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HERPOTRICHIA AND ITS SEGREGATES

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SUMMARY

The North American species described in *Herpotrichia* are more suitably disposed in five genera and four families: *Herpotrichia* (Massarinaceae), *Neopeckia* (Coccoideaceae), *Lojkania* (Fenestellaceae), *Pseudotrichia* and *Byssosphaeria* (Melanommataceae). New combinations are proposed in *Lojkania* for *Sphaeria decorticata* Cooke & Harkness, *Psilosphaeria melasperma* Cooke, *Amphisphaeria nuda* Ellis & Everhart, *A. separans* Ellis & Everhart, *Herpotrichia striatispora* Papendorf & von Arx, *Melanopsammina utahensis* Petrak and in *Byssosphaeria* for *Cucurbitaria alnea* Peck, *Herpotrichia jamaicana* Sivanesan, *Sphaeria salebrosa* Cooke & Peck, *Herpotrichia schiedermayeriana* Fuckel, *Sphaeria semen* Cooke & Peck, and *S. xestothele* Berkeley & Curtis. Two species are included from Venezuela, *Pseudotrichia mamillata* sp. nov. and *P. pachnostoma* (Berkeley & Curtis in Cooke) comb. nov., as well as one from Jamaica, *Byssosphaeria oviformis* sp. nov. *Herpotrichia erythrinae* Huguenin is transferred to *Byssosphaeria*.

North American species that key to *Herpotrichia* in recent treatments (Bose, 1961; Müller and von Arx, 1962; Sivanesan, 1972; Luttrell, 1973; von Arx and Müller, 1975) exhibit a diversity of features. It becomes obvious that *Herpotrichia* s. lat. is heterogeneous and that several genera are recognizable. The variations in shape, position and vestiture of ascomata and in characteristics of asci, pseudoparaphyses and ascospores, are such that it seems essential to re-establish several genera now included in the synonymy of *Herpotrichia*. I present here an account of the North

American species, and remarks on some extralimital taxa, utilizing five genera, arranged in four different families, two each in the Pleosporales and the Melanommatales.

Herpotrichia s. str. bears many resemblances to *Massarina* with numerous "curtainlike" pseudoparaphyses visible above the relatively short asci, ascospores hyaline and one septate, finally becoming light brown and several septate, usually constricted in each hemispore as well as at the primary septum, and usually surrounded by a gel coating. Taxa of *Herpotrichia* seem suitably placed in the family Massarinaceae as an erumpent-superficial, tomentose group of species.

Neopeckia, with the sole species *N. coulteri*, is also pleosporaceous but differs from *Herpotrichia* in several respects. The globose ascomata have a short broad papilla and are borne in and under abundant subiculum of narrow hyphae; the asci are cylindric and occupy much of the centrum space; the ascospores are broadly ellipsoid ovoid, reddish to dark brown, and usually one septate. The fungus presents some problems in disposition and for the present is placed in the Coccoideaceae, a family whose other members are parasitic on leaves of various plants.

The other three genera are melanommataceous, with trabeculate pseudoparaphyses and asci often in a peripheral hymenial layer. *Lojkania* includes species whose ascomata are pyriform with short to elongate beak, or ovoid, and whose ascospores are one septate, brown, ellipsoid. This genus seems best placed in the Fenestellaceae.

The globose and papillate ascomata in species of *Pseudotrichia* are covered by tomentum that is yellowish, green, rusty orange, gray or light brown. Ascospores are fusoid, hyaline becoming light brown, and one to several septate. The species of *Byssosphaeria* have a ± turbinate shape to the ascomata, with rounded or plane apex bearing a minute papilla, and ellipsoid or fusoid ascospores, hyaline soon light clear brown or reddish brown, one or several septate. Both *Pseudotrichia* and *Byssosphaeria* are accommodated in the Melanommataceae.

Herpotrichia Fuckel, Fungi Rhenani exs. no. 2171. 1868, in sched.
Enchnosphaeria Fuckel, Symb. Mycol. p. 146. 1870.

Ascomata immersed erumpent or superficial; separate or gregarious, medium sized, globose or somewhat depressed or pyriform, bases rounded or flattened, apex rounded, short or broadly caplike, opening by broad pore; surface tomentose,

at times tomentum short, especially at apex, at sides mingling with and/or forming scanty or abundant subiculum; peridium of pseudoparenchymatous cells, ± equal in width or thickened toward apex; centrum rounded or depressed. Asci bitunicate, basal, clavate or cylindric. Pseudoparaphyses narrowly cellular, numerous above asci and forming a sheet-like layer in section. Ascospores fusoid, ellipsoid or oblong, straight or inequilateral or slightly curved, ends acute or obtuse; hyaline becoming light yellowish brown, dull brown or reddish brown; one septate, median, constricted, often with constrictions in each hemispore and finally developing one or more septa in each hemispore; wall smooth or finely verruculose in age, usually surrounded by gel coating that may be elongated over tips as appendages; contents globular or guttulate; overlapping biseriate or uniseriate in the ascus.

Anamorph: coelomycetous where known, *Pyrenochaeta* or *Phoma* like.

Saprobic on woody or herbaceous substrates.

Type species: *H. rubi* Fuckel = *H. herpotrichoides* (Fuckel) Cannon.

Cannon (1982) established the earliest name for the type species, as Holm (in Farr et al., 1979) did for the earliest date of publication of *Herpotrichia*. *Enchnosphaeria*, typified by *E. pinetorum* (Fuckel) Fuckel, was originally separated on differences in septation of the ascospores, but is in fact not separable from *H. juniperi*.

Key to temperate North American species of *Herpotrichia*

1. Ascomata ± applanate, superficial in ample and widespreading subiculum; typically as "snow mould" on conifer leaves and branches; ascospores 18-27(-34) x 6-9(-12) µm ..... *H. juniperi*
1. Ascomata globose, depressed, or pyriform, immersed at first, becoming erumpent superficial, subiculum more restricted, usually as tomentum around individual ascomata 2
   2. Ascomata globose pyriform with broad caplike apex; ascospores fusoid, (21-)24-43 x (4-)5-7.5 µm ..... *H. macrotricha*
   2. Ascomata globose depressed 3
3. Ascospores ellipsoid oblong, ends obtuse, 24-31(-38) x 6-10 µm ..... *H. symphoricarpi*
3. Ascospores fusoid, ends ± acute, 18-27(-32) x 5-6.5 µm... *H. herpotrichoides*

Other species referred to *Herpotrichia* from extralimital regions include *H. parasitica* (Hartig) E. Rostrup (Tids. Skovbrug 12: 222. 1890). This species is parasitic on leaves of *Abies* in Europe and produces the anamorph *Pyrenochaeta parasitica* Freyer & van der Aa on the same mycelium. A recent redescription is that of Freyer and van der Aa (1975). This fungus appears to be dimeriaceous, with rather thin, soft peridium and septate brown setae. *Herpotrichia villosa* Samuels & Müller (Sydowia 31: 158. 1978) from Brazil produces a *Pyrenochaeta*-like anamorph in culture. *Herpotrichia caesalpiniae* (Doidge) Sivanesan (Mycol. Pap. 127: 15. 1972) is unusual by turbinate shape of ascomata, similar to species of *Byssosphaeria*, but other features are those of *Herpotrichia*; *H. millettiae* Sivanesan (Mycol. Pap. 127: 14. 1972) from Malasia has somewhat the same shape of ascomata and similarly shaped one-septate ascospores. Both *H. yasudae* (Hino) Pirozynski, the type species of *Chaetosphaerulina* Hino, and *H. vermicularispora* (Hino & Katumoto) Pirozynski deviate from *Herpotrichia* in ovoid to barrel-shaped ascomata and elongate-fusoid, multiseptate, hyaline ascospores. *Herpotrichia nigrotuberculata* (Hino & Katumoto) Pirozynski also has vertically elongate ascomata, but with a narrow base, and elongate-fusoid ascospores. These three species appear to belong in *Tubeufia* (Sivanesan, personal comm.). *Herpotrichia pandei* Bose is melanommataceous; the peridium is composed of parallel hyphae at the upper and lower sides, forming platelike areas on the surface. The species is better arranged in *Astrosphaeriella* (cf. Hawksworth, 1981).

Although an exhaustive summary of North American species placed at some time in *Herpotrichia* is not attempted, note is made of the following. *Herpotrichia nicaraguensis* Ellis & Everhart (in C. L. Smith, Bull. Iowa Univ. Lab. Nat. Hist. 2: 400. 1893) with small brown, one-celled ascospores in unitunicate asci belongs in class Ascomycetes. (Central Amer. Fungi, C. L. Smith 8 and Nicaraguan Fungi 77, two parts of holotype, NY). *Herpotrichia purpurea* Ellis & Everhart (Proc. Acad. Nat. Sci. Philadelphia 1895: 415.) is also one of class Ascomycetes. It is a member of the Helotiales, with purplish-brown tomentum and appendages, asci with amyloid apical ring, and hyaline, one-septate, fusoid ascospores. (Washington Flora 344, holotype, NY). *Herpotrichia graminea* Dearness & House (New York State Mus. Circ. 24: 32. 1940) was published without a Latin diagnosis and should be allowed to sink into oblivion. The holotype in NYS (House 820) is very sparse and immature. According

to the description, this is probably *H. macrotricha*. *Herpotrichia quinqueseptata* Weir (J. Agric. Res. 4: 252. 1915) was described as differing from *H. nigra* (= *H. juniperi*) in fusoid ascospores, not constricted at any of the five septa, measuring 28-34 x 7.5-9 µm. From Weir's (1915) illustration, the ascospores are quite different from others in *Herpotrichia*. Seaver (1915) suggested that *H. quinqueseptata* was based upon characteristics of *H. juniperi* but with ascospores of *Mytilidion cf. fusisporum* (Cooke) Saccardo. The ascospores are in agreement with those of *Mytilinidion gemmigenum* Fuckel, of which *M. fusisporum* is a synonym (Zogg, 1962).

Herpotrichia herpotrichoides (Fuckel) Cannon, Trans. Brit. Mycol. Soc. 79: 338. 1982. Figs. 1, 2

Sphaeria herpotrichoides Fuckel, Fungi Rhenani exs. no. 952. 1864, in sched.

Herpotrichia rubi Fuckel, Fungi Rhenani exs. no. 2171. 1868, in sched.

Herpotrichia rhenana Symb. Mycol. p. 146. 1870.

Ascomata 350-650 µm diam, apex rounded, opening by pore; peridium 35-45 µm wide, even in width; tomentum of narrow brown hyphae. Asci 100-160 x 12-15 µm. Ascospores 18-27 (-32) x 5-8 µm, hyaline, dull brown in age, fusoid, 1-septate, with two additional septa in age; usually surrounded by narrow gel coating that is sometimes elongated over tips.

On leaves or twigs or herbaceous stalks, Europe, North America, India.

Material examined: Europe: Fuckel Fungi Rhen. 952 (isotype of *Sphaeria herpotrichoides*, UPS; slide, IMI); Fungi Rhen. 2171 (isotype of *H. rubi*, UPS). North America: Massachusetts: Barr 6060 on rachis of *Carya* sp. Oregon: Barr 6285, twigs of *Ribes* sp.; 6288, stalks of *Epilobium* (MASS).

Herpotrichia herpotrichoides continues to be infrequently collected, as Cannon (1982) noted. He cited two more collections from Germany, four from Britain, and one from India. My collections, although few in numbers of ascomata, conform with European material.

Herpotrichia juniperi (Duby) Petrak, Ann. Mycol. 23: 43. 1925. Figs. 3, 4

Sphaeria juniperi Duby in Klotzsch Herb. Mycol. no. 1833. 1854.

Laestadia juniperi (Duby) Saccardo, Syll. Fung. 9: 585. 1891.

