

Swedish pteridicolous *Mycosphaerellae*

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The authors have revised the taxonomy and nomenclature of the *Mycosphaerella* species found on ferns in Sweden, viz. *Mycosphaerella asperulata* L. & K. Holm, sp. nova, *M. aspidii* (v. Höhn.) L. & K. Holm, comb. nova, *M. filicum* (Desm.) Starb. s. lato, *M. osmundicola* (Kirschst.) L. & K. Holm, comb. nova, and *M. pteridis* (Desm.) Schröt.

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In the course of an inventory of the Ascomycete flora on ferns in Sweden (cf. Holm & Holm 1978) it became apparent that the taxonomy and nomenclature of the pteridicolous *Mycosphaerellae* was in such a state of confusion as to necessitate a study of its own. The results of that revision are presented here. They are based largely on our own collections, in the main part from the province of Uppland, C Sweden. In addition the herbarium material in S and UPS has been revised, and some further type specimens have been obtained on loan from B and PC, which is gratefully acknowledged.

Five species have been found to occur in the country. By far most frequent is *Mycosphaerella aspidii*, a polyphagous fungus extremely common in dead fronds of various ferns. The other species are highly specialized and obviously more or less parasitic: *M. osmundicola* is confined to *Osmunda*, *M. pteridis* to *Pteridium*, and *M. asperulata* to *Polypodium*. *M. filicum*, finally, is conceived here in a broad sense, including forms on *Asplenium*, *Polypodium*, and *Dryopteris spinulosa*.

On the whole these fungi have not been much

studied. The pioneer in the field was Desmazières (1840, 1843), who first described *M. filicum* and *M. pteridis*. Auerswald's (1869) generic monograph was to be highly influential. It included five pteridicolous taxa: Desmazières's two (partly misunderstood) species and two new ones, *Sphaerella asplenii* and *S. tirolensis* (on *Polypodium*), and finally "*Sphaerella aquilina* (Fr.) Awd." on bracken. The names introduced by Auerswald have been much employed but variously interpreted. The nomenclature confusion has been still more aggravated by mixing *Sphaeria polypodii* Rbh. (= *Glomerella polypodii* (Rbh.) L. & K. Holm) up in it. The combination *M. polypodii* (Rbh.) Lindau has been used for various pteridicolous *Mycosphaerellae*. A noteworthy article on these fungi was published by von Höhnelt (1918). Based on a study of type specimens he correctly interpreted *Sphaeria filicum* and *S. polypodii*. By far the most thorough study devoted to any pteridicolous fungus is the investigation by Aggéry (1935) on the life history of "*Sphaerella subostiolicola*".

Artificial key

1. Ascocarps clothed with asperulate hyphae. On *Polypodium* 1. *M. asperulata*
- Ascocarps with \pm sparse, smooth hyphae 2

