Wettsteinina

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Twenty-three species accepted in *Wettsteinina* Höhnel are described and illustrated. Thirteen of these are new: ***W. arctica***, ***W. barrae***, ***W. bupleuri***, ***W. candida***, ***W. douglasii***, ***W. duplex***, ***W. junci***, ***W. kashmirensis***, ***W. kobresiae***, ***W. luzulae***, ***W. magnifica***, ***W. oreophila***, and ***W. savilei***. Details are given on 11 excluded species: ***Didymella anomala*** (Ell. & Ev.) n.comb. (= *Wettsteinina anomala* (Ell. & Ev.) Barr), ***Dothiora ellisii*** (Barr) n.comb. (= *Wettsteinina ellisii* Barr), *Gnomonia sabalicola* Earle (= *Wettsteinina sabalicola* (Earle) Barr), *Kriegeriella mediterranea* (E. Müller) von Arx & Müller (= *Wettsteinina mediterranea* E. Müller), ***Lophiostoma herbarum*** (Wehmeyer) n.comb. (= *Eriosphaeria herbarum* Wehmeyer), *Lophiostoma sieversiae* Peck (= *Wettsteinina sieversiae* (Peck) Barr = *Wettsteinina andromedae* (Auersw.) Barr. var. *cassiopes* (Dearn. & House ex Barr) Barr = *Phaeospora cassiopes* Dearness & House, ex Barr), *Lophiostoma* species 1, *Lophiostoma* species 2 (= *Wettsteinina niesslii* E. Müller), *Pleospora cytisi* Fuckel (= *Wettsteinina ambigua* Petrak), *Wettsteinina niesslii* E. Müller sensu Barr non Niessl, and *Wettsteinina yuccaegena* Barr. Some others are excluded but not redescribed. Cultures of *W. gigaspora*, the type species, indicated that the fungus is homothallic and does not form an anamorph in culture and that the centrum is of the *Pleospora* type. The families Pseudosphaeriaceae Höhnel and Wettsteininaceae Locquin nom.illeg. are synonymized with Pleosporaceae Nitschke.

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Les auteurs décrivent et illustrent 23 espèces acceptées dans le genre *Wettsteinina* Höhnel. On y trouve 13 nouvelles espèces : ***W. arctica***, ***W. barrae***, ***W. bupleuri***, ***W. candida***, ***W. douglasii***, ***W. duplex***, ***W. junci***, ***W. kashmirensis***, ***W. kobresiae***, ***W. luzulae***, ***W. magnifica***, ***W. oreophila*** et ***W. savilei***. On y donne des détails sur 11 espèces exclues : ***Didymella anomala*** (Ell. & Ev.) n.comb. (= *Wettsteinina anomala* (Ell. & Ev.) Barr), ***Dothiora ellisii*** (Barr) n.comb. (= *Wettsteinina ellisii* Barr), *Gnomonia sabalicola* Earle (= *Wettsteinina sabalicola* (Earle) Barr), *Kriegeriella mediterranea* (E. Müller) von Arx & Müller (= *Wettsteinina mediterranea* E. Müller), ***Lophiostoma herbarum*** (Wehmeyer) n.comb. (= *Eriosphaeria herbarum* Wehmeyer), *Lophiostoma sieversiae* Peck (= *Wettsteinina sieversiae* (Peck) Barr = *Wettsteinina andromedae* (Auersw.) Barr. var. *cassiopes* (Dearn. & House ex Barr) Barr = *Phaeospora cassiopes* Dearness & House, ex Barr), *Lophiostoma* sp.1, *Lophiostoma* sp.2 (= *Wettsteinina niesslii* E. Müller), *Pleospora cytisi* Fuckel (= *Wettsteinina ambigua* Petrak), *Wettsteinina niesslii* E. Müller sensu Barr non Niessl et *Wettsteinina yuccaegena* Barr. D'autres espèces sont aussi exclues sans être décrites. Les cultures de l'espèce type, le *W. gigaspora*, indiquent que ce champignon est homothallique, ne forme pas d'anamorphe en culture et que le centrum est du type *Pleospora*. Les auteurs établissent une synonymie entre les familles des Pseudosphaeriacées Höhnel et des Wettsteininacées Locquin nom.illeg. avec les Pleosporacées Nitschke.

