactylospora* could well originate from such a crustose thallus and thrust through the *Parmeliella triptophylla* thallus that predominates in the material; no microtome sections were made as the material was so sparse.

Specimen examined: **Wales:** Merioneth, near Barmouth, Arthog, Arthog Valley, associated with *Parmeliella triptophylla* on *Quercus*, 1971, B. J. Coppins (IMI 165145).

Monodictys anaptychia (Lindau) D. Hawksw.

Trans. Br. mycol. Soc. 65: 2120 (1975).—*Coniothecium anaptychia* Lindau, *Rabenh. Krypt.-Fl.* 1, 9(2): 169 (1908).

For further synonyms, typification, description and illustrations see Hawksworth (1975: 220–221) and Wedin (1993).

Observations: This species, which appears to be confined to thalli of *Anaptychia ciliaris*, has not previously been reported from the British Isles. It is otherwise known with certainty only from Germany and Sweden.

Specimen examined: **England:** West Gloucestershire, Woodchester, on *Anaptychia ciliaris*, 1886, H. P. Reader (E).

Opegrapha physciaria (Nyl.) D. Hawksw. & Coppins

in Coppins *et al.*, *Lichenologist* 24: 367 (1992).—*Lecidea physciaria* Nyl., *Suppl. Lich. Paris*: 8 (1897).

Observations: This species was mentioned in Purvis *et al.* (1992: 411) but with no details as to its characters or distribution. A full description,

illustration and discussion of this fungus, which is known only from thalli of *Xanthoria parietina*, is provided by Atienza (1992). Previous mentions of *O. parasitica* (Massal.) Vězda on this host from the British Isles (e.g. Coppins 1987) refer to this fungus. *Opegrapha physciaria* was considered by Atienza to differ from *O. parasitica* in having shorter ascospores (12–)15–16 μm long and asci that lack an amyloid apical ring. *Opegrapha physciaria* is certainly known otherwise from Finland, France, Germany, Spain and Sweden.

Specimens examined: **England:** South Devon, Slapton, Slapton Ley National Nature Reserve, on western slope of the shingle ridge, on *Xanthoria parietina* on *Fraxinus*, 1990, *D. L. Hawksworth* (IMI 339591).—**Ireland:** South Kerry, Lough Brin, on *Xanthoria parietina*, 1977, *A. Burnet* (E, IMI 361058). West Donegal, Doe Castle, on *Xanthoria parietina* on dead branches, 1991, *B. J. Coppins* (14988) & *P. W. James* (E).—**Scotland:** Orkney, North Ronaldsay, on *Xanthoria parietina*, 1976, *C. H. Neville-Smith* (E).

Phoma everniae D. Hawksw. sp. nov.

Similis *Phomae lecanorinae* Diederich, sed pycnidiis ad 35 μm diam. et cum cellulis 2.5–3 (–3.5) μm compositis.

Typus: England, South Devon, Slapton, Slapton Ley National Nature Reserve, Duck Marsh, on *Evernia prunastri* on *Salix*, 22 April 1990, *D. L. Hawksworth* (IMI 339566—holotypus).

(Fig. 1A–B)

Conidiomata pycnidia, immersed in the outer layer of the cortex of the host, erumpent only at the ostiolar opening, scattered, dark brown to black, subglobose, (20–)30(–35) μm diam.; ostiole irregular, opening 6–10 μm wide, cells more intensely pigmented around its margin; pycnidial wall composed of a single layer of subglobose to angular-compressed dark brown pseudo-parenchymatous cells 2.5–3(–3.5) μm diam. in surface view. *Conidiogenous cells* arising from the inner wall of the pycnidial cavity, subglobose to short-ampulliform, enteroblastic, acrogenous, not proliferating, hyaline, 3–4(–5) μm diam. *Conidia* sparse, arising singly, narrowly ellipsoid to almost bacillariform, hyaline, smooth-walled, 4.5–5 \times 1–1.5 μm .