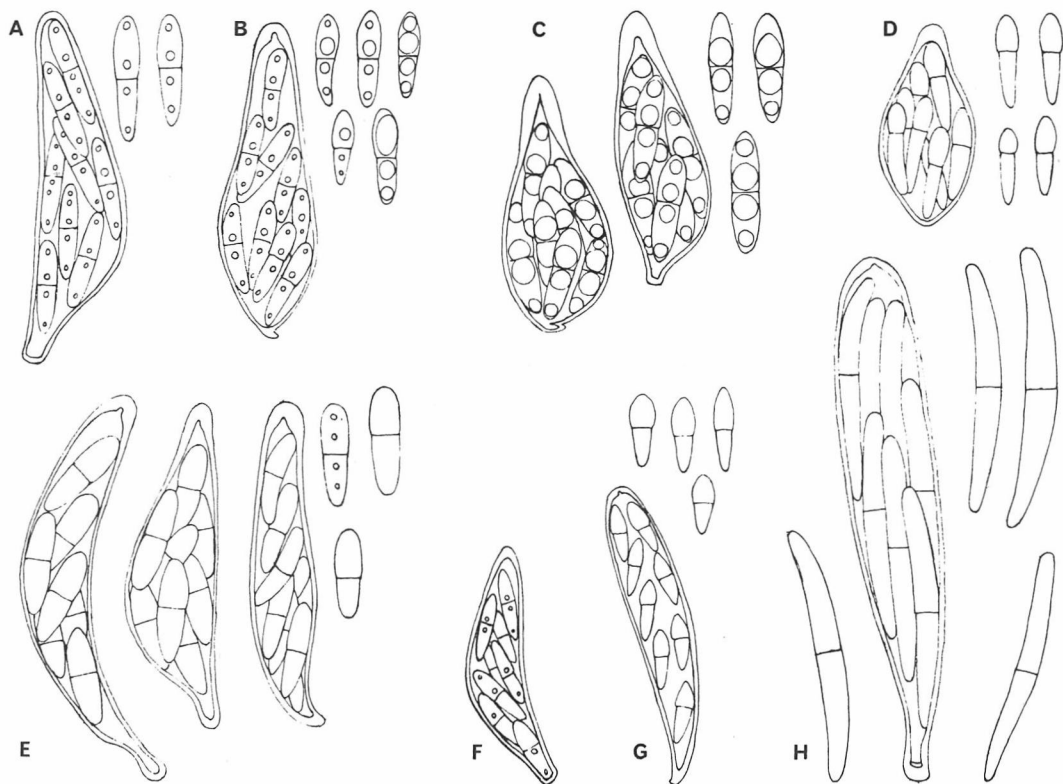


Fig. 1. Asci and spores. — A: *Mycosphaerella filicum* on *Asplenium adiantum-nigrum* (Jaap, F. sel. 617). — B: Ditto, on *Dryopteris spinulosa*: ascus (Lind), mature spores (Holm 350 a). — C: Ditto, on *Polypodium vulgare* (Holm 925 a). — D: *M. osmundicola*. — E: *M. asperulata*. — F: *M. aspidii* on *Polypodium vulgare*. — G: Ditto, on *Dryopteris filix-mas*. — H: *M. pteridis*. — All $\times 1000$.

2. Spores cylindrical, $> 25 \mu\text{m}$. On *Pteridium* 5. *M. pteridis*
 — Spores fusiform, cuneate, or oblong, $< 20 \mu\text{m}$ 3
 3. Spores with a suprmedian septum. On *Osmunda* 4. *M. osmundicola*
 — Spores with a median septum 4
 4. Saprobitic. Ascocarps scattered, spores without or with indistinct guttules 2. *M. aspidii*
 — Parasitic. Ascocarps mostly grouped. Spores with very distinct guttules 3. *M. filicum*

1. *Mycosphaerella asperulata* L. & K. Holm, sp. nova

Typus: Suecia, Uplandia, par. Dalby, "Jerusalem", in frondibus languescentibus *Polypodii vulgaris*, 29.VII.1978, K. & L. Holm 1469 (UPS holotypus).

?*Sphaerella subostiolicola* Aggéry, Bull. Soc. Hist. Nat. Toulouse 68: 72 (1935) — Type: France, Pyrénées Orient., Molitg-les-Bains, "sur les feuilles vivantes de *Polypodium vulgare* L., *P. vulgare* var. *serratum* D. C. et *P. cambricum* L." (n.v.).

Exs.: Karst., F. fenn. 669 ('*Sphaeria Polypodii*', UPS).

Fig. 1 E, 2.

Species inter *Mycosphaerellas* mycelio profuso asperulato perdistincta.

Ascocarps gregarious in *hypophyllous* spots, piercing the epidermis with a minute papilla, \pm globose, $80\text{--}140 \mu\text{m}$ diam., clothed by a dark grey asperulate tomentum. *Peridium* $15\text{--}20 \mu\text{m}$ of 2–3 layers of \pm flattened cells, up to $12 \mu\text{m}$. *Asci* rather numerous in a fascicle, oblong to slightly ventricose, $40\text{--}50 \times 10\text{--}12 \mu\text{m}$, 8-spored. *Spores* oblong, with obtuse ends and a \pm median septum, generally $12\text{--}15 \times 4\text{--}4.5 \mu\text{m}$,

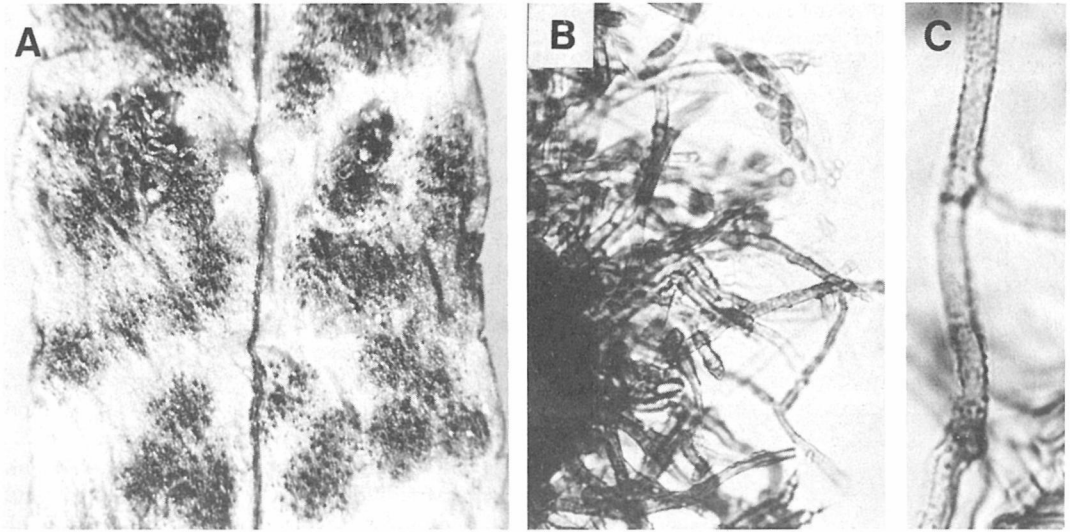


Fig. 2. *Mycosphaerella asperulata*. – A: Groups of ascocarps, $\times 8$. – B: Hairs, $\times 530$. – C: Hair, $\times 1300$.

hyaline, when fully mature with a granular plasma.

Parasitic-saprobic in the fronds of *Polypodium vulgare*.