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Introduction

The genus *Wettsteinina* Höhnel typified by *W. gigaspora* Höhnel (1907*a*) has intrigued a number of mycologists. *Wettsteinina* was described together with *Pseudosphaeria* (type *P. pachyasca* (Niessl) Petrak) and included in the family Pseudosphaeriaceae Höhnel. Most authorities have considered the two genera to be synonymous. Müller (1950) and Barr (1972) have given very useful accounts of many species. Wehmeyer made many notes on collections he examined in Europe but was not able to publish this information. The senior author saw a number of collections in European herbaria and in 1961–1962 was fortunate in having the opportunity to work with Emil Müller and collect some of the species in fresh condition and cultivate a few of these. Dr. Margaret Barr and Dr. Douglas Savile collected some very interesting specimens in alpine or arctic regions of Canada. Revisions are proposed on the basis of studies of type specimens.

The format and methods are described in an earlier paper (Shoemaker 1984). A generic description, a key to species, descriptions of accepted species, and names of excluded species arranged alphabetically by epithet are provided and followed by a section on excluded species arranged alphabetically by genus and then species.

Generic description

Wettsteinina Höhnel, Sitzungsber. Kaiserl. Akad. Wiss. Wien Math. Naturwiss. Kl. Abt. 1, 116: 126–129. 1907
= *Pseudosphaeria* Höhnel, ibid 116: 129. 1907

Ascocarps scattered, immersed, subepidermal, becoming erumpent, or rarely superficial, globose, conoid or depressed, glabrous or tomentose. Beak short, truncate–conical, terete, without periphyses, rarely with brown beak hairs, or without a beak and opening by a simple flush ostiole, or by means of a broad circular intraepidermal disclike cap. Ascocarp wall surface a textura angularis with few exceptions. Wall in longitudinal section usually uniform in thickness, rarely wider at basal margin or around margin of opening, of polygonal or rectangular, brown, thin-walled pseudoparenchyma. Physes with thin septa, rarely guttulate, with slime coating. Asci few to numerous, from a central base, with croziers, short-stalked, bitunicate, saccate to broadly fusiform, rarely cylindrical, with 8(16) irregularly clumped or biseriate ascospores. Ascospores broadly fusiform, straight or gently curved, transversely 1- to 7-septate, first septum complete and slightly constricted, often constricted at additional full septa, or at ringlike internal thickenings in the wall that simulate partial septa, cells contiguous in all but *W. macrotheca*, hyaline, later brown when exposed on plant parts, smooth or rarely rough, guttulate or not, usually with a conspicuous broad, sharply delimited sheath.

Pathogenic to saprophytic on plant leaves and stems. Hyphae brown, septate, uniform in diameter, broad, immersed in host cells or meandering on the surface.

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The septa in the ascospores of *Wettsteinina* are rather unusual. The first septum is complete, but any later septa are usually incomplete, merely a ringlike thickening in the wall. The appearance, however, resembles that of full septa in that the protoplasts seem to be separated but closely appressed. Only in one exceptional species, *W. macrotheca*, are the protoplasts widely separated and contracted into discrete cubical cells.

The genus *Wettsteinina* including its synonym *Pseudosphaeria* has been of fundamental interest in the establishment of the family Pseudosphaeriaceae and the order Pseudosphaeriales. Much of the concept came from Höhnel's detailed account and illustration of *W. gigaspora*. The anatomical details are discussed under that species. When he established Pseudosphaeriaceae, Höhnel gave little information on the structure of the type species of *Pseudosphaeria, P. callista*, which is now recognized as a synonym of *W. mirabilis*. In retrospect, Höhnel's scanty information on *P. callista* is confusing because he examined material from Rehm misidentified as *Sphaerulina callista*. It was not the type and proved to be *W. pachyasca*. Further observations are given under *W. callista* (Rehm) Petrak sensu Höhnel. In summary, the development is closest to *Pyrenophora* as noted by Höhnel (1907*b*). Consequently, the family names Pseudosphaeriaceae Höhnel (1907*a*) and Wettsteininaceae Locquin nom.illeg. (as Wettsteiniaceae) (1974, table) published without indication of type, are synonyms of Pleosporaceae Nitschke.