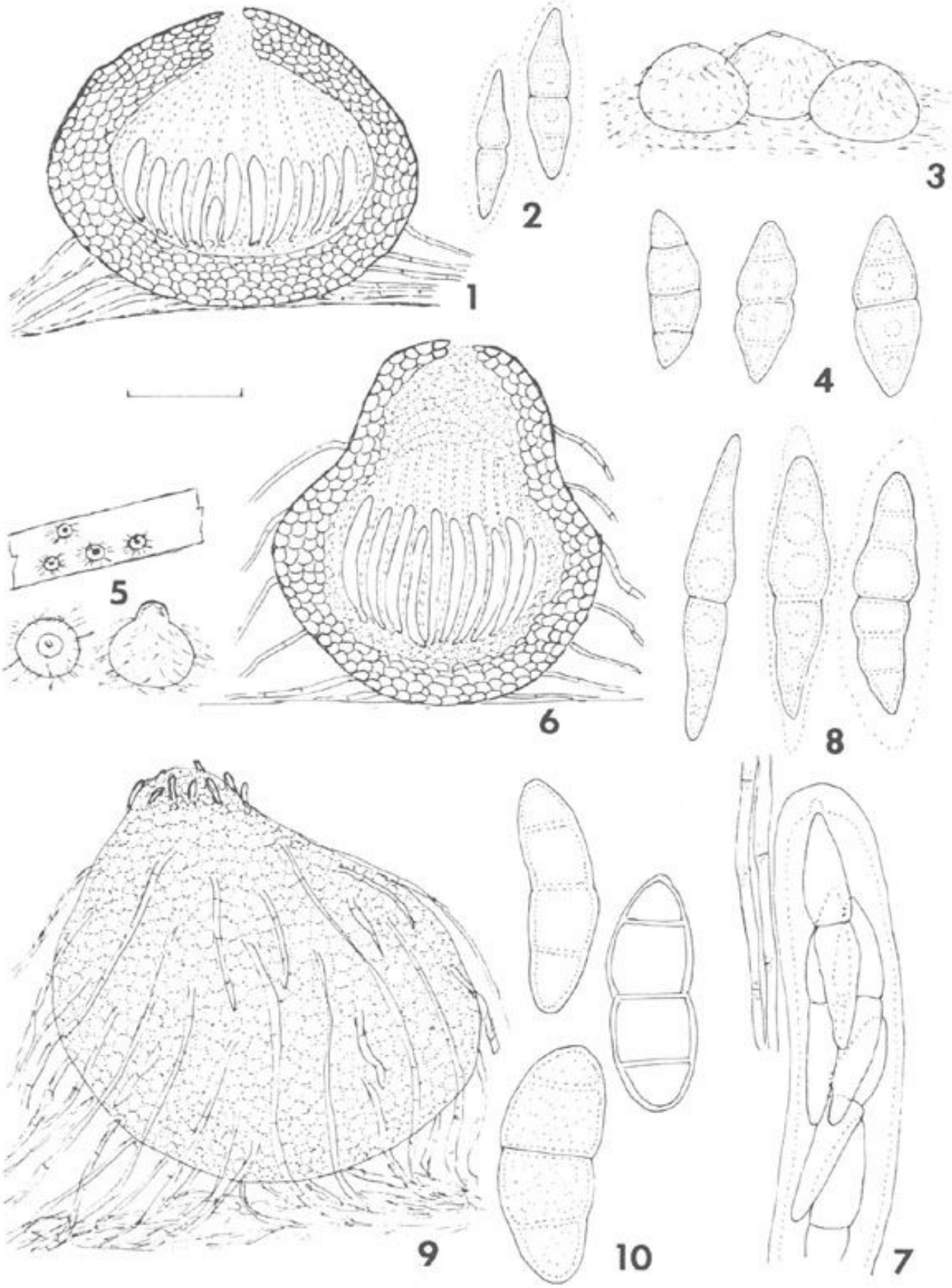
Ozonium plica Kalchbrenner, Math. es Termesz. Közlem. p. 159. 1862.
Sphaeria pinetorum Fuckel, Hedwigia 7: 14. 1868.
Enchnosphaeria pinetorum (Fuckel) Fuckel, Symb. Mycol. p. 147. 1870.
Herpotrichia pinetorum (Fuckel) Winter in Rabenhorst's Krypt. Fl. 2: 208. 1885.
Bertia querceti Rehm, Ascomyceten, no. 43. 1870; in Saccardo, Syll. Fung. 1: 583. 1882.
Enchnosphaeria santonensis Saccardo, Michelia 2: 66.1880.
Lasiosphaeria scabra Auerswald, Fungi Eur. no. 1245; in Saccardo, Syll. Fung. 2: 202. 1883.
Enchnosphaeria passicrinis Saccardo, Syll. Fung. 2: 206. 1883.
Herpotrichia nigra Hartig, Allg. Forst. Jagd. Z. 64: 15. 1888.
Enchnosphaeria nigra (Hartig) Berlese, Icon. Fung. 1: 105. 1892.
Herpotrichia mucilaginosa Starbäck & Greville, Bih. K. Svenska Vetens.-Akad. Handl. 16: 8. 1890.

Ascomata superficial on and immersed in ample subiculum, globose depressed, base ± applanate, 220-400 µm diam, opening by broad pore, tomentum from peridium and subiculum of brown, septate, smooth-walled hyphae, 3-6 µm wide, often iridescent; peridium 30-35 µm wide. Asci (66-)100-145 x (10-)12-18(-20) µm. Ascospores 18-27(-34) x 6-9(-12) µm, hyaline becoming light dull brown, ellipsoid fusoid, 3-(4-) septate.

Anamorph: *Pyrenochaeta*-like; in culture pycnidia appendaged, 80-200 µm diam; conidiogenous cells lining cavity, 4-10 x 1.5-2 µm, branched or unbranched; conidia 1.5-2.5 x 1-2 µm, hyaline, ovoid, one celled (Bose, 1961).

Typically forming "snow mould" of conifers, with leaves and twigs matted together by subiculum; occasionally on other plants. Europe, North America, especially in western mountains.

Figs. 1-10. Species of *Herpotrichia:* 1, 2.*H. herpotrichoides*. 1. Ascoma in section. 2. Ascospores. 3, 4. *H. juniperi*. 3. Habit sketch of ascomata in subiculum. 4. Ascospores. 5-8. *H. macrotricha*. 5. Habit sketches of ascomata. 6. Ascoma in section. 7. Ascus, upper portion, and parts of pseudoparaphyses. 8. Ascospores. 9, 10. *H. symphoricarpi*. 9. Ascoma in surface view. 10. Ascospores. Standard line = 150 µm for figs. 1, 6, 9; 15 µm for figs. 2, 4, 8, 10.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Material examined: Europe: Rabenhorst-Winter-Patzschke Fungi Eur. no. 3961; Fuckel, Fungi Rhen. 1797 (isotype of *Sphaeria pinetorum*, UPS); Rehm Ascom. no. 996. North America: numerous collections from species of *Abies, Juniperus, Libocedrus, Picea, Pseudotsuga, Tsuga* (*Pinus* rarely) from Alberta, British Columbia, Montana, Idaho, Washington, Wyoming, Oregon, Colorado, Utah, Arizona, California. Exsiccati specimens include: Bartholomew, Fungi Col. 4634; Ellis N.A.F. 1342 (specimen on *Picea*); Ellis & Everhart Fungi Col. 1737; Solheim Myc. Saximont. Exs. 26, 124.

The synonymy is taken from Bose (1961) and Sivanesan (1972). Sivanesan reported collections of this species from Nova Scotia and Quebec in eastern Canada; my collections under this name from the Gaspé region of Quebec are instead *H. macrotricha*.

Simms (1967) investigated the ecology of *H. juniperi* (as *H. nigra*). The mycelial subiculum developed on branches that were covered by snow. Initials of ascomata formed after the second winter of snow cover, and ascomata matured on the groupd following dehiscence of the infected twigs.

Herpotrichia macrotricha (Berkeley & Broome) Saccardo, Syll. Fung. 2: 213. 1883. Figs. 5-8

Sphaeria macrotricha Berkeley & Broome, Ann. & Mag. Nat. Hist. ser. 2, 9: 319. 1852.

Lasiosphaeria (Enchnosphaeria) macrotricha (Berkeley & Broome) Cooke, Grevillea 16: 16. 1887.

Sphaeria scabra Currey, Trans. Linn. Soc. London 22: 315. 1859.

Lasiosphaeria scabra (Currey) Saccardo, Syll. Fung. 2: 202. 1883.

Lasiosphaeria (Leptospora) scabra (Currey) Massee, Grevillea 16: 37. 1887.

Venturia callimorpha Auerswald, Bot. Tausch-Ver. 1867-68, non *V. callimorpha* (Montagne) Auerswald, non *Sphaeria callimorpha* Montagne.

Enchnoa callimorpha (Auerswald) Winter in Rabenhorst, Fungi Eur. no. 1238. 1869.

Herpotrichia callimorpha (Auerswald) Winter, Hedwigia 23: 99. 1885.

Enchnosphaeria callimorpha (Auerswald) v. Höhnel, Sitzungsber. Kaiserl. Akad. Wiss., Math.-Naturwiss. Cl., Abt. 1, 132: 95. 1923.

Sphaeria albidostoma Peck, New York State Mus. Rep. 32: 51. 1879.

Herpotrichia leucostoma Peck, Bull. New York State Mus. 2: 23. 1887. (name change only)
Herpotrichia albidostoma (Peck) Saccardo, Syll. Fung. 9: 857. 1891.
Herpotrichia boldae Spegazzini, Fungi Chil. p. 65. 1910.
Didymella agrostidis Dearness & House, Bull. New York State Mus. 233/234: 34. 1921.

Ascomata (150-)200-400 µm diam, 250-450 µm high, globose to pyriform, apex broadly caplike, pallid grayish white under dissecting microscope; tomentum of narrow septate hyphae; peridium brown, 20-37 µm wide, in the caplike apex of hyaline or light yellow pseudoparenchymatous cells, only the outer layer brown, finally opening as broad pore. Asci (70-)90-150 x (10-)12-15(-18) µm, usually 8-spored, at times 4- or 6-spored. Ascospores (21-)24-43 x (4-)5-7.5 µm, hyaline, in age dull brown, fusoid, 1-(3-5-)septate; wall finely verruculose in age, narrow gel coating often elongate over tips as appendages.

On varied substrates, culms of sedges, grasses, stalks of herbaceous plants, woody twigs, nut pericarps, leaves of conifers. Widely distributed in temperate regions.

Material examined: Europe: slides of cotype of *Sphaeria macrotricha*, of holotype of *Sphaeria scabra* (IMI); Rabenhorst Fungi Eur. 1238 as *Enchnoa callimorpha* (IMI). South America: slide of holotype of *Herpotrichia boldae* (IMI). North America: Quebec: Barr 2194, 2202, on *Juniperus* leaves (MASS). Maine: Barr 3313B on *Thuja* leaves; Barr 3451 on *Fraxinus* leaves (MASS). Massachusetts: Barr 4794 on *Carya* pericarps (MASS). New York: holotype of *Sphaeria albidostoma* on twigs of *Acer spicatum*, Catskill Mts., Sep (NYS, part in NY); holotype of *Didymella agrostidis*, Albany, 3 Jun 1918 (NYS); on *Solidago* stalks, Mt. Marcy, Aug, Peck (NYS). Georgia: GA 8234 on culms of *Carex* (GA); Barr 6493 on *Arundinaria* (MASS).

The caplike apex to ascomata is a distinctive feature of this species. Bose (1961, as *H. callimorpha*) reported numerous collections on a variety of substrates from India; the fungus grew in culture but produced no anamorph. Sivanesan (1972) examined numerous collections from Europe and one from Chile. Both authors had included *Sphaeria albidostoma* as a synonym of *H. schiedermayeriana*, based upon description only. The holotype of Peck's species shows well the capitate apex, as well as basal asci and hyaline ascospores with constrictions in each hemispore, structures quite different from those of *Byssosphaeria schiedermayeriana*.

Herpotrichia symphoricarpi (Tracy & Earle) Barr in Holm, Svensk Bot. Tidskr. 62: 239. 1968. Figs. 9, 10
Gibberidea (?) symphoricarpi Tracy & Earle, Plantae Bakerianae 1: 28. 1901.

Ascomata separate or gregarious in small groups, erumpent, globose depressed, 450-550 µm diam, 400-500 µm high, short papillate, tomentose, tomentum as short hyphal appendages toward apex, more elongate and recumbent from middle and lower peridium and forming sparse subiculum; peridium 28-33 µm wide. Asci 100-120 x 16.5-20 µm. Ascospores 24-31(-38) x 6-10 µm, reddish brown, ellipsoid, ends obtuse, 3-septate, end cells lighter than mid cells.

On twigs of *Symphoricarpos*, Colorado.

Material examined: Bob Creek west of Mt. Hesperus, 27 Jun 1898, Plants of S. Colorado 173, 2 packets (holotype, NY).