Mycosphaerella asperulata is a most characteristic fungus, which generally can be identified with the naked eye. Infested leaflets turn brownish and their underside is spotted by numerous, indefinite dark patches, 1–2 mm large, caused by the clustered tomentose ascocarps. The profuse mycelium is distinctly asperulate, hence the specific epithet. We do not know of any other species of *Mycosphaerella* with this type of mycelium, and possibly it is not well accommodated in the genus. It is rather strange that this most distinctive species has been largely overlooked. Possibly *Sphaerella subostiolicola* Agg ry might be identical; its hypophyllous habit is suggestive. Unfortunately, it has been impossible to trace any material of that species (according to kind information from Dr J. Fayret, Toulouse).

Munk (1957 p. 312) recorded a fungus on *Polypodium* under the name of "*Mycosphaerella* cfr. *filicum*"; judging from the description it probably was *M. asperulata*.

It is possible that *M. asperulata* is less common than the other fungi forming leaf-spots on *Polypodium*, i.e. *Glomerella polypodii* and *M.*

filicum, but it is certainly not rare in Scandinavia. Besides the type we have seen the following material:

Sweden: *Uppland*, Dalby, "Jerusalem", 27.VII.1978, Holm 1468 a; 300 m ESE of "Jerusalem", 9.XI.1978, Holm 1524; 400 m SSW of "Jerusalem", 7.VII.1976, Holm 885 b. – H ggeby, Skadevi, VII.1888, C. W. Brostr m (S). – *S dermanland*, Mariefred, 7.VI.1938, Th. Arwidsson (S). – *V stmanland*, Nora, Kerstinbo, 21.V.1975, Holm 571 a.

Finland: *Tavastland*, Mustiala (= Karst., F. fenn. 669). – H meenlinna, Aulanko, 27.VI.1968, P. Alanko 6836 (H). – Elim ki, 19.VI.1971, P. Alanko 16889 (H).

2. *Mycosphaerella aspidii* (von H hnel) L. & K. Holm, comb. nova

Carlia Aspidii v. H hnel, Ann. Mycol. 16: 62 (1918) – Lectotype: Austria, Schladming, *Dryopteris filix-mas*, VIII.1908, v. H hnel (= Rehm, Asc. 1809, sub nom. *Myc. Asplenii* var. *Aspidii*, S!)

[*Mycosphaerella filicum* sensu auct. plur., non sensu orig.]

[*Mycosphaerella aquilina* sensu auct. plur., non sensu orig., vide infra.]

Mycosphaerella aquilina f. *Aspidiorum* (Sacc.) Jaap, F. sel. exs. 615 in sched. (1913) – *Sphaerella aquilina* f. *Aspidiorum* Saccardo, Ann. Mycol. 7: 435 (1909) – Type: Germany, pr. Werneuchen, *D. filix-mas*, 30.V.1909, H. Sydow (= Syd., Myc. germ. 784, UPS isotype!)

Exs.: On *Dryopteris filix-mas*: Fckl, F. rhen. 854 ('*Sphaeria Polypodii* Rabh. f. *Aspidii*') (S) – Jaap, F. sel. 615 ('*Myc. aquilina* f. *aspidiorum*') (S) – Krieg., F.