Key to species

1. Ascoma with evident disclike cap 2
2. Ascospore first septum supramedian less than 0.48 3
3. Secondary septa mere rings or lacking ..... *W. kashmirensis*
3. Secondary septa complete 4
4. Ascospores cylindroid, cells separated ..... *W. macrotheca*
4. Ascospores obovoid, intact ..... *W. luzulae*
2. Ascospore first septum median 0.49–0.51 5
5. Spore wall thickened at secondary septa ..... *W. gentianae*
5. Not so 6
6. Sheath enlarged at first septum ..... *W. oreophila*
6. Sheath uniform 7
7. Asci 16-spored ..... *W. duplex*
7. Asci 8-spored 8
8. Ascospores ellipsoidal ..... *W. macrospora*
8. Ascospores fusiform, blunt at ends ..... *W. dryadis*
2. Ascospore first septum submedian over 0.52 9
9. Ascospores 1-septate ..... *W. magnifica*
9. Ascospores 6-septate ..... *W. candida*
1. Ascoma with short ostiolate beak 10
10. Ascospore first septum supramedian 0.48 or less 11
11. Secondary septa complete ..... *W. pachyasca*
11. Secondary septa ringlike 12
12. Spores 3-septate 13
13. Ascospores 26–31 × 9–11 μm ..... *W. junci*
13. Ascospores 30–46 × 10–15 μm ..... *W. eucarpa*
12. Spores 4-septate 14
14. Ascoma wall very thick, over 80 μm ..... *W. gigaspora*
14. Ascoma wall thin, under 30 μm ..... *W. mirabilis*
10. Ascospore first septum median, 0.49–0.51 15
15. Secondary septa mere rings or lacking 16
16. Sheath uniform ..... *W. kobresiae*
16. Sheath truncate at ends, wide at middle ..... *W. savilei*
15. Secondary septa complete 17
17. Spores 3-septate ..... *W. andromedae*
17. Spores 5-septate ..... *W. bupleuri*
10. Ascospore first septum submedian over 0.52 18

18. Spores ellipsoidal 19

19. Sheath 2–3 μm ..... *W. operculata*
19. Sheath 3–7 μm ..... *W. barrae*

18. Spores somewhat obovoid 20

20. Spores 10–16 μm wide ..... *W. arctica*
20. Spores 22–24 μm wide ..... *W. douglasii*

Species of *Wettsteinina*

Wettsteinina ambigua Petrak, Ann. Mycol. 22: 59–60. 1924

See excluded species *Pleospora cytisi* and *Mycosphaerella sarothamni*.

Wettsteinina andromedae (Auersw.) Barr, Contrib. Inst. Bot. Univ. Montreal, 73: 8. 1959

Figs. 17, 38, 57, 84, 107, 146

≡ *Sphaerella andromedae* Auersw. Mycol. Eur. 5,6: 12. 1869

≡ *Leptosphaeria andromedae* (Auersw.) Sacc. Syll. Fung. 2: 49. 1883

Ascocarps scattered, superficial on cuticle and around base of leaf hairs, curved conoid, glabrous, 80–165 μm wide, 80–100 μm high. Beak short, curved, truncate–conical, terete, 30–50 μm long, 40–50 μm wide, composed of 3 or 4 layers of brown polygonal 6–8 × 2–5 μm cells around a 20–30 μm diameter ostiole filled with hyaline pseudoparenchyma, without periphyses or surface setae. Ascocarp wall surface composed of 3–4 μm wide meandering hyphae especially near base. Wall in longitudinal section uniform in thickness, lacking a base, 9–15 μm thick, of 4 to 8 layers of 2–8 × 2–4 μm polygonal to rectangular thin-walled to slightly thick walled brown cells. Physes numerous, 1.5–3 μm wide, septate at 10- to 20-μm intervals, with thin septa, rarely guttulate, with slime coating. Asci few, 3–8, from a central base, saccate to broadly fusiform, 80–85 × 38–56 μm, with 8 irregularly clumped widely spaced ascospores. Ascospores broadly fusiform, 31–41 × 12–16 μm, straight, 3-septate, in sequence 2:1:2, second cell from apex enlarged, end cells short, first septum complete and slightly constricted, median (0.50), often constricted at additional full septa, hyaline, later brown when exposed on plant parts, smooth, eguttulate, with an inconspicuous thin sheath, 0.5 μm wide.