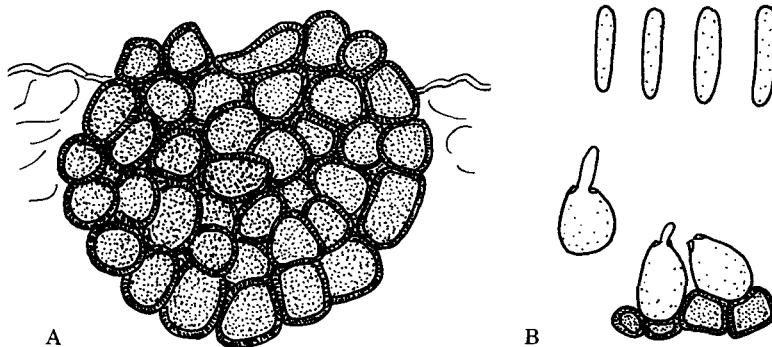


FIG. 1. *Phoma everniae* (holotype). A, Pycnidium, vertical aspect but unsectioned. B, Conidiogenous cells and conidia. Scale = 10 μm .

Distribution: Known only from the holotype collection.

Observations: This minute species occurs on older basal fronds of *Evernia prunastri* in which the upper cortical layer is starting to degenerate. Whether the fungus is a pathogen causing this damage or an opportunistic saprobe is unclear in the single collection available.

The fungus is described in *Phoma* with some hesitation in view of the minute size of the pycnidia and the poorly differentiated ostiole. *Minutophoma* D. Hawksw. was excluded as a possibility for *P. everniae* as the species has a continuous wall below the conidiogenous cells, and much less elongated conidiogenous cells. The species shows some similarity to two of the currently recognized lichenicolous species of *Phoma*: *P. dubia* (Lindsay) Sacc. & A. Trotter, known on *Usnea* thalli from New Zealand, has rather similar conidia $3.5\text{--}5 \times 1.5\text{--}2 \mu\text{m}$, but pycnidia up to $60 \mu\text{m}$ in diam. and a more complex wall structure (Hawksworth 1981), and *P. lecanorina* Diederich, a pathogen on *Lecanora expallens* in Luxembourg, also with rather similar conidia $3\text{--}5 \times 1\text{--}1.5 \mu\text{m}$, but pycnidia also up to $60 \mu\text{m}$ and larger pycnidial wall cells $3.5\text{--}5 \mu\text{m}$ across (Diederich 1986).

Polycoccum kernerii Steiner

Sber. Akad. wiss. Wien, mat.-nat. Kl. 102: 162 (1893); type: Greece, Pentélique, on *Lecidea fuscoatra*, M. Steiner [not traced].—*Didymosphaeria kernerii* (Steiner) Vouaux, *Bull. Soc. mycol. Fr.* 29: 108 (1913).

(Fig. 2)

Ascomata perithecia, discrete but aggregated into groups on somewhat raised and swollen areoles of the host, erumpent, with the upper $\frac{1}{4}$ to $\frac{1}{3}$ exposed, black, subglobose, $0.2\text{--}0.3 \text{ mm}$ diam.; ostiole \pm flattened, not papillate, *c.* $25\text{--}30 \mu\text{m}$ wide; walls composed of angular to rounded pseudoparenchymatous cells, unevenly red-brown, $5\text{--}8 \mu\text{m}$ diam. in surface view. *Hamathecium* of branched and anastomosed pseudoparaphyses, persistent, $1\text{--}2.5 \mu\text{m}$ wide. *Asci* broadly cylindrical, apex thickened, bitunicate in structure, discharge fissitunicate, *c.* $85 \times 22 \mu\text{m}$, 8-spored. *Ascospores*

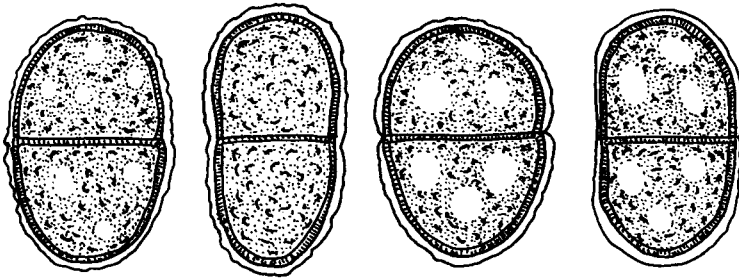


FIG. 2. *Polycoccum kernerii* (IMI 353988) ascospores. Scale = $10 \mu\text{m}$.