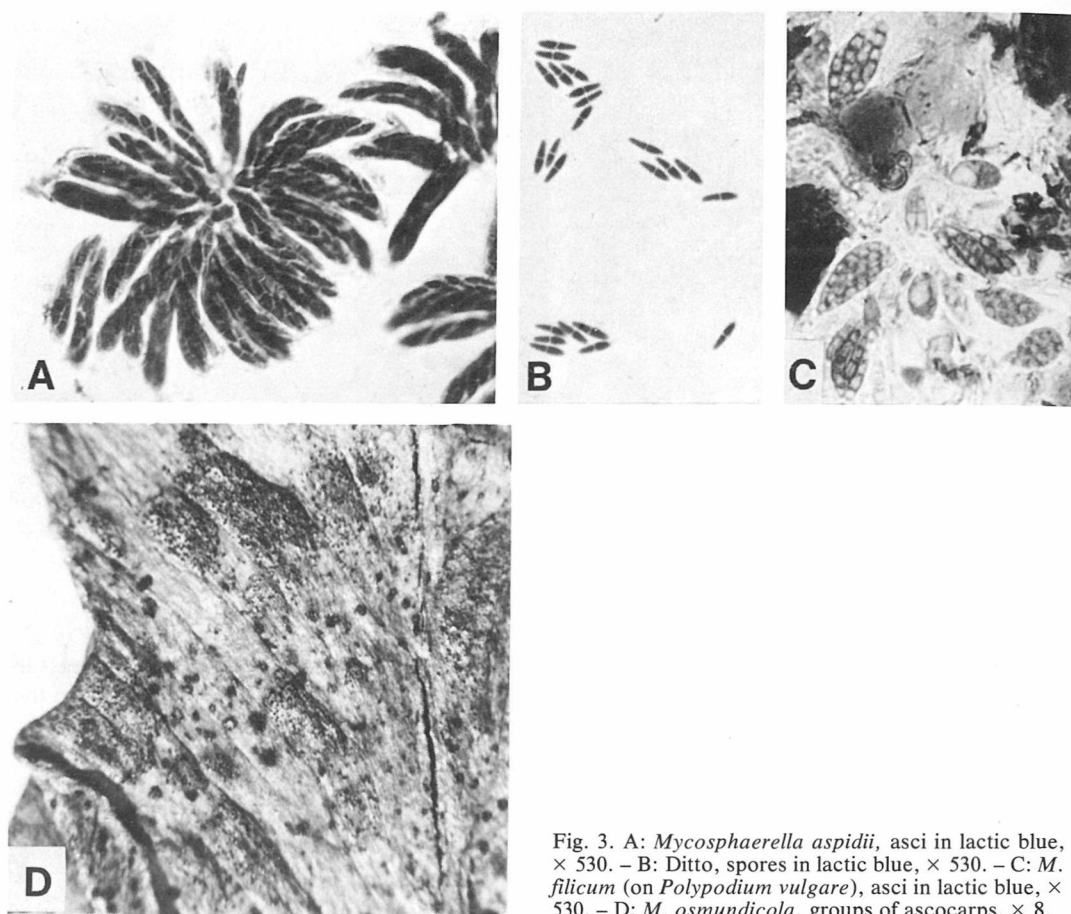


Fig. 3. A: *Mycosphaerella aspidii*, asci in lactic blue, $\times 530$. - B: Ditto, spores in lactic blue, $\times 530$. - C: *M. filicium* (on *Polypodium vulgare*), asci in lactic blue, $\times 530$. - D: *M. osmundicola*, groups of ascocarps, $\times 8$.

sax. 2063 (*M. aquilina*) (S) - Lundell & Nannf., F. exs. succ. 2270 (*M. filicium*) (S, UPS) - Petr., Fl. Bohem. Mor. II:1:778 (*M. aquilina* f. *Aspidiorum*) (S) - Rehm, Asc. 1809 (*M. Asplenii* v. *Aspidii*) (S) - Syd., Myc. germ. 784, 1334 (*Sphaerella aquilina* f. *Aspidiorum*) (S, UPS).

On *Pteridium aquilinum*: Rbh., F. eur. 1728 (*Sphaerella aquilina*) (S, UPS).

Fig. 1 F, G, 3 A, B, 4 A.

Ascocarps amphigenous, mostly in dead fronds, generally scattered, \pm sparsely connected by hyphae; subglobose, immersed, piercing the epidermis with the bluntly conical apex, 50-80 (-100) μm diam. *Peridium* c. 10 μm broad, of 2-3 layers of \pm flattened cells up to 25 μm large. *Asci* generally numerous in a fascicle, oblong-clavate or \pm saccate, c. 35-40 \times 7-8 μm , very briefly stipitate. *Spores* \pm distichous, somewhat

cuneate, 8-11 \times 2.5-3.5 μm , with a median septum, hyaline, generally eguttulate but on some hosts with indistinct oil droplets, cf. below.

Mycosphaerella aspidii is probably the most frequent of all pteridicolous ascomycetes. It is apparently polyphagous, and we have found it on a number of ferns: *Athyrium alpestre* (= *A. distentifolium*), *A. filix-femina*, *Cystopteris fragilis*, *C. montana*, *Dryopteris cristata*, *D. filix-mas*, *D. dilatata* coll., *D. spinulosa*, *Lastrea dryopteris*, *L. phegopteris*, *Matteuccia struthiopteris*, *Osmunda regalis*, *Polypodium vulgare*, and *Pteridium aquilinum*. It is extremely common and is hardly ever absent from dead fronds of e.g. *Athyrium* and *Dryopteris* spp. The fructifying mycelium is generally saprobic, but

may exceptionally be parasitic, as is evident from Fckl., F. rhen. 854, with ascocarps in spotted green leaves of *Dryopteris filix-mas*. This widespread fungus seems on the whole to be but little variable, though special biotypes may occur on *Polypodium* and *Pteridium*. On these hosts it is always found with indistinctly guttulate spores, a condition otherwise only rarely met with in this species. The form on *Polypodium* moreover seems to deviate by fewer and more saccate asci (cf. Fig. 1 F). It has sometimes been identified with *Mycosphaerella tyrolensis*, see under *M. filicum* whilst the form on bracken has passed as *M. aquilina*, see below.

The nomenclature is rather complicated. Surprising as it is, this most common among fern fungi had to wait long for a name of its own. This delay was due to the common belief that the fungus was identical with *M. filicum*. Apparently von Höhnelt (in Rehm 1909 p. 136) was the first one to break with this bad tradition, and later on (von Höhnelt 1918 p. 61) he introduced the substitute name "*Carlia Aspidii* (Fuckel) von Höhnelt". The reference to Fuckel is not correct, though, as the implied basionym, "*Sphaeria Polypodii* f. *Aspidii* Fuckel", is a nomen nudum. However, von Höhnelt himself supplied a short description, sufficient to validate the name *Carlia aspidii*, which should be ascribed to von Höhnelt alone. But the typification is somewhat problematic. Selecting Fuckel, F. rhen. 854, as the collection first cited by Höhnelt, would seem fairly reasonable. However, von Höhnelt's description was evidently not based on this material, which he stated to be "ganz unreif, ohne Schläuche" (von Höhnelt 1918 p. 62). He cited several other exsiccata, too, among others Rehm, Asc. 1809, which seems to be an appropriate lectotype. It is moreover the type of *M. asplenii* var. *aspidii* von Höhnelt, Ann. Mycol. 7: 136 (1909).