I share L. Holm's (1968) reservations about the disposition of this species, mainly because of ascospore shape and pigmentation. There are, however, several series of species with varied shapes to the ascospores within the closely related genus *Massarina*. In all other features *H. symphoricarpi* is in reasonable agreement with my concept of *Herpotrichia*.

Neopeckia Saccardo in Peck, Bull. Torrey Bot. Club 10: 127. 1883.
Didymotrichia Berlese, Atti Congr. Bot. Internaz. Genova 1892: 572. 1893.

Ascomata globose, medium sized, black, papilla short and broad, opening by rounded pore, superficial on substrate, immersed beneath and in abundant subiculum of narrow, long-celled, dark reddish brown hyphae, these penetrating leaf through stomata; peridium firm, composed of several rows of reddish brown, slightly compressed pseudoparenchymatous cells, thin walled and pallid internally; surface smooth except for hyphae appendages similar to hyphae of subiculum. Asci bitunicate, basal, cylindric, nearly sessile with footlike base usually bent, 8-spored. Pseudoparaphyses narrowly cellular, slightly branched, gelatinizing in mature ascomata. Ascospores reddish brown to dark brown; ellipsoid ovoid, ends obtuse, slightly asymmetric, upper hemispore slightly broader than lower, straight; one-septate, rarely 2- or 3-septate, septum ± median, slightly constricted; wall thick, smooth,

at times surrounded by narrow gel coating; contents with one large globule per cell; overlapping uniseriate in the ascus.

Anamorph: coelomycetous, *Pyrenochaeta*-like.

Type species: *N. coulteri* (Peck) Saccardo.

Bose (1961) arranged *N. coulteri* in *Herpotrichia*, and other authors have accepted this decision. *Neopeckia coulteri* differs in several respects from species of *Herpotrichia*, most notably in long cylindric asci that occupy the locule almost completely and in ovoid, brown, one-septate ascospores. *Neopeckia* is reinstated as a genus separate from *Herpotrichia* s. str. In its habit on conifer leaves and twigs, *N. coulteri* resembles *Herpotrichia juniperi*, but the two species differ in centrum structure. Ascospores of *Neopeckia coulteri* are usually one-septate, rarely two- or three-septate (Boyce, 1916), and are always broader and darker brown than those of *Herpotrichia juniperi*.

At present, *Neopeckia coulteri* is the only species of the genus. *Herpotrichia millettiae* Sivanesan (1972) may also belong here, with cylindric asci that fill the centrum at maturity and broadly ovoid, light brown ascospores. The less pigmented ascospores, and the habit on dead branches of *Millettia* sp. (Leguminosae), differ from those characters of *Neopeckia coulteri*.

For comments on *Didymotrichia*, see discussion under *Byssosphaeria*.

Neopeckia coulteri (Peck) Saccardo in Peck, Bull. Torrey Bot. Club 10: 127. 1883. Figs. 11-14

Sphaeria coulteri Peck in Hayden's U.S. Geol. Survey 1872, 6: 792. 1873.

Enchnosphaeria coulteri (Peck) Saccardo, Syll. Fung. 2: 207. 1883.

Lasiosphaeria coulteri (Peck) Ellis & Everhart, North Amer. Pyreno. 147. 1892.

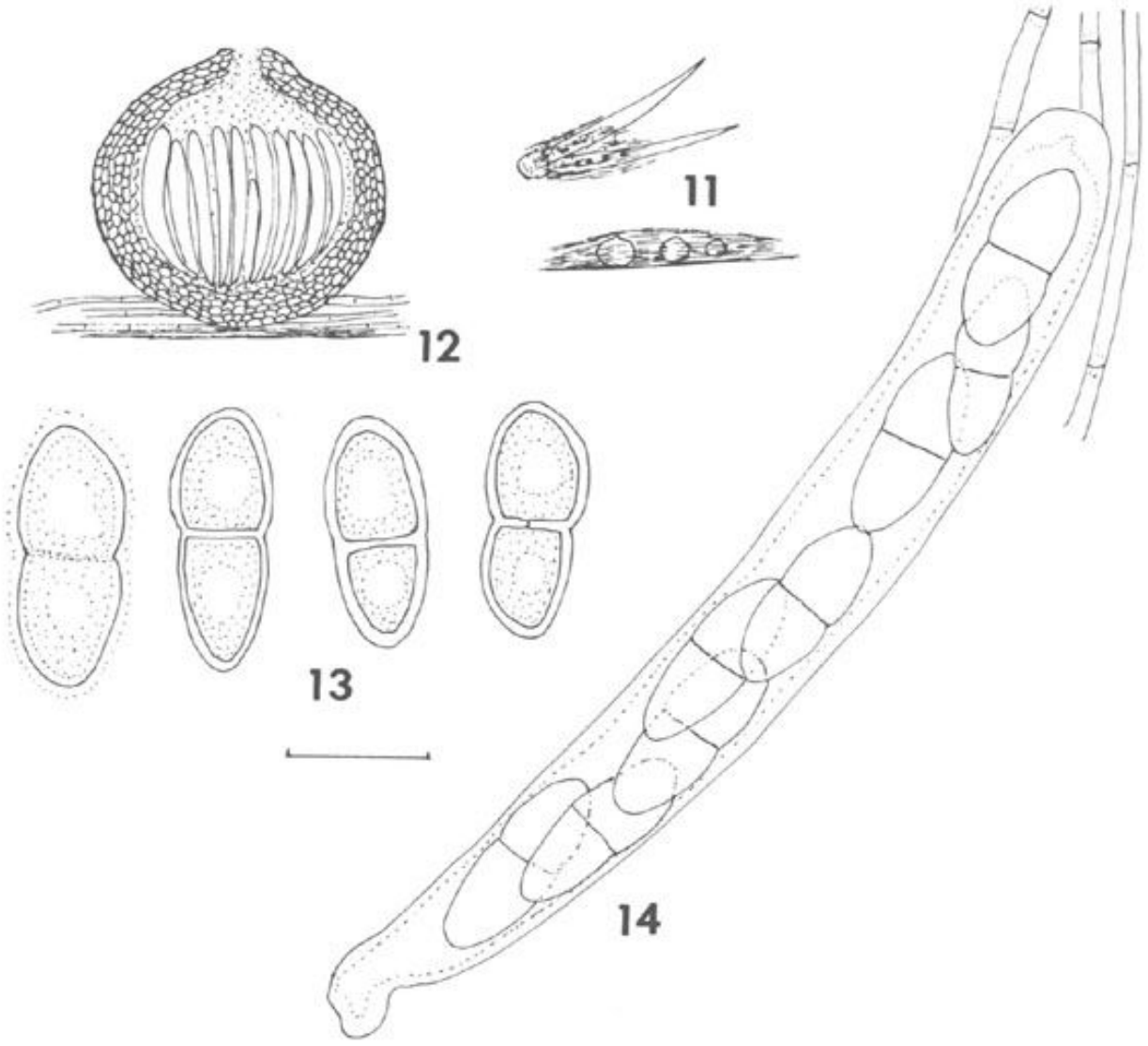
Didymotrichia coulteri (Peck) Berlese, Atti Contr. Bot. Internaz. Genova 1892: 572. 1893.

Herpotrichia coulteri (Peck) Bose, Phytopathol. Z. 41: 195. 1961.

Lasiosphaeria acicola Cooke, Grevillea 8: 87. 1880.

Amphisphaeria acicola (Cooke) Saccardo, Syll. Fung. 1: 727. 1882.

Ascomata 250-380(-500) µm diam, hyphae of appendages and subiculum 2-5 µm wide. Asci 120-160 x 12-22 µm. Ascospores 19.5-27.5 x 9-10.5 µm; gel coating 1.5-2 µm wide.



Figs. 11-14. *Neopeckia coulteri*. 11. Habit sketches of ascomata in subiculum. 12. Ascoma in section. 13. Ascus and parts of pseudoparaphyses. 14. Ascospores. Standard line = 150 µm for fig. 12; 15 µm for figs. 13, 14.

Anamorph: Pycnidia small, conidia borne from short phialides lining centrum, one-celled, hyaline, 2.5-4 x 1.5-2 µm; developed in culture (Bose, 1961).

Smothering and matting together leaves and twigs of species of *Pinus* (*P. albicaulis*, *P. aristata*, *P. contorta*, *P. jeffreyi*, *P. murrayana*, *P. monticola*, *P. ponderosa*). In mountain regions of western North America; also reported from Switzerland (Bose, 1961, on *P. montana*) and Roumania (Sivanesan, 1972, on *P. pumilio*).

Material examined: Numerous collections from western North America, from British Columbia, Washington, Oregon, California, Idaho, Montana, Wyoming, Colorado, Nevada. Exsiccati specimens include: Bartholomew Fungi Col. 4647; Ellis N.A.F. 1342 p.p.; California Fungi 486, 654; Flora of Washington 219; Mycobiota of North America 35; Myc. Saximont. Exs. 125; Plants of Idaho 3644; Plants of Nevada 1350.

The original collection of *Sphaeria coulteri* from Yellowstone Lake was not found among Peck's specimens in NYS, although other authentic material is preserved there. In one of the folders in NY, a note from Peck to Seaver, dated 24 Apr 1911, indicated that the original specimen apparently was lost from the capitol building "when many things destroyed by leaky roofs and many others stolen." In the *Neopeckia coulteri* folder in UPS is a portion of presumptive isotype labelled "Yellowstone (Coulter) P. A. Saccardo" that accords well with other collections of this species.

Lojkania Rehm, Növeny Kozl. 4: 2. 1905.
Sydowina Petrak, Ann. Mycol. 21: 182. 1923.

Ascomata immersed in and under periderm or with bases in outer layers of decorticated wood, gregarious or separate, erumpent, superficial when periderm gone; medium large, pyriform or ovoid, tapering to broad apex, ± beaklike at times, at times flared below tip, pore rounded; surface smooth or roughened, usually surrounded by reddish brown hyphae, sparse or abundant, that forms subiculum toward base; peridium firm, reddish brown, of small ± compressed layers of cells, or double and of small sclerotial cells. Asci basal to lateral or ± peripheral, cylindric or clavate and stipitate. Pseudoparaphyses trabeculate, in matrix. Ascospores clear brown to dark reddish brown; broadly ellipsoid fusoid, often biconic, symmetric; one-septate, slightly or strongly constricted, separating into part cells at times; wall thick, dark, smooth, verrucose, foveolate, or longitudinally striate, occasionally surrounded by narrow gel coating; contents with one large globule per cell; uniseriate or partially biseriate in the ascus.

Anamorph not known for most species.

Saprobic on branches, periderm, or decorticated wood of gymnosperms and angiosperms.

Type species: *L. hungarica* Rehm = *L. melasperma* (Cooke) Barr.

Sydowina vestita, the type species of *Sydowina*, does not differ sufficiently from *Lojkania hungarica*, the type species of *Lojkania*, to permit separation. Both names are predated by *Sphaeria melasperma* as Sivanesan (1972) pointed out.

The worldwide distribution of species of *Lojkania* is little known. The species recognized here are most readily separated by characteristics of the ascospores.

Key to temperate North American species of *Lojkania*

1. Ascospores deeply constricted at the septum, readily separating at maturity into part spores, (19-)23-30(-33) x 9-13 µm ..... *L. separans*
1. Ascospores somewhat or not constricted at the septum, not separating into part spores 2
   2. Ascospore wall ornamented by longitudinal striae, 10-16 x 5-7.5 µm; asci clavate and stipitate ..... *L. striatospora*
   2. Ascospore wall smooth, verrucose, or foveolate, ascospores larger; asci cylindric 3
3. Ascospores (20-)22-30(-35) x 9-12(-14) µm, wall smooth, ends acute ..... *L. melasperma*
3. Ascospores 18-25 µm long, wall smooth or ornamented ...4
   4. Ascospore wall verrucose or verruculose ..... *L. decorticata*
   4. Ascospore wall smooth or foveolate 5
5. Ascospores 7.5-10(-11) µm wide; ascomata short papillate *L. utahensis*
5. Ascospores 9-12 µm wide; ascomata pyriform with conspicuous papilla ..... *L. nuda*

Lojkania decorticata (Cooke & Harkness) Barr, comb. nov. Figs. 24, 25

Sphaeria decorticata Cooke & Harkness, Grevillea 13: 19. 1884.

Amphisphaeria decorticata (Cooke & Harkness) Berlese & Voglino, Addit. Syll. Fung. 124. 1886.