± monostichously arranged in the ascus, broadly ellipsoid, ± rounded at the apices, 1-septate, not to somewhat constricted at the septum, the cells ± equal in size, at first hyaline but becoming olivaceous green to green-brown and finally red-brown, with an uneven and coarsely warted almost colourless perispore when young but becoming smoother and less conspicuously warted with age, finally sometimes only with the epispore clearly evident, frequently with several conspicuous guttules in each cell, (12–)14–15(–17·5) × (7–)8·5–10(–10·5) µm.

Host: *Lecidea fuscoatra* thallus, the infected areoles becoming somewhat swollen and raised and eventually rather decolourized, sometimes evidently killed; evidently gall-forming to commensalistic at first but finally pathogenic.

Distribution: France, Greece, and the British Isles.

Observations: No material of this species was seen by Hawksworth & Diederich (1988: 302), who knew it only from the original description. None of Steiner's material of this fungus could be located in W. However, what is clearly the same species was discovered in the British Isles for the first time by Giavarini (1990: 384), but no details of the collection were presented; a modern description and notes are consequently provided.

The macro- and microscopic details of the specimens studied from France and Devon agree so closely with Steiner's original description of the fungus, and the account provided by Vouaux (1913), there can be no doubt that the collections are conspecific. The only differences of note are that no pseudoparaphyses as wide as 3–4 µm were found, and that the size range of the ascospores is greater than the published 11–14 × 8–9 µm.

Now that modern collections are available, *P. kernerii* can be compared more closely with other species of the genus. The relatively large perithecia and the dimensions of the ascospores set this fungus apart from most species of *Polycoccum*. It differs from *P. cladoniae* Diederich & D. Hawksw. in the arrangement of the ascospores, their type of ornamentation, and ascus size; and from *P. galligenum* Vězda in the broader ostiole and ascospore ornamentation.

It is conceivable that *Verrucaria fumosaria* Leighton [syn. *Polycoccum fumosaria* (Leighton) Arnold], described from *Lecidea fuscoatra* 'f. *fumosa*' collected by Leighton at Pen Cow, near Fishguard in September 1876 (Leighton 1877: 239) might be an earlier name for this species. However, the original account differs in some significant respects; in particular the perithecia were said to be dimidiate and much incurved at the base, paraphyses were stated to be absent, the ascospores were given as 15·5–16 × 7 µm, and the published illustration (Leighton 1877: Pl. 32 fig. 19) of the ascospores shows them to be quite smooth-walled and more narrowly ellipsoid than in the specimens studied. No type or authentic material of Leighton's taxon could be traced, and examination of a specimen of '*Lecidea fuscoatra* f. *fumosa* Pen-y-rhiw near Fishguard Pembrokeshire Sept 1876 W.A.L.' located in BM did not reveal any fungus recalling Leighton's description. On the evidence available, the possibility that *V. fumosaria* might have been *Endococcus rugulosus* Nyl., as

tentatively indicated by Hawksworth (1979: 288), cannot be dismissed and so Leighton's name should not be taken up for *P. kernerii*.

Specimens examined: **France:** Département des Ardennes: Rancennes, Rochers d'Aviette, on *Lecidea fuscoatra* on schists, 1978, J. Lambinon 78/F/613 (LG).—**England:** South Devon, Dartmoor, Sourton, Sourton Tors, 20/543898, on *L. fuscoatra* on diorite/dolerite boulders, 1989, V. J. Giavarini (IMI 353988).

***Polycoccum slaptoniense* D. Hawksw. sp. nov.**

Similis *Polycocco bryonthae* (Arnold) Vězda, sed perithecia grandiusculis, 150–200(–250) µm diam.; ascis longioribus et angustioribus, 100–110 × (6–)6·5–7 µm; et ascosporis semper 1-septatis.

Typus: England, South Devon, Slapton, Slapton Ley National Nature Reserve, east end of Duck Marsh near The Causeway, on *Xanthoria parietina* on *Sambucus nigra*, 2 October 1993, D. L. Hawksworth (IMI 359711—holotypus).