Another name which has been much used for this species is *Mycosphaerella* (*Sphaerella*) *aquilina*, cf. the list of exsiccata. The nomenclator is as follows: *Xyloma aquilinum* Fries, Obs. Mycol. 2: 362 (1818) – *Sphaeria aquilina* Fries, Syst. Mycol. 2: 522 (1823) – *Sphaerella aquilina* Auerswald, Mycol. Eur. 5/6: 20 (1869) – *Mycosphaerella aquilina* Schröter, Pilze Schlesiens 2: 341 (1894). – Following Schröter most authors have applied this name to the

small-spored *Mycosphaerella* on bracken. Nannfeldt, on the contrary, in Lundell & Nannfeldt (1954 p. 32) used it for the long-spored one, i.e. *M. pteridis*, on the basis of Vestergren's (1897 p. 266) report that Fries's "type specimen" represented the latter form. As a matter of fact, this material contains a mixture of both species. However, Fries's *Sphaeria aquilina* surely was neither of them. The fungus was originally referred to *Xyloma*, a name which Fries certainly would not have employed for a sphaerellaceous species. In Systema Mycologicum it is listed between *Sphaeria empetri* (= *Duplicaria empetri*) and *Sphaeria artocreas* (= *Discosia artocreas*). This company, as well as Fries's description certainly will exclude the fungus from *Mycosphaerella*. The original material in UPS, referred to by Vestergren, is labelled "*Sphaeria aquilina* Fr. Femsjö" in Fries's characteristic handwriting, and might be considered "type material". Besides numerous ascocarps of *Mycosphaerella aspidii* and *M. pteridis*, there are some dark spots on the fronds, which could well be the Friesian *Sphaeria aquilina*. These spots are indeterminable remnants of dead fruit bodies. Von Höhnelt (1919 p. 74) interpreted *Sphaeria aquilina* Fr. as identical with a fungus which occurs intermixed in Thüm., Myc. univ. 73 ('*Hysterium aquilinum*') and Rehm, Asc. 270 ('*Hypoderma aquilinum*'). Von Höhnelt named this fungus "*Placostroma aquilinum* (Fr.) v. Höhnelt". This identification is fairly reasonable. However, the old name *Sphaeria aquilina* has been conceived in still another sense, as referring to a species of *Leptopeltis*, viz. the so-called "*Leptopeltis aquilina* (Fr.) Petr.", i.e. *L. pteridis* (Mouton) v. Höhnelt. (cf. Holm & Holm 1977 p. 220). This species is present, too, in the cited exsiccata, and is certainly the fungus which Thümen and Rehm had in mind. In any case, it seems strongly advisable to drop the name *Sphaeria aquilina* wholly, in view of the various interpretations of the name and of the bad condition of the original material. *Sphaeria aquilina* sensu von Höhnelt was recently described by us as *Monographos minor* (Holm & Holm 1978 p. 106).