Ascomata 385-550 µm diam, pyriform or ± ovoid, superficial from cracks in decorticated periderm or wood beneath epidermis, separate or few gregarious; peridium ca. 40 µm wide. Asci 120-160 x 15-17 µm. Ascospores 18-25 x (7-)9-10(-11) µm, clear brown becoming dark reddish brown, not or slightly constricted at septum, at times with dark banding in each hemispore but not a true septum; wall verruculose or verrucose, surrounded by gel coating.

On wood of *Quercus agrifolia*, old leaf tips of *Yucca* sp. California.

Material examined: California: San Francisco, Harkness (holotype, NY); San Francisco State Univ. Campus, Dec 1980, H. E. Bigelow (MASS).

The obviously roughened wall of ascospores is a distinctive feature of this species. Cultures from ascospores of the specimen on *Yucca* formed dark mycelium. Pycnidia were

produced within two weeks, globose, short papillate, 220-275 µm diam. Conidiogenous cells lined the inner wall, short, hyaline, annellidic. Conidia were formed and held together in a gel material, dark brown, 10-13 x 4.5-5.5 µm, one celled or one septate, surface finely verruculose. This is the first anamorphic connection reported in members of the genus, and more information is needed.

Lojkania melasperma (Cooke) Barr, comb. nov. Figs. 15-17

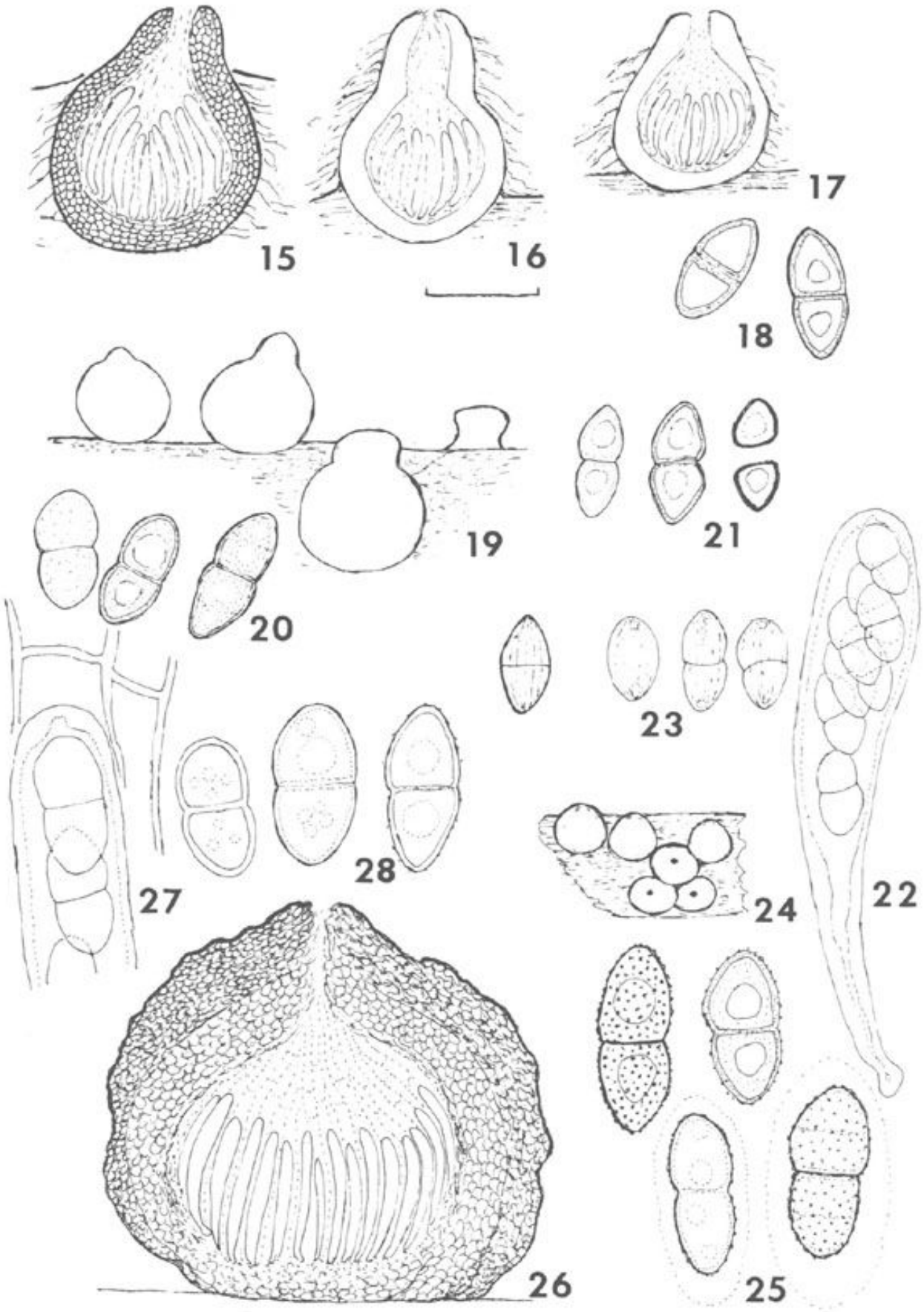
Psilosphaeria melasperma Cooke, Grevillea 8: 118. 1880.
Amphisphaeria melasperma (Cooke) Saccardo, Syll. Fung. 1: 725. 1882.
Herpotrichia melasperma (Cooke) Sivanesan, Mycol. Pap. 127: 8. 1972.
Delitschia lignicola Mouton, Bull. Soc. Roy. Bot. Belb. 25: 151. 1886.
Sydowina lignicola (Mouton) Petrak, Ann. Mycol. 23: 96. 1925.
Herpotrichia lignicola (Mouton) Bose, Phytopathol. Z. 41: 201. 1961.
Neopeckia quercina Delacroix, Bull. Soc. Mycol. France 6: 182. 1890.
Rhynchostoma julii Fabre var. *vestitum* Rehm, Hedwigia 30: 256. 1891.
Sydowina vestita (Rehm) Petrak, Ann. Mycol. 21: 182.1923.
Lojkania hungarica Rehm, Növeny Kozl. 4: 2. 1905.

Ascomata 400-700 µm diam, pyriform, erumpent superficial. Asci 130-250 x 12-16 µm. Ascospores 20-39 x 9-14 µm, ends ± acute, constricted at median septum.

On coniferous and angiospermous wood. Europe, North America.

Material examined: Europe: Rehm Ascom. 1030 (slide ex holotype of *Rhynchostoma julii* f. *vestitum*, IMI); Petrak, Fl. Boh. et Mor. exs. 1700 (slide ex *Rhynchostoma julii* var. *vestitum*, IMI); Petrak, Myc. Carpatica 271 (slide ex *Sydowina vestita*, IMI); *Lojkania hungarica* (isotype, UPS; slide ex holotype, IMI); *Neopeckia quercina* (slide ex holotype, IMI). North America: New York: W. R. Gerard 237a (slide ex holotype *Psilosphaeria melasperma*, IMI).

Sivanesan (1972) studied and provided synonymy for this species. I was privileged to examine his slides in IMI, which show variations in shape of ascomata and length of beaks among the collections, but great similarity in ascospore shape. This species has the largest ascospores of those included in *Lojkania*.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Lojkania nuda (Ellis & Everhart) Barr, comb. nov.Figs.19,20
Amphisphaeria nuda Ellis & Everhart, Erythea 2: 18. 1894.
Herpotrichia australis Bose, Phytopathol. Z. 41: 200. 1961.

Ascomata 250-600 µm diam, pyriform, apex at times flared below tip. Asci 115-165 x 12-16 µm, basal. Ascospores 18-24 x 9-12 µm, biconic, not or slightly constricted at septum; wall smooth or foveolate.

On periderm or wood of angiosperms. North America, South Africa.

Material examined: South Africa: Pretoriuskop Rest Camp, Krüger Nat'l Park, Transvaal, 16 Mar 1960, H. Schüepp (slides and specimen ex holotype of *H. australis*, IMI). North America: Kansas: Ellis & Everhart N.A.F. 3001, on *Celtis*, Rockport, Nov 1893 (isotype, MASS; holotype of *A. nuda*, NY).

The North American specimens do not seem to differ in any way from the type of *Herpotrichia australis*, although both host and locality are quite different.

Lojkania separans (Ellis & Everhart) Barr, comb. nov. Fig. 21
Amphisphaeria separans Ellis & Everhart, Bull. Torrey Bot. Club 24: 130. 1897.
Herpotrichia separans (Ellis & Everhart) Sivanesan, Mycol. Pap. 127: 10. 1972.
Sydowina moravica Petrak, Ann. Mycol. 23: 95. 1925.
Herpotrichia petrakiana Bose, Phytopathol. Z. 41: 199. 1961.

Figs. 15-28. Species of *Lojkania*: 15-18. *L. melasperma*. 15-17. Variations in shape and position of ascomata in section; 15 from type of *Psilosphaeria melasperma*, 16 from type of *Neopeckia quercina*, 17 from type of *Lojkania hungarica*. 18. Ascospores. 19, 20. *L. nuda*. 19. Habit sketch of ascomata in and erumpent from substrate. 20. Ascospores. 21. *L. separans*, ascospores. 22, 23. *L. striatispora*. 22. Ascus. 23. Ascospores, that on left from slide of type. 24, 25. *L. decorticata*. 24. Habit sketch of ascomata on substrate. 25. Ascospores. 26-28. *L. utahensis*. 26. Ascoma in section. 27. Upper portion of ascus and fragment of pseudoparaphyses. 28. Ascospores. Standard line = 300 µm for figs. 15-17; 150 µm for fig. 26; 15 µm for figs. 18, 20-23, 25, 27, 28.

Ascomata 500-900 µm diam, pyriform, ovoid or subglobose, erumpent. Asci 130-200 x 12-16 µm. Ascospores (19-)23-30 (-33) x 9-13 µm, ends acute, constricted deeply at the median septum and often separating into part spores at maturity.

On branches of angiosperms, North America, Pakistan, India.

Material examined: North America: Kansas: slide ex holotype of *A. separans*, IMI. Pakistan: slide ex holotype of *H. petrakiana*, IMI. India: Bikaner, G. P. Sharma, IMI.

I am indebted to Sivanesan (1972) and to his slides in IMI for information on this species.

Lojkania striatispora (Papendorf & von Arx) Barr, comb. nov. Figs. 22, 23

Herpotrichia striatispora Papendorf & von Arx, Nova Hedwigia 12: 395. 1966.

Ascomata 330-600 µm diam, pyriform, immersed erumpent. Asci 62-90 x 9-12 µm, clavate, stipitate. Ascospores 10-16 x 5-7.5 µm, ends acute, constricted or not constricted at the median septum, wall roughened by longitudinal raised striae.

On branches of angiosperms: South Africa, North America.

Material examined: South Africa: slide ex holotype of *H. striatispora*, CBS 385.65, IMI. North America: Iowa: Barr 6933 (MASS). Arizona: Barr 6773 (MASS).

The collection from Arizona on *Cercidium* agrees in all respects with the description and illustration of ascospores, as well as with the slide from type culture deposited in IMI, except that the ascospores of the Arizona material are often constricted at the septum, whereas those from South African material are not. The Iowa collection on *Carya* is sparse in numbers of ascomata, but is in accord with the other material seen. Small, longitudinally striate ascospores are definitive.

Lojkania utahensis (Petrak) Barr, comb. nov. Figs. 26-28

Melanopsammina utahensis Petrak, Ann. Mycol. 25: 274. 1927.

Ascomata 440-770 µm diam, globose, short papillate, superficial and bases embedded in decorticated wood; peridium broad, especially above, up to 65 µm wide at base and to 78-104 µm wide above, of small sclerotial cells. Asci 100-160 x 10-15 µm. Ascospores 16-24 x 7.5-10(-11) µm, hyaline

to light brown, finally dark brown, septum thick; wall smooth or at times verruculose.

On woody branches, western North America.

Material examined: North America: Montana: Great Falls, 18 Jul 1889, F. W. Anderson (on type material of *Teichospora mammoides*, NY); Utah: Grantsville, 13 Apr 1918, J. F. Brenckle, Utah Fungi n. 31 (isotype, NY). California: Mt. Shasta, near Horse Camp, Siskiyou Co., 23 Jul 1941, W. B. Cooke 15597 (NY).