(Fig. 3A–E)

Ascomata perithecia, mainly arising singly but sometimes in groups of 2–3, almost completely immersed in tuberculiform galls when on the thallus of the host, not associated with gall-formation when in the apothecia of the host; galls with single perithecia 0·15–0·2(–0·3) mm diam. in surface view, those with 2–3 perithecia mainly 0·2–0·3 mm diam.; perithecia with only the ostiolar to upper $\frac{1}{4}$ exposed, black, subglobose, 150–200(–250) µm diam.; ostiole ± flattened, not papillate; walls (12–)15–20 µm thick, composed of 3–4 layers of angular and radially compressed pseudoparenchymatous cells (*textura angularis*), dark red-brown, mainly 6–10 µm diam. in surface view and 6–12 × 4–5 µm in vertical section. *Mycelium* immersed, hyphae ramifying through the cortical layers of the host, hyphae mainly filamentous and 2·5–3·5 µm wide, becoming torulose and up to 4·5 µm wide close to the perithecia. *Hamathecium* of branched and anastomosed pseudoparaphyses, abundant, persistent, septate, 1·5–2 µm wide; centrum I – (Lugol's), after pre-treatment with potassium hydroxide. *Asci* narrowly cylindrical, apex thickened with a papillate internal apical beak, bitunicate in structure, discharge fissitunicate, 100–110 × (6–)6·5–7 µm, 8-spored. *Ascospores* strictly monostichously arranged in the ascus, ellipsoid, rounded at the apices, 1-septate, slightly constricted at the septum, the cells ± equal in size, dark red-brown, pigmentation particularly deep around the septum, consistently minutely verruculose, no perispore evident when mature, not conspicuously guttulate, 13–14·5 × 5–6(–7·5) µm.

Host: On thalli and apothecia of *Xanthoria parietina*, forming striking tubercle-like galls on the thallus but not the apothecia. The gall tissue remains yellow for some time, and provides a stark contrast with the exposed black perithecial apices making the fungus easy to recognize with a hand lens. The infected lobes become intensely orange-red in colour and are finally killed.

Distribution: Known only from the holotype collection.

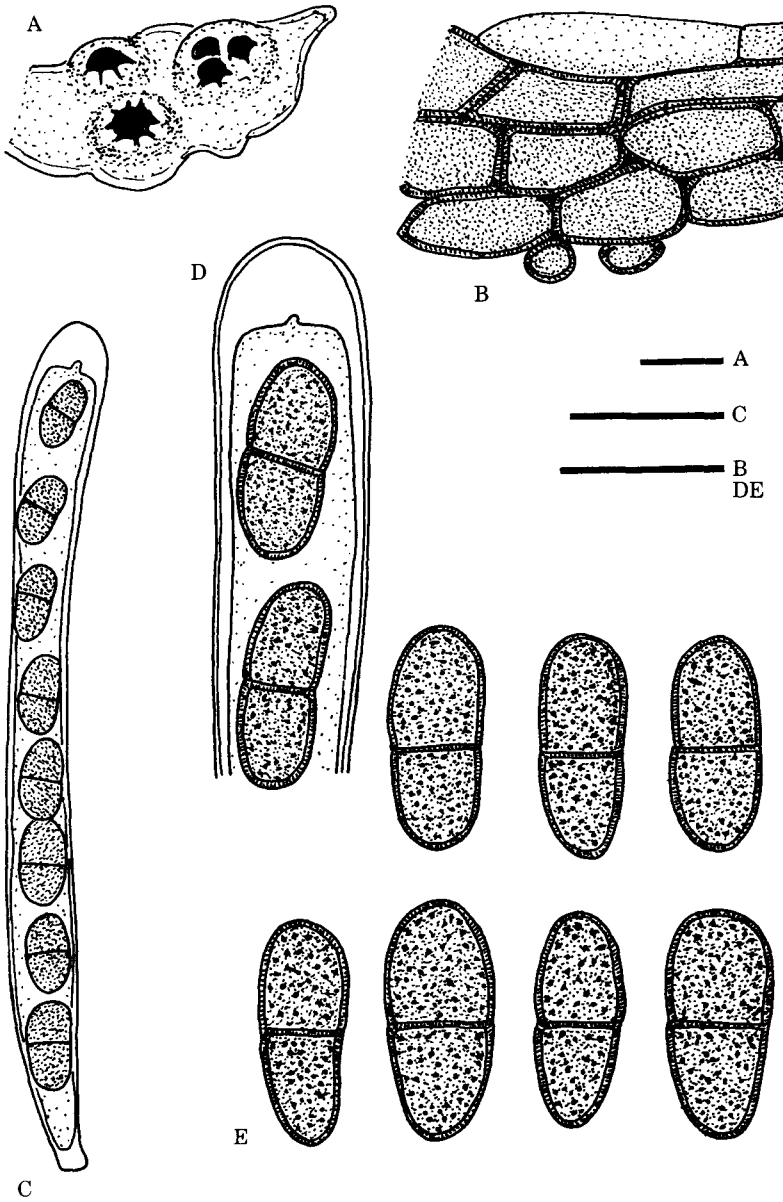


FIG. 3. *Polycoccum slaptioniense* (holotype). A, Tubercle-like galls with immersed perithecia. B, Vertical section of ascoma wall. C, Ascus with mature ascospores. D, Ascus apex. E, Ascospores. Scales A=200 μ m, B and D-E=10 μ m, C=20 μ m.