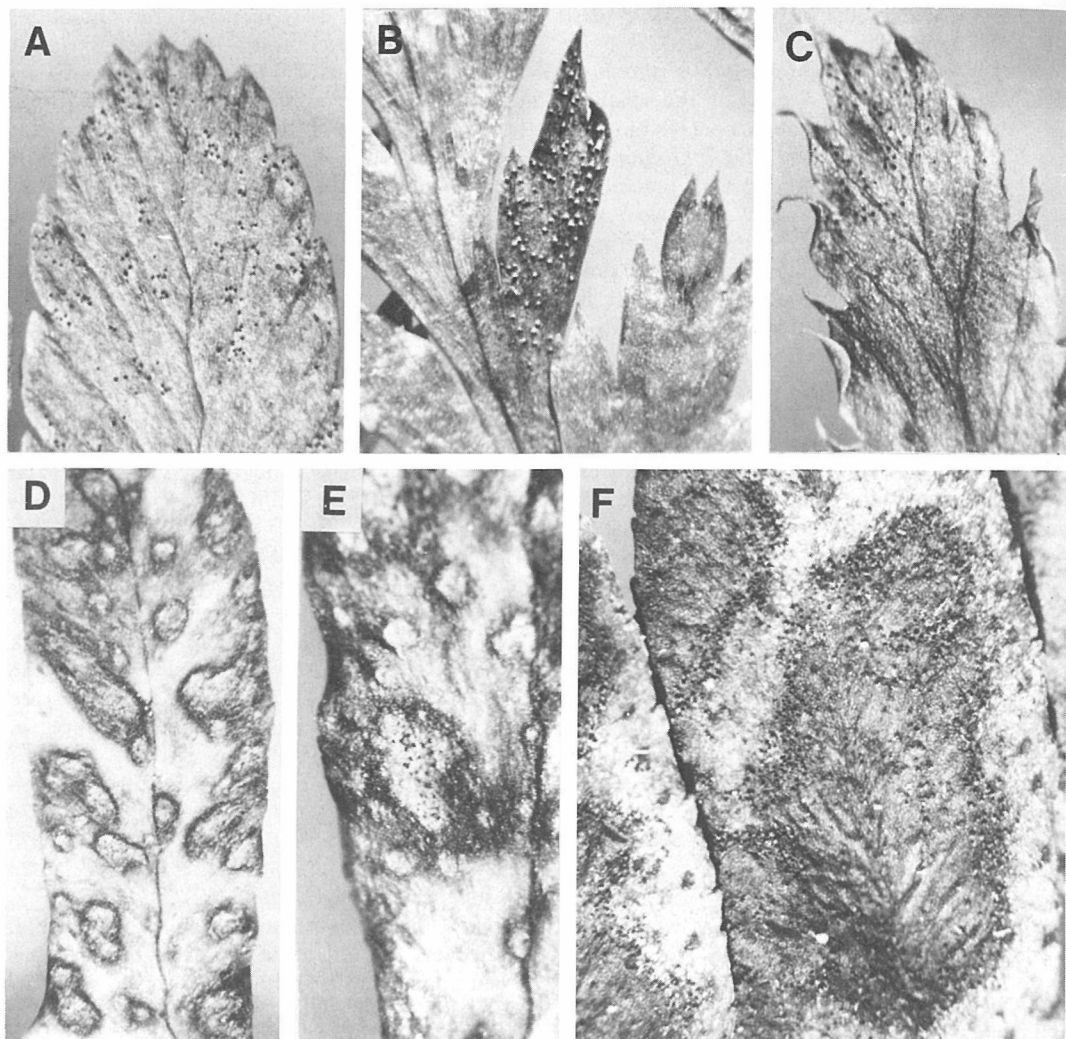


Fig. 4. Ascocarps. - A: *Mycosphaerella aspidii*, $\times 8$. - B: *M. filicum* on *Asplenium adiantum-nigrum*, $\times 8$. - C: *M. filicum* on *Dryopteris spinulosa*, $\times 8$. - D-F: *M. filicum* on *Polypodium vulgare*. - D: Young spots in living leaves, $\times 4$. - E: Detail of D, $\times 8$. - F: Elderly spot in dead leaflet, $\times 8$.

3. *Mycosphaerella filicum* (Desm.) Starbäck, s. lato

Starbäck, Bihang K. Sv. Vet.-Akad. Handl. 15:3:2:9 (1889) - *Sphaeria Filicum* Desmazières, Pl. Crypt. France ed. 1: 983 (1839); Ann. Sci. Nat. Bot. ser. 2. 13; 187 (1840) - *Sphaerella filicum* (Desm.) Auerswald in Mycol. Eur. 5/6: 20 (1869) - Type: France, *Asplenium adiantum-nigrum* (PC!).

Mycosphaerella asplenii (Awd) Lindau in Engler-Prantl, Nat. Pflanzenfam. 1:1:426 (1897) - *Sphaerella Asplenii* Rbh. ex Auerswald, Mycol. Eur. 5/6: 20

(1869); Rbh. ex Niessl, Verhandl. Naturforsch. Ver. Brünn. 3: 178 (1864), nom. nud. - Type: "Auf allen Theilen abgestorbener Wedel von *Asplenium septentrionale*" (n.v.).

?*Mycosphaerella tirolensis* (Awd) Magnus in Dalla Torre & Sarnthein, Fl. Tirol, Vorarlberg und Liechtenstein 3: 463 (1905) - *Sphaerella tirolensis* Auerswald, Mycol. Eur. 5/6: 20 (1869) - Type: "Lebt auf abgestorbenen Wedeln von *Polypodium vulgare*" (n.v.).

Fig. 1 A-C, 3 C, 4 B-F.

Mycosphaerella filicum is used here as a comprehensive name for some closely related forms, which start their development as true parasites but which apparently will not reach full maturity until the host tissue is dead. They can be characterized as follows:

Ascocarps generally densely grouped in brownish spots in living fronds, immersed, piercing the epidermis with a bluntly conical apex, subglobose, (50–)60–80 μm diam., connected by olivaceous hyphae. *Asci* few, mostly 10–15, finally pyriform, 25–40 \times 10–14 μm . *Spores* oblong, (11–)13–15(–18) \times 3.5–4.5 μm , with a median septum, slightly greenish, in each cell with 2 very distinct oil globules, which finally fuse.

M. filicum is distinctive owing to the parasitic habit, the saccate asci and the strongly guttulate spores. Since it forms leaf spots it catches the eye and has been relatively much collected, unfortunately generally in an unripe condition. It is possible that the ascocarps do not reach full maturity until the infested fronds are dead. As understood here, *M. filicum* will comprise forms on *Asplenium* spp., on *Polypodium vulgare*, and on *Dryopteris spinulosa*, which will be discussed separately. Unfortunately the nomenclature has been much confused, as the name *Mycosphaerella* (*Sphaerella*) *filicum* has been widely employed for *M. aspidii*. This practice was introduced by Auerswald (1869) and perpetuated by many authors, i.a. Starbäck who made the combination in *Mycosphaerella*.