Melanopsammina, typified by *M. carinthiaca* v. Höhnel, is evidently hyalodidymous and a pleosporaceous fungus. The type specimen in FH no longer bears any fungus, nor did it when L. Holm examined it in 1966. Holm (1968) thought the species hardly differed from *Lentomita caespitosa* Niessl. This and related species Müller and von Arx (1962) had relegated to *Otthia*.

Lojkania utahensis seems to be closely related to *L. nuda* but has a less developed apical papilla and somewhat narrower ascospores. Both species may appear to be superficial when the covering periderm has been sloughed.

Pseudotrichia Kirschstein, Ann. Mycol. 37: 125. 1939.

Ascomata immersed erumpent to superficial, gregarious or scattered; globose, pyriform, or ovoid, with short to somewhat elongated papillate apex, usually flask-shaped in section; apex and pore rounded or apex compressed and pore slit-like; surface black, covered by greenish, yellowish, rusty orange, grayish or brown verruculose hyphae, often including granular pigmented material, apical region glabrous; peridium firm, composed of compressed cells, reddish brown, pigment patchy; ostiolar canal periphysate. Subiculum present or sparse. Asci bitunicate, peripheral, clavate. Pseudoparaphyses trabeculate, in matrix. Ascospores hyaline becoming light brown in age; fusoid, tapered to obtuse or ± acute ends, symmetric, straight or inequilateral or slightly curved; one or several septate, primary septum median, constricted, each hemispore septate in age; contents with one or a few globules; wall smooth or finely verruculose in age, usually surrounded by gel coating; biseriate, partially uniseriate, or parallel in the ascus.

Anamorph not known.

On or in old stromata of other ascomycetes or on decaying wood, hypersaprobic.

Type species: *P. stromatophila* Kirschstein = *P. mutabilis*

Petrak erected the genus *Khekia* in the Lophiostomataceae, but his exsiccati specimen (Flor. Boh. et Mor. Nr. 132) was determined as *Calospora ambigua* Pass., and he proposed the combination *Khekia ambigua* (Pass.) Petrak (Hedwigia 62: 284. 1921). Although Petrak's fungus was *Pseudotrichia mutabilis*, Passerini's species was not, and *Calospora ambigua* Passerini is a synonym of *Pseudovalsa longipes* (Tul.) Saccardo in the Diaporthales (Wehmeyer, 1941b). Kirschstein erected *Pseudotrichia stromatophila* based upon Petrak's Nr. 132 (as 123) "*Calospora ambigua* Pass. Forsan nova species?" and observed that *Khekia* was an invalid name. Petrak (1940) repudiated Kirschstein's name and retained *Khekia*. At this time he utilized the earlier epithet and called the species *Khekia mutabilis*. Petrak also considered *Lophiotricha viburni* Richon (Bull. Soc. Mycol. France 32: XI. 1885) as possibly providing an earlier generic name, but concluded that the two taxa differed. Wehmeyer (1941a) accepted *Pseudotrichia*, and at that time used the epithet *aurata*. He reported on some aspects of development in culture. Colonies on oat agar were yellowish green on the surface. Primordia developed on sterilized twigs of *Ulmus*, on both healthy twigs and ones bearing stromata of *Eutypella* sp. Young ascomata contained at first interwoven hyphae. Meristematic cells in the upper regions formed a conic papilla, and others produced down-growing pseudoparaphyses. Asci were not produced in his cultures. Munk (1956) also accepted the genus, but evidently in a different sense according to his description and the position in classification. His *Pseudotrichia minor* seems to be a species of *Massarina*.

Pseudotrichia differs from *Herpotrichia* in several respects. Luttrell (1973) noted under *Herpotrichia* that *Pseudotrichia* lacked a subiculum. The major differences are the rather large ascomata, often with compressed apices, and the peripheral arrangement of asci and trabeculate pseudoparaphyses in *Pseudotrichia*. Petrak was quite correct about the compressed, lophiostomataceous aspect of the fungus, although within a single collection the apices may be rounded or compressed or somewhat triangular. An authentic specimen in Herb. E. Fries (UPS; Smolandia: Femsjö) shows such variation in the apices of ascomata.

Pseudotrichia mutabilis (Persoon: Fries) Wehmeyer, The Fungi of New Brunswick, Nova Scotia, and Prince Edward Island, p. 35 (footnote). 1950. Figs. 29-32

Sphaeria (Villosae) mutabilis Persoon: Fries, Syst. Mycol. 2: 447. 1823.

Lasiosphaeria mutabilis (Persoon: Fries) Fuckel, Jahresber. Nassau. Ver. Naturk. 25-26: 302. 1871.
Herpotrichia mutabilis (Persoon: Fries) Winter in Rabenhorst's Kryptogamenfl. 1(2): 209. 1885.
Enchnosphaeria mutabilis (Persoon: Fries) v. Höhnel, Sitzungsber. Kaiserl. Akad. Wiss., Math.-Naturwiss. Cl., Abt. 1, 126: 346. 1917.
Khekia mutabilis (Persoon: Fries) Petrak, Ann. Mycol. 38: 203. 1940.
Nectria aurigera Berkeley & Ravenel var. *flavitecta* Berkeley & Curtis, Grevillea 4: 46. 1875.
Calonectria flavitecta (Berkeley & Curtis) Saccardo, Michelia 1: 308. 1878.
Sphaeria viridicoma Cooke & Peck, New York State Mus. Rep. 29: 64. 1876 (name only, Rep. 26: 87. 1874).
Lasiosphaeria viridicoma (Cooke & Peck) Saccardo, Syll. Fung. 2: 193. 1883.
Lophiotricha viridicoma (Cooke & Peck) Kauffman, Pap. Michigan Acad. 9: 189. 1929.
Pseudotrichia viridicoma (Cooke & Peck) Wehmeyer, Canad. J. Res. C, 20: 579. 1942.
Lophiotrema parasitica Peck, New York State Mus. Rep. 40: 71. 1887.
Lophiostoma angustilabrum (Berkeley & Broome) Cooke var. *parasiticum* (Peck) Chesters & Bell, Mycol. Pap. 120: 9. 1970.
Lophiotrema vestita Peck, New York State Mus. Rep. 40: 71. 1887.
Calonectria chlorinella (Cooke) Ellis & Everhart, North Amer. Pyreno. p. 113. 1892, non Cooke.
Calonectria atkinsonii Rehm, Ann. Mycol. 2: 178. 1904.
Zignoella (Trematosphaeria) ybbsitziensis Strasser, Ann. Mycol. 9: 82. 1911.
Melogramma ybbsitziensis (Strasser) v. Höhnel, Sitzungsber. Kaiserl. Akad. Wiss., Math.-Naturwiss. Cl., Abt. 1, 123: 103. 1914.
Thyridaria aurata Rehm, Ann. Mycol. 10: 392. 1912, non Rehm, Ann. Mycol. 12: 172. 1914.
Pseudotrichia aurata (Rehm) Wehmeyer, Mycologia 33: 60. 1941.
Khekia ambigua Petrak, Hedwigia 62: 284. 1921 sub *Khekia ambigua* (Passerini) Petrak.
Pseudotrichia stromatophila Kirschstein, Ann. Mycol. 37: 125. 1939.

Ascomata 385-615 µm diam, 440-770 µm high; peridium broad, 32-60 µm wide. Asci (90-)120-155 x 12-20 µm. Ascospores 26-39 x (6-)7-9 µm, 1-3-septate.

Hypersaprobic in old stromatic ascomycetes or on wood bearing hyphae of other fungi. Temperate Europe and North America.

Material Examined: Numerous collections from eastern North America and from Colorado and Arizona. Type specimens: New York: Sandlake, Oct, C. H. Peck (isotype of *Sphaeria viridicoma*, NYS); Elizabethtown, Sep, C. H. Peck (holotype of *Lophiotrema parasitica*, NYS); Gansevoort, Sep, C. H. Peck (holotype of *Lophiotrema vestita*, NYS).

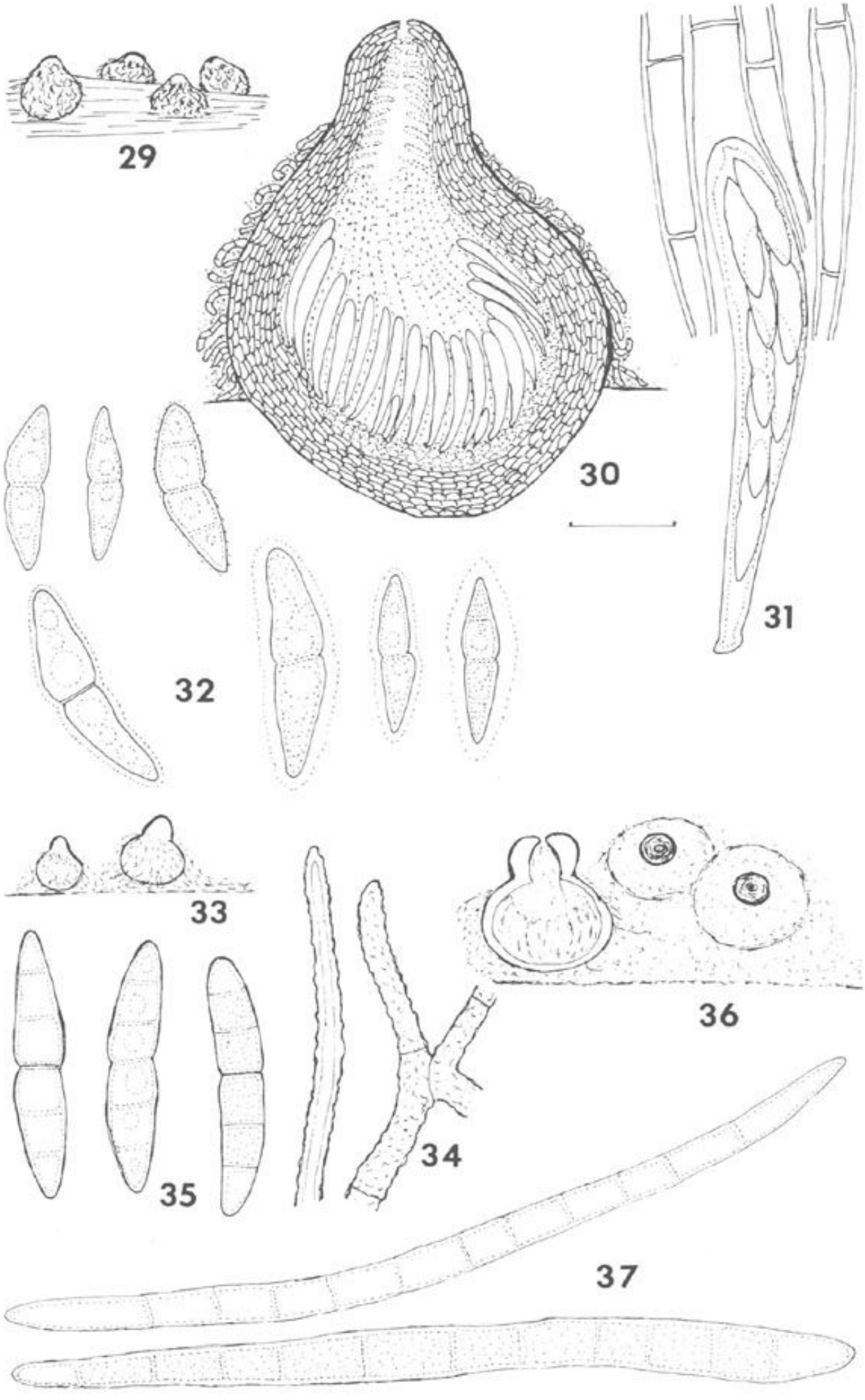
Pseudotrichia in temperate regions is represented by *P. mutabilis*, a species that shows variation in rounded or compressed papillate apices and in pigmentation of the tomentum clothing ascomata. Two species known from Venezuela add to the genus more conspicuous apices that are broad and short beaklike, and tomentum that forms a basal subiculum on the substrate. Although the ascospores differ, the following two species are obviously closely related. Both present a spectacular appearance under the dissecting microscope, the broad apical papilla contrasting strongly to the tomentose body of the ascoma, and seated in a weft of gray or brown subiculum. The ascospores of *P. mamillata* are much like those of *P. mutabilis*, whereas those of *P. pachnostoma* are considerably longer and have more septa.