Observations: This species belongs to a small group of *Polycoccum* species that have narrowly cylindrical asci with strictly monostichously arranged ascospores. It is closest to *P. bryonthae* (Arnold) Vězda, a mainly arctic

and alpine species occurring on *Caloplaca* and *Pertusaria* (Hawksworth & Diederich 1988; Alstrup & Hawksworth 1990), but that fungus has smaller perithecia 70–100(–150) μm diam., shorter and broader asci (60–)70–80 \times 10–12 μm , and almost invariably has some ascospores with a second septum in the upper cell.

Endococcus parietinarius (Lindsay) Clauz. & Roux, which also occurs on *Xanthoria parietina* and produces brown 1-septate ascospores, can easily be separated from *Polycoccum slaptioniense* by a variety of characters. That fungus has more erumpent to almost superficial perithecia (25–)40–60(–80) μm diam., lacks pseudoparaphyses, has clavate asci about 40 \times 15 μm with irregularly distichously arranged ascospores, and somewhat smaller ascospores, 10.5–13(–14) \times (3.5–)4–5 μm , with completely smooth walls. The asci and ascospores of *E. parietinarius* are illustrated in Hawksworth (1982: 383). These two fungi also cause different symptoms on the host; in *E. parietinarius* the perithecia are generally scattered over whitish grey decolourized areas of the thallus, which it kills, and galls are not characteristic. Reports of gall formation by *E. parietinarius* (e.g. Keissler 1930: 392) may be due to confusion either with *P. slaptioniense* or mixed infections with other lichenicolous fungi.

In the course of checking whether this *Polycoccum* had previously been described, I also studied the holotype of *Mycoporum physciicola* Nyl. (France, Ranton, Vienne, on *Xanthoria parietina*, January 1873, *f. Richard* 570, H-NYL 4294). I can confirm that this name is correctly treated as a synonym of *E. parietinarius*.

***Pronectria xanthoriae* Lowen & Diederich**

Mycologia 82: 788 (1990).

A full description with illustrations is provided in Lowen & Diederich (1990).

Observations: This species is mentioned here to draw attention to the fact that infected *X. parietina* thalli assume a deeper orange colour than is usual for that lichen, so much so that this species was discovered by observing atypically coloured thalli on a wall while driving along the road. The species is otherwise known only from a single collection from Luxembourg.

Specimen examined: **England:** Derbyshire: Bakewell, Over Haddon, in apothecia and thalli of *Xanthoria parietina* on limestone wall, 1985, *D. L. Hawksworth* 5513 (IMI 294074—holotype).

***Sphaerellothecium araneosum* (Arnold) Zopf**

Nova Acta Acad. Caesar. Leop. Carol. 70(2): 185 (1897).—*Sphaerella araneosa* Arnold, *Flora* 57: 153, 175 (1874).

Observations: This species, which has not been reported previously from the British Isles, was retained in *Endococcus* Nyl. by Hawksworth (1979: 286) on the basis of the published descriptions. This fungus has been investigated further by Triebel (1989: 70–72) who accepted *Sphaerellothecium* Zopf as a genus distinct from *Endococcus* on the basis of the superficial dark brown hyphal reticulum formed on the host thallus and I– hymenial gel, and from

Echinothecium Zopf in having ascospores that become brown and in the absence of setae on the ascomata.