Our treatment of *M. filicum* is admittedly preliminary. The taxonomy of these forms can probably not be definitely settled without extensive cultivation experiments, which are outside the scope of this study.

On *Asplenium* species

Exs.: On *A. adiantum-nigrum*: Desm., Pl. Cr. Fr. 983 (PC) – Fockel, F. rhen. 831 (S) – Jaap, F. sel. 617 (S), 710 a, b (S) – Rehm, Asc. 1571 (S).

On *A. septentrionale*: Jaap, F. sel. 616 (S) – Petr., Fl. Bohem. Mor. II:1:2481 (S); Myc. gen. 327 (UPS) – Rbh., F. eur. 2438 (S) – Rehm, Asc. 1570 (S).

On *A. trichomanes*: Thüm., F. austr. 243 (UPS).

Fig. 1 A, 4 B.

Particularly when growing on *A. adiantum-nigrum* the fungus is quite conspicuous owing to the \pm discoloured leaves; often a large part of

the lamina turns brownish, beginning at the margins (Fig. 4 B). The clustered ascocarps are generally epiphyllous, but hypophyllous groups of ascocarps are not at all rare. Almost all herbarium material seen by us is more or less immature. However, we can find no support for distinguishing between the forms on different species of *Asplenium*, as some authors have tried. We thus include *Mycosphaerella asplenii* in *M. filicum*. (We have not seen any authentic material of *Sphaerella asplenii*, but there can be no doubt about the identity of Auerswald's fungus; particularly convincing is his drawing of the spores with oil globules.)

Mycosphaerella filicum is probably rather common on *Asplenium* spp., though it catches the eye only on *A. adiantum-nigrum*. We have seen material from Sweden, Denmark, France, Germany, Switzerland, Austria, Hungary, and Yugoslavia. So far only three Scandinavian collections are known:

Sweden: Uppland, Dalby, Löjhällen, *A. septentrionale*, 7.VI.1976, Holm 831b. – Ännesta, *A. s.*, 4.XI.1978, Holm 1523.

Denmark: Bornholm, Hammershus, *A. adiantum-nigrum*, 8.VIII.1922, J. Lagerkranz (UPS).

On *Dryopteris spinulosa*

Exs.: Eriksson, F. par. 196 (S, UPS) – Rbh., Herb. Mycol. II:534 (S) – Vgr., Micr. 1080 (S, UPS).

Fig. 1 B, 4 C.

This form is very noteworthy because of the *hypophyllous* ascocarps; otherwise it agrees well with the forms on *Asplenium* and *Polypodium*. Possibly it also has somewhat smaller spores. Anyway we do not feel justified in describing it as a new taxon, as we have seen only one fully mature collection (Holm 350).

It is indeed amazing that this form seems to be restricted to *Dryopteris spinulosa* or in any case to have a marked preference for this particular species. We have searched for it in vain in the Scandinavian collections of *D. dilatata* s.lat. in UPS whilst scrutinizing the material of *D. spinulosa* resulted in one find (Umeå, cf. below). If the fungus will discriminate between those closely related species it must be ranked as a skilful taxonomist.

On account of the leaf spots the fungus is rather conspicuous, and has been noticed by several collectors and throughout identified as

Mycosphaerella (*Sphaeria*, *Sphaerella*) *filicum*. Besides the above-mentioned exsiccata we have seen the following material:

Sweden: Småland, Ö. Torsås, Sunnansjö, 16.VIII.1883, C. J. Johanson (S). – Dalarna, Garpenberg, Realsbo, 29.VIII.1974, Holm 350 a. – Västerbotten. Umeå, X.1919, V. Ålund (UPS).

Denmark: Sealand, Slangstrup, 20.X.1907, J. Lind (S).

Germany: Brandenburg, pr. Buckow, 20.X.1917, P. Vogel (S). – Saxony, Schandau, Hort. Bot., VIII.1903, P. Sydow (S).

On *Polypodium vulgare*

Exs.: 0. (Roumeg., F. gall. 2935 sub nom. *Sphaerella tyrolensis* is quite immature and indeterminate, at least in UPS – Vgr, Micr. rar. sel. 1489 sub nom. *M. tyrolensis* is *Glomerella polypodii*, UPS.)

Fig. 1 C, 3 C, 4 D–F.

Generally forming very distinct necrotic leaf spots, first in live, then in dying fronds; the patches are first whitish with a few epiphyllous ascocarps (Fig. 4 D, E) and later turn brown with many crowded fruit bodies (Fig. 4 F). At a late saprobic stage scattered ascocarps also occur, outside the spots, even in the underside of the leaves. Those ascocarps may grow intermixed with fruit bodies of *M. aspidii*, which are very similar.

It is possible and perhaps probable that Auerswald's *Sphaerella tirolensis* belongs here. Unfortunately we have not been able to trace any authentic material (there is none in B, nor in K). Anyway this fungus has been little collected. Nevertheless it seems to be common around Uppsala. It should not be confused with "*Mycosphaerella polypodii*", i.e. *Glomerella polypodii*, cf. Holm & Holm (1978 p. 102) which is superficially similar.