Pseudotrichia mamillata Barr, sp. nov. Figs. 33-35

Ascomata globosa 440-495 µm diametro, gregaria prope basin subiculo brunneo extenso tomentoso ochraceo luteo; apices glabri nigri mamillati. Asci bitunicati cylindrici 100-110 x 10-12 µm. Pseudoparaphyses trabeculatae. Ascosporae 33-40 x 5-6 µm, brunneolae fusoideae quinqueseptatae.

Holotypus in monocotyledoni ignoti "La Silla, south-

Figs. 29-37. Species of *Pseudotrichia:* 29-32. *P. mutabilis.* 29. Habit sketch of ascomata. 30. Ascoma in section. 31. Ascus and portions of pseudoparaphyses. 32. Ascospores. 33-35. *P. mamillata.* 33. Habit sketch of ascomata. 34. Portions of rough-walled hyphae. 35. Ascospores. 36-37. *P. pachnostoma.* 36. Habit sketch of ascomata. 37. Ascospores. Standard line = 150 µm for fig. 30; 15 µm for figs. 31, 32, 34, 35, 37.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facing slope, Parq. Nac. En Avila, Edo. Miranda, Venezuela, 30 Jun 1972," leg. K. P. Dumont et al., n. VE-3829 (holotype, NY; isotype, MASS; portion in VEN not examined).

Ascomata 440-495 µm diam, gregarious with bases immersed in brown subiculum, tomentum ochraceous yellow; apex glabrous, black, conspicuous above tomentose body of ascoma. Asci 100-110 x 10-12 µm. Ascospores 33-40 x 5-6 µm, clear light brown, ends paler, fusoid, 5-septate, with slight constriction at median septum.

On unidentified bamboo, known only from type collection.

Pseudotrichia pachnostoma (Berkeley & Curtis in Cooke) Barr, comb. nov. Figs. 36, 37

Byssosphaeria (Trichosphaeria) pachnostoma Berkeley & Curtis in Cooke, Grevillea 15: 80. 1886.

Trichosphaeria pachnostoma (Berkeley & Curtis in Cooke) Saccardo, Syll. Fung. 9: 602. 1891.

Ascomata up to 880 µm diam, gregarious with bases immersed in brown subiculum, tomentum gray or light brown; apex glabrous, black or dark gray, ca. 385 µm diam, 330 µm high; peridium 50-90 µm wide. Asci 130-160 x 18-20 µm. Ascospores 100-120 x 5-7 µm, elongate fusoid, tapered to ± obtuse ends, brown, end cells hyaline or nearly so, 7-11-septate, not constricted at septa.

On wood, base of palm frond, Venezuela.

Material examined: "*Sphaeria pachnostoma* B. & C." (NY, authentic specimen); Uei-Tepui, north-facing slope, road between El Dorado and Sta. Elena, Edo. Bolivar, Venezuela, 5 Aug 1972, K. P. Dumont et al., VE-6953 (NY, MASS). The portion of n. VE-6953 deposited in VEN was not examined.

Apparently the name *Sphaeria pachnostoma* was not published by Berkeley, and the first valid presentation of the epithet was by Cooke (1886) where he cited "*Sphaeria pachnostoma* B. & C." and Herb. Berk. no. 9620. Cooke's brief diagnosis disguised the true nature of the fungus; the ascospores were said to be lanceolate, continuous, hyaline, and to measure 30 x 5 µm. Dennis (1970) in his account of fungi of Venezuela mentioned but had not seen the species.

Byssosphaeria M. C. Cooke, Grevillea 7: 84. 1879.

Macbridella Seaver, Mycologia 1: 195. 1909.

Xenonectria v. Höhnel, Sitzungsber. Kaiserl. Akad. Wiss., Math.-Naturwiss. Cl., Abt. 1, 129: 149. 1920.

Ascomata superficial, separate or usually gregarious, occasionally coalescent; turbinate, globose, or ovoid, small to large; apex rounded or plane with minute papilla, soon dehiscent and opening by rounded pore, pore and surrounding cells pallid, whitish, or gray or bright yellow, orange or red pigmented (conspicuous when moistened), pore region appearing sulcate or plicate at times; surface often irregular or slightly roughened with protruding cells or pulverulent, usually bearing dependent hyphal appendages that merge as a subiculum beneath gregarious ascomata, appendages lacking at times; peridium composed of thick-walled small pseudoparenchymatous cells, heavily pigmented externally, bright red or reddish brown, inner layers of cells compressed, hyaline or pallid, cells in pore region hyaline or brightly colored, yellow, orange or reddish, in KOH often leaching bright reddish pigments. Asci bitunicate, peripheral, clavate or broadly cylindric. Pseudoparaphyses trabeculate, in matrix. Ascospores hyaline becoming light reddish brown or clear brown, pigment often more intense at tips of spore; ellipsoid or fusoid, ± symmetric, ends acute or obtuse; one-septate, median, usually constricted at the septum, each hemispore remaining one celled or becoming septate although not constricted; contents globular; walls smooth or delicately longitudinally striate, ends with evanescent hyaline appendages at times but not always visible in aged specimens; overlapping biseriate in the ascus.

Anamorph: coelomycetous where known, *Pyrenochaeta*-like.

Saprobic on decorticated wood, bark of fallen branches, old leathery leaves, petioles, pericarps, etc. of angiosperms. Cosmopolitan.

Type species: *B. keitii* (Berkeley & Broome) Cooke = *B. schiedermayeriana*.

Byssosphaeria was designated by Cooke for species in *Sphaeria, Byssisedae* Fries, and has been regarded as including a diversity of Ascomycetes. The genus was validly typified by *B. keitii* (Holm in Farr et al., 1979). *Byssosphaeria keitii*, described from a greenhouse, is identical with *B. schiedermayeriana* (Sivanesan, 1972), and the genus is accepted for taxa with the features described above.

Berlese created *Didymotrichia* (Atti Congr. Bot. Internaz. Genova 1892: 572. 1893) to encompass species that are included in *Byssosphaeria* in the present study. Unfortunately, he did not designate the type species, and he did include *Neopeckia coulteri* (Peck) Saccardo in his list of four species. *Neopeckia coulteri* is the type species of *Neopeckia* Saccardo (1883); *Didymotrichia* is automatically typified by

D. coulteri (Art. 7. 11) and *Didymotrichia* is a synonym of *Neopeckia* (Holm in Farr et al., 1979; personal comm.). Although this was not the intent of Berlese, according to his comments in Icones Fungorum 1: 106, 107 (1890), it is a fact.

Xenonectria v. Höhnel was erected as a genus in the Nectriaceae for *Herpotrichia schiedermayeriana* var. *caldariorum* P. Hennings. Bose (1961) included the generic name as a synonym of *Herpotrichia*, and the species as a synonym of *H. schiedermayeriana*, without further comment. The taxon seems to be inseparable from *Byssosphaeria schiedermayeriana* and furnishes another example of a predominantly tropical species found in greenhouse conditions in temperate regions.

Samuels (1973) established that *Macbridella chaetostroma* (Ellis & MacBride) Seaver, the type species of *Macbridella*, was identical with *Herpotrichia rhodosticta*. This species is *Byssosphaeria rhodomphala* in my interpretation, and *Macbridella* is a synonym of *Byssosphaeria*.

Key to North American Species of *Byssosphaeria*

1. Ascomata with bright orange or reddish pore area 2
1. Ascomata with pallid, gray, or whitish pore area; asco- tapering to ± acute ends 4
   2. Ascospores (16-)18-23(-25) x (4-)6-7(-9) µm, ends obtuse, 1-septate ..... *B. rhodomphala*
   2. Ascospores longer, ends ± acute 3
3. Ascospores (17-)22-28 x 4-6 µm, 1-3-septate ..... *B. xestothele*
3. Ascospores (25-)30-42 x 5-8 µm, 1-3-(5-7-)septate ..... *B. schiedermayeriana*
   4. Ascospores 12-18(-22) x (3-)4.5-5.5 µm, 1-septate ... *B. diffusa*
   4. Ascospores longer and relatively narrower 5
5. Ascospores 18-30 x 3-5 µm 6
5. Ascospores 25-50 x (5-)6-9 µm 8
   6. Ascospores 18-24(-30) x 4-5 µm, 1-3-septate; lower sides of ascomata bearing appendages and seated on subiculum ..... *B. alnea*
   6. Ascospores 20-30 x (2.5-)3-5.5 µm, 1-3-septate; surface of ascomata roughened with protruding cells but without appendages, seated on blackened substrate . 7
7. Ascomata globose to ellipsoid, 400-600 µm diam; ascospores 20-30 x 3.5-5.5 µm ..... *B. semen*
7. Ascomata ± ovoid, 1-1.5 mm diam; ascospores 25-30 x (2.5-)3-3.5 µm ..... *B. oviformis*

8. Ascospores 25-35 x (5-)6-8 µm, 1-3-septate; surface of áscomata with appendages ..... *B. jamaicana*
8. Ascospores (30-)40-50 x (6-)7-9 µm, 1-(3-5-)septate; surface of ascomata roughened with protruding cells but without appendages ..... *B. salebrosa*

An extralimital taxon is *Herpotrichia erythrinae* Huguenin from New Caledonia. This species is much like *B. xestothele* in length of ascospores but their width and obtuse ends are more those of *B. rhodomphala*. *Byssosphaeria erythrinae* (Huguenin) Barr, comb. nov. (basionym: *Herpotrichia erythrinae* Huguenin, Bull. Soc. Mycol. France 81: 701. 1965) is a recognizable taxon. *Herpotrichia caesalpiniae* (Doidge) Sivanesan from South Africa has ascomata shaped like those of *Byssosphaeria* (cf. Sivanesan, 1972, Pl. 1F) but all other characters are pleosporaceous rather than melanommataceous.

The confusion of taxa in *Byssosphaeria* has been noted several times. It was not resolved by Seaver's (1922) "clarification" of "*Neopeckia diffusa* and *Herpotrichia albidostoma*." I was able to study the collections that Seaver had examined and from his composite descriptions of two species to recognize instead five in *Byssosphaeria* and one in *Herpotrichia*, the isotype of *H. albidostoma* which is *H. macrotricha*. The two smaller-spored species of *Byssosphaeria*, *B. rhodostoma* and *B. diffusa*, were delimited clearly by Bose (1961). The larger-spored species, *B. schiedermayeriana*, *B. jamaicana*, and *B. salebrosa* (with the synonymous name *H. incisa*) differ in surface vestiture and in pigmentation of the apex of ascomata as well as in ascospore sizes.

Byssosphaeria alnea (Peck) Barr, comb. nov. Figs. 46, 47
Cucurbitaria alnea Peck, New York State Mus. Rep. 28: 75. 1876.
Otthia alnea (Peck) Saccardo, Syll. Fung. 1: 740. 1882.
Gibberidea alnea (Peck) Wehmeyer, Canad. J. Res. C, 20: 586. 1942.
Massarina alnea (Peck) L. Holm, Svensk Bot. Tidskr. 62: 226. 1968.

Ascomata 220-460 µm diam, globose, forming compact groups of twenty or more in cracks of periderm; apex with short, shining black papilla; surface bearing brown hyphal appendages that form a subiculum below the group; peridium 40-50 µm wide, pore region pallid. Asci 105-140 x 7.5-12 µm. Ascospores 19.5-24 x 4-5 µm, becoming light brown, fusoid, tapered to acute ends, 1-septate, finally 3-septate;

delicate gelatinous coating or appendages present.

On branches of *Alnus*, northeastern North America.

Material examined: New York: Karner (= Center), May 1874, C. H. Peck (holotype, NYS).

Wehmeyer (1942) reported this species from Nova Scotia. Holm (1968) removed the taxon from *Gibberidea*, and transferred it to *Massarina* as the best accommodation. He tentatively included in synonymy *Massaria alni* Otth ex Jaczewski, *Massarina alni* (Jaczewski) Saccardo, although the type material was immature. *Massarina* in my concept is a genus of the Pleosporales and deviates in several features from *B. alnea*.

Byssosphaeria diffusa (Schweinitz) Cooke, Grevillea 15: 81. 1887. Fig. 45

Sphaeria diffusa Schweinitz, Trans. Amer. Philos. Soc. 4: 210. 1834.

Herpotrichia diffusa (Schweinitz) Ellis & Everhart, North Amer. Pyreno. p. 158. 1892; Starbäck, K. Svenska Vet.-Akad. Handl. 19, III: tab. 2, fig. 17. 1894.