Zopf misapplied the name *S. araneosum* to the species now called *S. contextum* Triebel. A modern description, together with illustrations, of *S. araneosum* is provided by Alstrup & Hawksworth (1990: 28–30) under the name *Echinothecium glabrum* M. S. Christ. *et al.*, which Hafellner (1993: 762) pointed out to be conspecific with *S. araneosum*. However, the justification of making a distinction between these two genera is suspect. In *S. minutum* Hafellner, recently reported from Scotland (Hitch 1993: 63) and which occurs on *Sphaerophorus* species, the ascospores remain colourless and are $9\text{--}11 \times 3\text{--}4 \mu\text{m}$. In *Sphaerellothecium araneosum* the common situation is also for the ascospores to remain colourless (although eventually some can become brown) and the only constant differentiating feature recognized for these genera is thus the setae on the ascomata. I agree with Hafellner (1993) that the generic concepts need a critical re-examination, and I would not be surprised if that led to *Echinothecium* being treated as a synonym of *Sphaerellothecium*.

Specimen examined: England: South Devon, Slapton, on *Ochrolechia parella* on tombstone in churchyard, 1993, *D. L. Hawksworth* (IMI 359058).

Stigidium degelii R. Sant.

Graphis Scripta 5: 3 (1993).

Observations: This new commensalistic species on *Degelia plumbea* was recently described by Santesson (1993), who cited two British collections, from East and West Inverness, in UPS. The species, which was also reported from Norway and Sweden, has larger and often more protruding perithecia than *S. schaereri* (Massal.) Trevisan s. str., 1-septate ascospores $(9\text{--})11\text{--}16 \times (3\text{--})4\text{--}5 \mu\text{m}$, and abundant pycnidia producing conidia $4\text{--}5 \times 0.8\text{--}1 \mu\text{m}$.

This fungus has been known to Dr B. J. Coppins, Dr J. C. David and myself for some years, and is probably not infrequent in western Scotland, although at first we hesitated to separate it from *S. peltideae* (Vainio) R. Sant. However, the latter has shorter ascospores, $9\text{--}12 \times 2.5\text{--}3.5 \mu\text{m}$, which can also be up to 3-septate. Details of the Scottish collections of *S. degelii* seen by me are as follows. [Additional collections from Scotland in E are currently on loan elsewhere.]

Specimens examined: Scotland: Argyllshire: Loch Creran, on *Degelia plumbea*, 1974, *B. J. Coppins* 1871 (IMI 332730a). Isle of Skye: Dunvagan Castle Woods, on *D. plumbea*, 1979, *B. J. Coppins* 4163 (IMI 241055). West Inverness: Arnisdale village, on *D. plumbea*, 1975, *B. J. Coppins* 1042 (IMI 197664).

Stigidium hageniae (Rehm) Hafellner

in Santesson, *Thunbergia* 6: 8 (1988).—*Sphaerella hageniae* Rehm, in Winter, *Flora* 55: 523 (1872).

Observations: A collection from the Isle of Man sent to me for determination agrees well with material distributed under this name by Santesson (*Fungi Lichenicoli* Exs. no. 121; IMI 330703) on *Anaptychia ciliaris* from Spain;

this was the basis of the first citation of this species from Great Britain and Ireland reported in Brightman (1992: 64). Additional collections subsequently discovered in E by Dr B. J. Coppins are also noted below.

The proportion of 3-septate ascospores seems to vary between collections of this species from rare to predominant, although their dimensions are similar. The perithecia are most abundantly developed on the lower fronds of the thalli and the species should be searched for in that position on large specimens of the host lichen.

Specimens examined: **England:** Hertfordshire: Aldenham, on *Anaptychia ciliaris* subsp. *ciliaris*, [18th century], herb. *A. Menzies* (E). Isle of Man, Calf Sound, on *A. ciliaris* subsp. *mamillata* on sandstone, 1990, *P. M. Earland-Bennett* (IMI 345125). West Gloucestershire: Woodchester, on *A. ciliaris* subsp. *ciliaris*, 1886, *H. P. Reader* (E).—**Scotland:** East Lothian, Gullane, on *A. ciliaris* subsp. *mamillata*, 1908, *J. McAndrew* (E); *loc. cit.*, 1913, 1946, *F. R. Irvine* (E); *loc. cit.*, [no date], *W. Evans* (E). Fife: shore at Elie, on *A. ciliaris* subsp. *mamillata*, 1904, *J. McAndrew* (E); Fife Ness, on *A. ciliaris* subsp. *mamillata*, 1908, *W. Evans* (E).—**Ireland:** South Kerry: Skellig Michael, on *A. ciliaris* subsp. *mamillata*, 1983, *D. Long* 11821 (E).

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