4. *Mycosphaerella osmundicola* (Kirschst.) L. & K. Holm, comb. nova

Sphaerella osmundicola Kirschstein, Hedw. 81: 194 (1944) – Type: Germany, Olpe, in dead leaves of *Osmunda regalis*, 23.VI.1940, leg. A. Ludwig (B!).

Fig. 1 D, 3 D.

Ascocarps amphigenous, densely crowded, immersed in the leaf tissue, subglobose, c. 50 μm diam., connected by a \pm profuse, dark intramatric mycelium. Asci few, c. 10, pyriform, 25–30 \times 10–12 μm , sessile, 8-spored. Spores con-

globate, \pm cuneiform, 10–13(–15) \times 2.5–3 μm , hyaline, with a suprmedian septum.

This species seems very distinctive, in aspect as well as microscopically: the groups of ascocarps appear as dark spots, c. 5 mm long; the spores are characterized by the suprmedian septum. It has so far been known only from two German collections, cf. Kirschstein (1944). Possibly Schröter's (1894 p. 342) record of "*Mycosphaerella filicum*" on *Osmunda* actually refers to this species.

Sweden: Småland, Femsjö, Älmås, in last year's leaves of *Osmunda regalis*, 13.VII.1929, Nannfeldt 2416 (UPS).

5. *Mycosphaerella pteridis* (Desm.) Schröter

Schröter, Pilze Schlesiens 2: 341 (1894) – *Sphaerella pteridis* (Desm.) De Notaris, Sfer. ital. 87 (1863), non *Sphaerella pteridis* Cooke, J. Bot. 4: 250 (1866) quod est *Didymella prominula* – *Sphaeria pteridis* Desmazières, Pl. Crypt. Fr. ed. 1: 1295; Ann. Sci. Nat. Bot. sér. 2. 19: 359 (1843) – Type: France, *Pteridium aquilinum* (P.C!). [? *Sphaeria punctiformis* b. *Pteridis* Fries, Syst. Mycol. 2: 525 (1823), nom. nud.]

Sphaerella indistincta Peck, Ann. Rept N. Y. State Mus. 28:81 (1877) – Type: USA, N. Y., Albany, *Pteridium aquilinum*, VI.1876, leg. Peck (= Thüm., Myc. univ. 759, UPS isotype!).

Exs.: Desm., Pl. Crypt. Fr. I:1295 (PC) – ? Fr., Sci. suec. 86 ('*Sphaeria punctiformis*', UPS) – Fckl, F. rhen. 852 ('*Sphaeria aquilina*', S) – Krieg., F. sax. 129 (S) – Lundell & Nannf., F. suec. 2268 ('*M. aquilina*', S, UPS) – Rbh., F. eur. 249 (S) – Rehm, Asc. 443, 837 ('*Sphaerella aquilina*', S) – Syd., Myc. germ. 3311 (S, UPS); Myc. march. 1072 (?), 1973 ('*Sphaerella aquilina*', S, UPS) – Thüm., Myc. univ. 759 ('*Sphaerella indistincta*', UPS), 1841 (UPS).

Fig. 1 H.

Ascocarps epiphyllous, scattered or often rather densely grouped, subglobose, 100–130 μm diam., immersed, piercing the epidermis with a blunt apex. Peridium up to 30 μm broad, of textura angularis. Asci rather numerous, \pm oblong, 60–70 \times 12 μm , with a brief but distinct pedicel, 8-spored. Spores \pm parallel, cylindrical-fusiform with obtuse ends, often arcuate, (25–) 30–38 \times 4–5 μm , without (or with indistinct) guttules, hyaline, with a median or slightly suprmedian septum.

In dead fronds of *Pteridium aquilinum*.

This species is easily distinguished from the other Nordic pteridicolous *Mycosphaerellae* by its long and narrow spores. It can also be

identified under the binocular fairly safely because of the relatively large ascocarps, grouped in the upper leaf side. It is very common and apparently confined to *Pteridium*, often found intermixed with *Mycosphaerella aspidii*.

We concur here in a widely accepted tradition when identifying this fungus with Desmazières's *Sphaeria pteridis*. His original material (PC!) is quite immature, but agrees well in appearance with *M. pteridis* as understood here, and as nothing forbids the supposed identity, we think it appropriate to follow the tradition from De Notaris, Winter and Schröter. In his protologue Desmazières cited *Sphaeria punctiformis* b. *Pteridis* Fr. as a synonym with explicit reference to Fr., *Scilicet*. 86. (It is uncertain whether this means the first or the second edition.) The identification may be correct: the material at UPS of ed. 1, No. 86 is immature but could well be Desmazières's species. In any case the epithet "*pteridis*" should be credited to Desmazières alone, as "*Sphaeria punctiformis* b. *Pteridis* Fr." is a nomen nudum.

Sphaerella pteridis Cooke is quite different. Cooke referred to Desmazières but as is evident from his description and illustration his fungus is the so-called *Didymella prominula* (Speg.) Piroz. & Morgan-Jones (possibly a form of *Scirrhia aspidiorum?*).

Finally it is worth mentioning that Desmazières's description contains a remarkable passage: "ascis clavatis e duplici membrana compositis" (Desmazières 1843 p. 359). This

may be the first record in the literature of a bitunicate ascus!

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