Neopeckia diffusa (Schweinitz) Saccardo, Syll. Fung. 11: 317. 1895.

Didymotrichia diffusa (Schweinitz) Berlese, Atti Congr. Bot. Internaz. Genova 1892: 572. 1893.

Sphaeria parietalis Berkeley & Curtis, Grevillea 4: 107. 1876.

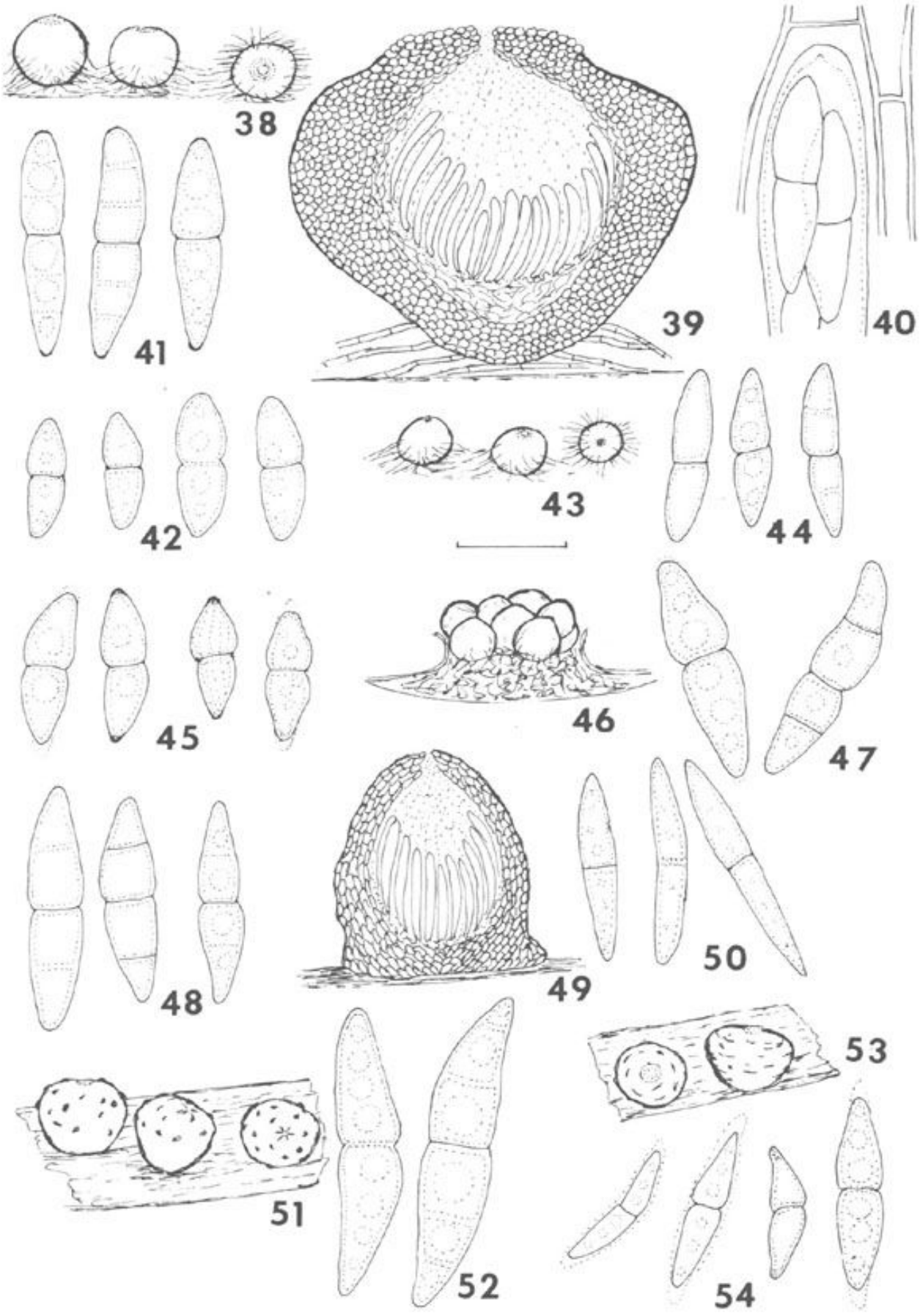
Enchnosphaeria parietalis (Berkeley & Curtis) Saccardo, Syll. Fung. 2: 207. 1883.

Herpotrichia parietalis (Berkeley & Curtis) Ellis & Everhart, North Amer. Pyreno. p. 157. 1892.

Didymotrichia parietalis (Berkeley & Curtis) Berlese, Atti Congr. Bot. Internaz. Genova 1892: 573. 1893.

Neopeckia parietalis (Berkeley & Curtis) Saccardo, Syll. Fung. 11: 317. 1895.

Figs. 38–54. Species of *Byssosphaeria*: 38–41. *B. schiedermayeriana*. 38. Habit sketch of ascomata. 39. Ascoma in section. 40. Upper portion of ascus and portions of pseudoparaphyses. 41. Ascospores. 42. *B. rhodomphala*, ascospores. 43, 44. *B. xestothele*. 43. Habit sketch of ascomata. 44. Ascospores. 45. *B. diffusa*, ascospores. 46, 47. *B. alnea*. 46. Habit sketch of ascomata. 47. Ascospores. 48. *B. jamaicana*, ascospores. 49, 50. *B. oviformis*. 49. Ascoma in section. 50. Ascospores. 51, 52. *B. salebrosa*. 51. Habit sketch of ascomata. 52. Ascospores. 53, 54. *B. semen*. 53. Habit sketch of ascomata. 54. Ascospores. Standard line = 150 µm for fig. 39; 500 µm for fig. 49; 15 µm for figs. 40–42, 44, 45, 47, 48, 50, 52, 54.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Ascomata superficial, scattered or gregarious, often in dense crowds on subiculum; ovoid or ± globose, ± turbinate in section, (170-)400-600 µm diam; apex rounded or nearly truncate, with minute papilla at first, opening by small pore; surface dull black below, grayish white at apex around pore; appendages at lower sides merging with subiculum, of narrow reddish brown hyphae; peridium thick, 20-44 µm wide above, 65-150 µm at base, cells small, reddish brown, thick walled, cells around pore pallid or light yellowish, pigment not leaching out in KOH. Asci (50-)70-100 x (9-)12-13 µm, occasionally only 2-4-spored. Ascospores 12-18(-22) x (3-)4.5-5.5 µm, light clear brown, tips darkened, 1-septate; wall finely longitudinally striate, often with delicate appendages over ends.

Anamorph: *Pyrenochaeta*-like; pycnidia formed in culture, 250-400 µm diam, with hyphal appendages; conidiogenous cells branched or simple, 5-12 x 1.5-2.5 µm; conidia 2-3 x 1-1.5 µm, hyaline, one celled, ovoid (Bose, 1961).

On decorticated wood or twigs. Most common in eastern North America; also reported from India, South Africa (Bose, 1961), Uganda, Ghana (Sivanesan, 1972).

Material examined: North America: Ontario: ex Univ. Toronto Crypt. Herb. 2619 (NY). Pennsylvania: authentic collection of *S. diffusa* ex Herb. Schweinitz (IMI, slide; NY, UPS). Illinois: Ellis & Everhart N.A.F. 2549 (MASS, NY, DAOM). Idaho: Bonner Co., 5 Jun 1940, Slipp 657 (MASS, UIFP 2357). South Carolina: authentic collection of *S. parietalis* ex Herb. Curtis (IMI, slide; UPS). Georgia: GA 7877 (GA). Alabama: R. P. Burke, Fungi of Montgomery Co., no. 325 (NY).

Byssosphaeria jamaicana (Sivanesan) Barr, comb. nov.

Fig. 48

Herpotrichia jamaicana Sivanesan, Mycol. Pap. 127: 35. 1972.

Ascomata 340-550 µm diam, globose, with numerous dependent brown hyphal appendages, as subiculum beneath gregarious ascomata; pore area pallid; peridium 50-60 µm wide, dark reddish brown externally. Asci 80-120 x 12-15 µm. Ascospores 25-35 x (5-)7-8 µm, 1-3-septate, light to clear brown, fusoid, ends ± acute; constricted at primary septum; no appendages seen.

On decorticated rotting wood. West Indies.

Material examined: Jamaica: 1909, A. E. Wight (holotype, FH). Puerto Rico: Espinosa, 2 Mar 1915, J. A. Stevenson 2627 (NY); Explorations of Porto Rico n. 1817, F. J. Seaver

and C. E. Chardon, 1923 (NY). Trinidad: Matchepoori, 11 Mar 1921, F. J. Seaver, Plants of Trinidad n. 3128 (NY).

Byssosphaeria jamaicana is now known from two collections made in Puerto Rico and one in Trinidad, in addition to the type from Jamaica. It probably is much more widespread than these records indicate. I suspect that some collections identified as "*Herpotrichia schiedermayeriana* with pallid pore region" belong instead to *B. jamaicana*.

Byssosphaeria oviformis Barr, sp. nov. Figs. 49, 50

Ascomata ovoidea 1-1.5 mm diametro et lato gregaria, prope basin in ligno denigrato immerso. Asci bitunicati cylindrici 120-130 x 7-9 µm. Pseudoparaphyses trabeculatae. Ascosporae 25-30 x (2.5-)3-3.5 µm hyalinae fusoideae uniseptatae.

Holotypus in ligno decorticato "vicinity of Windsor Cave, 140 m, 18°21' N, 77°39' W, Trelawney Parish, Jamaica, 21 Apr 1981" leg. W. R. Buck n. 5949 (holotypus, NY; isotypus, MASS).

Ascomata superficial, bases in substrate, gregarious; ovoid, 1-1.5 mm diam and high; apex tapered to blunt papilla, opening by rounded pore; surface dull black; peridium firm, carbonaceous, 100-130 µm wide, composed of numerous parallel compressed layers of cells, vertically oriented at the base, vinaceous brown, with hyaline internal layers. Asci bitunicate, peripheral, cylindric, 120-130 x 7-9 µm. Pseudoparaphyses trabeculate. Ascospores 25-30 x (2.5-)3-3.5 µm, hyaline, narrowly fusoid; one septate, not constricted, septum median; three globules or clusters of guttules in each hemispore, i.e., potentially several septate; wall smooth; overlapping biseriate in the ascus.

On blackened decorticated wood, known only from type.

In the ascomata without subiculum, seated on blackened substrate surface, and in narrow ascospores that remain hyaline and one septate for considerable time, *B. oviformis* is related most closely to *B. semen*. The latter species has smaller, more globose ascomata and slightly broader ascospores. *Byssosphaeria jamaicana* differs from both in possession of tomentum of dependent appendages and broader ascospores.

Byssosphaeria rhodomphala (Berkeley) Cooke, Grevillea 15: 81. 1887. Fig. 42

Sphaeria rhodomphala Berkeley, J. Bot. London 4: 313. 1845.

Herpotrichia rhodomphala (Berkeley) Saccardo, Syll. Fung. 2: 212. 1883.

Herpotrichia diffusa var. *rhodomphala* (Berkeley) Ellis & Everhart, Proc. Acad. Nat. Sci. Philadelphia 47: 21. 1895.

Sphaeria rhodosticta Berkeley & Broome, J. Linn. Soc. London 14: 126. 1873.

Herpotrichia rhodosticta (Berkeley & Broome) Saccardo, Syll. Fung. 2: 213. 1883.

Didymotrichia rhodosticta (Berkeley & Broome) Berlese, Atti Congr. Bot. Internaz. Genova 1892: 572. 1893.

Neopeckia rhodosticta (Berkeley & Broome) Saccardo, Syll. Fung. 11: 317. 1895.

Sphaeria lanuginosa Berkeley & Curtis, Grevillea 4: 108. 1876.

Melanopsamma lanuginosa (Berkeley & Curtis) Saccardo, Syll. Fung. 1: 577. 1882.

Amphisphaeria subiculosa Ellis & Everhart, J. Mycol. 2: 103. 1886.

Nectria chaetostroma Ellis & McBride, Bull. Lab. Nat. Hist. Iowa State Univ. 4: 70. 1896.

Macbridella chaetostroma (Ellis & McBride) Seaver, Mycologia 1: 195. 1909.

Letendraea chaetostroma (Ellis & McBride) Weese, Sitzungsber. Akad. Wiss. Wien, Math.-Naturwiss. Cl., Abt. 1, 125: 512. 1916.

Herpotrichia rhodospiloides Peck, Bull. Torrey Bot. Club 36: 155. 1909.

Ascomata superficial, scattered or gregarious on ample subiculum, globose or turbinate, 220-500 µm diam, apex rounded plane, opening by rounded pore, often puckered or sulcate around pore; surface dull black, with red, orange, or yellow pulverulence around pore; peridium 20-60 µm wide above, 40-45 µm wide at base, pigment leaching from apical cells in KOH. Asci (50-)85-120 x 10-13 µm. Ascospores (16-)18-23(-25) x (5-)6-7.5(-9) µm, light brown, ends obtuse, 1-(3-)septate; faintly longitudinally striate, occasionally bearing delicate hyaline appendages over ends.

Anamorph: *Pyrenochaeta*-like; pycnidia formed in culture, 130-170 µm diam, with hyphal appendages; conidiogenous cells phialidic, lining cavity, 5-10 x 4-6 µm; conidia 6.5-10 x 3-4 µm, hyaline, one celled, ellipsoid, oblong or ovoid

(Samuels and Müller, 1978).

On wood and bark of various trees. Cosmopolitan.

Material examined: Numerous collections from tropical and temperate regions of North and South America, Africa, Asia. Selected collections: North America: Ohio: ex Berkeley herb., *Sphaeria rhodomphala* (UPS). Kansas: Bartholomew Fungi Col. 3632 as *Herpotrichia diffusa*. Missouri: Ellis & Everhart N.A.F. 2130 as *Amphisphaeria subiculosa*; Rabenhorst-Winter-Pazschke Fungi eur. 3960; DAOM 90017 (DAOM). Arkansas: holotype of *Herpotrichia rhodospiloides* (NYS), also distributed as Fungi Col. 2835. Georgia: GA 7979 (GA). South Carolina: Curtis, *Sphaeria rhodomphala* (UPS); Ravenel 1595 (MASS). Louisiana: Flora Ludoviciana 382, holotype of *Amphisphaeria subiculasa* (NY). Ceylon: slide ex holotype of *Sphaeria rhodosticta* (IMI); specimen (UPS).

This species was separated from *Herpotrichia diffusa* by Bose (1961), who utilized ascospore shape: ellipsoid with obtuse ends for *H. rhodosticta*, fusoid with acute ends for *H. diffusa*. Normally the ascomata differ in pigmentation around the pore region also, with *Byssosphaeria rhodomphala* having reddish, orange or yellowish granular deposit and *B. diffusa* grayish white. Both Bose and Sivanesan (1972) used the specific epithet *rhodosticta*, and assigned *Sphaeria rhodomphala* to synonymy with *Herpotrichia diffusa*. The ascospores of *Sphaeria rhodomphala* are larger (25 x 7.5 µm) than those of *S. diffusa*. In addition, authentic specimens named as *Sphaeria rhodomphala* by Berkeley in Fries's Herbarium in UPS are reddened about the apical pore. It is concluded that *Sphaeria rhodomphala* is the earliest name for this species that occurs in both temperate and tropical regions.

Byssosphaeria salebrosa (Cooke & Peck) Barr, comb. nov.
Figs. 51, 52

Sphaeria (Denudatae) salebrosa Cooke & Peck, New York State Mus. Rep. 29: 61. 1878.
Amphisphaeria salebrosa (Cooke & Peck) Saccardo, Syll. Fung. 1: 726. 1882.
Trematosphaeria salebrosa (Cooke & Peck) Sivanesan, Trans. Brit. Mycol. Soc. 65: 397. 1975.
Herpotrichia incisa Ellis & Everhart, Proc. Acad. Nat. Sci. Philadelphia 45: 130. 1893.

Ascomata 440-800 µm diam, globose or ovoid, scattered or gregarious on sparse subiculum or on blackened substrate; surface irregularly roughened with projecting masses of cells,

dull black; peridium 30-35 µm wide at sides, up to 55-100 µm at base, of thick-walled, small brown cells, cells around pore yellowish, not leaching pigment in KOH. Asci 120-150 x 13-16.5 µm. Ascospores (30-)40-50 x (6-)7-9 µm, hyaline, soon light brown, fusoid, ends acute, 1-(3-5-)septate, constricted at median primary septum only.

On woody substrates. Eastern North America.

Material examined: Ontario: dead roots of *Acer spicatum*, London, 15 Apr 1892, J. Dearness (holotype of *Herpotrichia incisa*, NY). New York: on branches of *Vaccinium* or *Andromeda*, Center, Oct, C. H. Peck (holotype of *Sphaeria salebrosa*, NYS).

This species has ascospores much like those of *Byssosphaeria schiedermayeriana*, although no appendages were found on the ascospores, and they tend to range longer. The subiculum is sparse and the ascomata are quite rough and irregular, without any reddened area at the apex.

Byssosphaeria schiedermayeriana (Fuckel) Barr, comb. nov.
Figs. 38-41

Herpotrichia schiedermayeriana Fuckel, Jahrb. Nass. Ver. Naturk. 27-28: 27. 1873.

Sphaeria cirrhostoma Berkeley & Broome, J. Linn. Soc. London 14: 126. 1873.

Lasiosphaeria cirrhostoma (Berkeley & Broome) Saccardo, Syll. Fung. 2: 201. 1883.

Herpotrichia cirrhostoma (Berkeley & Broome) Petch, Ann. Roy. Bot. Gard. Peradeniya 5: 291. 1912.

Sphaeria (Byssisedae) keitii Berkeley & Broome, Ann. Mag. Nat. Hist. 17: 144. 1876.

Byssosphaeria keitii (Berkeley & Broome) Cooke, Grevillea 7: 84. 1879.

Herpotrichia keitii (Berkeley & Broome) Saccardo, Syll. Fung. 2: 212. 1883.

Psilosphaeria (Zignoella) keitii (Berkeley & Broome) Cooke, Grevillea 16: 51. 1887.

Lasiosphaeria keitii (Berkeley & Broome) Berlese, Icon. Fung. 1: 114. 1892.

Herpotrichia tonkiniana Patouillard, Bull. Soc. Mycol. France 8: 51. 1892.

Herpotrichia schiedermayeriana var. *caldariorum* P. Hennings, Hedwigia 34: 102. 1895.

Xenonectria caldariorum (P. Hennings) v. Höhnel, Sitzungsber. Kaiserl. Akad. Wiss., Math.-Naturwiss. Cl., Abt. 1, 129: 150. 1920.

Herpotrichia sabalicola P. Hennings, Verh. Bot. Ver. Prov. Brandenb. 40: 154. 1898.
Neopeckia roberti Starbäck, Ark. Bot. 5: 16. 1905.
Neopeckia nobilis Rick, Broteria 5: 44. 1906.
Herpotrichia philippinensis Rehm, Leafl. Philipp. Bot. 6: 2203. 1914.
Neopeckia rhodosticta var. *magnifica* Rehm, Leafl. Philipp. Bot. 8: 2947. 1914.
Herpotrichia bakeri Sydow, Ann. Mycol. 15: 203. 1917.
Neopeckia rhodostoma Sydow, Ann. Mycol. 15: 204. 1917.
Neopeckia brasiliana Viegas, Bolm. Soc. Bras. Agron. 9: 2. 1946.

Ascomata scattered or gregarious, dependent appendages formed from lower sides and spreading on substrate as subiculum; globose or ovoid, 500-825 µm diam; dull black below, red or orange around pore region; peridium 50-100 µm wide. Asci (80-)100-150 x 12-15 µm. Ascospores (25-)32-42 x 5-8(-9) µm, light brown, 1-(3-5-)septate.

Anamorph: formed in culture, pycnidia 70-500 µm diam, with hyphal appendages; conidiogenous cells phialidic, lining cavity, 5-8 x 4-6 µm, or more elongate, 5-10 x 3-6 µm; conidia 2.5-3.5(-4) x 1.5-2(-3) µm, hyaline, ellipsoid or subglobose (Samuels and Müller, 1978).

On varied substrates, rotting logs and branches, endocarps of coconut, culms and petioles, on wood or cord in greenhouses. Cosmopolitan in warmer regions.

Material examined: numerous collections from tropical North and South America, Africa, Asia; also from Germany, Italy, Britain. North America: Florida: Collier Co., 1 Jan 1972, K. P. Dumont et al. (NY). Louisiana: Fungi Col. 1035; Flora Ludoviciana 2463 (NY).

The synonymy is essentially that prepared by Sivanesan (1972) but without those names (*albidostoma, incisa*) that do not accord with this taxon in my interpretation. *Byssosphaeria schiedermayeriana* is typically a tropical species, although it was originally discovered in the European Alps on *Sambucus* branches. The large ascomata with orange, bright or dull reddish plane apices are striking. Ascomata, asci and ascospores are larger than in the similar-appearing *B. rhodomphala*, but their kinship is notable. When Berkeley and Broome described *Sphaeria keitii* they suggested that it might be of exotic origin and thought it could be related to *S. rhodosticta* (= *B. rhodostoma*). Although many collections of North American tropical specimens have been labelled as "*Herpotrichia albidostoma*" the original of this

species is a true *Herpotrichia* and is identical with *H. macrotricha*. Similarly shaped and sized ascospores account for the confusion. In the temperate-zone *H. incisa* (=*Byssosphaeria salebrosa*), ascospores are again quite similar, but the ascomata differ markedly.

Byssosphaeria semen (Cooke & Peck) Barr, comb. nov.
Figs. 53, 54

Sphaeria semen Cooke & Peck, New York State Mus. Rep. 29: 65. 1878. (name only, Rep. 26: 87. 1874).
Metasphaeria semen (Cooke & Peck) Saccardo, Syll. Fung. 2: 170. 1883.

Ascomata 400-600 µm diam, 330-550 µm high, globose or somewhat depressed; without appendages or subiculum, surface crustose and roughened; pore area pallid; peridium thick, 40-84 µm wide, outer region reddish brown, inner region hyaline. Asci 80-110 x 9-12 µm. Ascospores 20-30 x 3.5-4.5(-6) µm, hyaline becoming light brown, fusoid, ends tapered and acute, 1-(3-)septate, constricted at median septum; delicate appendages at each end.

On decaying petioles of *Sorbus* sp., rotting hardwood. Eastern North America.

Material examined: New Hampshire: Barr 3915 (MASS). New York: Sandlake, Sep 1872, C. H. Peck (holotype, NYS); Sandlake, no date, C. H. Peck (NYS).

This species is smaller than *B. salebrosa*, but it is obviously related by the surface of ascomata that is roughened but not appendaged.

Byssosphaeria xestothele (Berkeley & Curtis) Barr, comb.nov.
Figs. 43, 44

Sphaeria xestothele Berkeley & Curtis, Grevillea 4: 107. 1876.
Lasiosphaeria xestothele (Berkeley & Curtis) Saccardo, Syll. Fung. 2: 194. 1883.
Herpotrichia xestothele (Berkeley & Curtis) Berlese, Icon. Fung. 1: 107. 1894.
Eriosphaeria xestothele (Berkeley & Curtis) Dearness & House in Seymour, Host Index of the fungi... 543. 1929.
Herpotrichia schiedermayeriana var. *xestothele* (Berkeley & Curtis) Sivanesan, Mycol. Pap. 127: 20. 1972.

Ascomata 330-440 µm diam, 330-550 µm high, globose or ovoid, reddish around pore area, hyphal appendages dependent and forming subiculum with gregarious ascomata or occasion-

ally forming compound structures of several centra surrounded by common outer peridium; peridium bright red in section in apical region, reddish brown below, of small-celled pseudoparenchyma, thick walled, 30-52 µm wide. Asci 70-100 x 9-12 µm. Ascospores hyaline becoming light brown, 20-26 x 4.5-6 µm, 1-3-septate, constricted at median septum, fusoid, tapered to ± acute ends; usually bearing delicate appendages, faintly longitudinally striate.

On fallen branches of *Cornus florida* or old leathery leaves. Eastern North America, Mexico.

Material examined: South Carolina: Society Hill, Apr 1855, Curtis (isotype of *Sphaeria xestothele*, Curtis Herb. in FH). Mexico: old leaves of *Loranthus crassipes*, Hacienda de Tamasopo, San Luis Potosi, 16 Dec 1891, ex Pringle Plantae Mexicanae 3978 (MASS).

Sivanesan (1972) considered this taxon to be only a small variety of *Herpotrichia schiedermayeriana* but it appears to be separable at the species level in comparison with the other species in the genus.

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