HOST: *Cassiope tetragona* (L.) D. Don.

COLLECTIONS EXAMINED: CANADA: NFLD.: 74230(*c*), Hebron vicinity, Labrador, R. T. Wilce 404, 22 Oct. 1955, ex Herb. Barr P 102; 74240(*e*), Labrador, R. T. Wilce, 1954, ex Herb. Barr 16; 62928, Head of Clyde Inlet, Baffin I., P. Dansereau, 31 July 1950; N.W.T.: Dist. of Franklin: 70498, Four Rivers Bay, 72°50′ N 95°30′ W, Somerset I., D. B. O. Savile 3652D, 28 July 1958; Dist. of Keewatin: 70499, Coral Harbour, Southampton I., D. B. O. Savile 3991 et al., 16 Aug. 1959.

This species is quite distinctive among the many pyrenomycetes on *Cassiope*. The fruit bodies are entirely superficial on the thick cuticle. They are somewhat conic but are usually bent with a short curved beak. The wall is thin but strong, composed of several layers of very small cells. Near the ostiole, the wall is very dark but not appreciably thickened. The asci are few. The ascospores have short blunt end cells and a smooth clearly defined thin wall that may be double.

The type could not be located for examination. It is not at K, though The Index of *Taxonomic Literature* 1, p. 81 (Stafleu and Cowan 1976) states Kew is the repository of Auerswald's herbarium. It is to be hoped that the type can be found. If one is forced to use the illustration that accompanied the original description, then the concept might change because the original illustrations of spores in an ascus are more like those of *Leptosphaeria hyperborea*.

Holm (1975, p. 156) expressed some reservations about the placement of this species in *Wettsteinina* and thought it might merit its own genus. It does have some resemblance to *Kriegeriella mediterranea* (Müller) von Arx & Müller, though we do not propose such a transfer.

The variety *cassiopes* Barr has been referred to *Lophiostoma sieversiae* Peck, so no subspecific rank is used for *W. andromedae*.

Wettsteinina anomala (Ell. & Ev.) Barr, Contrib. Univ. Mich. Herb. 9(8): 548–549. 1972

See excluded species *Didymella anomala* (Ell. & Ev.) n.comb.

Wettsteinina arctica n.sp. Figs. 3, 47, 58, 85, 108,149

Ascomata dispersa, immersa, plano-globosa, glabra, 140–280 μm lat., 135–200 μm alt. Rostrum erumpens, teres, minutum, 0–15 μm long., 15–50 μm lat., cellulis brunneis, polygoniis, 6–18 × 4–7 μm compositum; ostiolum sine periphysibus. Paries ascomatis 15–25 μm lat., cellulis brunneis, polygoniis, tenui-tunicatis, 8–13 × 6–12 μm compositus. Physes 2–3 μm lat., multiseptatae, eguttulatae, mucosae. Asci pauci, obclavati, 65–95 × 22–40 μm, 8-spori. Ascosporae tetraseriatae, obovatae, 25–38 × 10–16 μm, 1-septatae, septo submedio, constricto; hyaline, guttulatae, laeves vel echinulatae, strato mucoso 1–2 μm lat. circumdatae.

Hab. in caulibus *Arctagrostidis latifoliae*—"CANADA: N.W.T.: Dist. of Franklin: 70502, Base Camp, 72°05′ N 94°10′ W, Somerset I., D. B. O. Savile 3816A, 13 Aug. 1958, as *Wettsteinina macrotheca* (Rostr.) Müller (sl. immature) det. M. E. Barr." HOLOTYPUS (DAOM).

Ascocarps scattered, immersed, subepidermal, globose, depressed and flattened above, glabrous, 140–280 μm wide, 135–200 μm high. Beak short, the merest papilla, 0–15 μm high, 15–50 μm wide, composed of 2 to 4 layers of brown vertically elongated 6–18 × 4–7 μm cells, without periphyses or surface setae. Wall in longitudinal section uniform in thickness except at the wider area at upper margin, 15–25 μm thick, of 1 to 4 layers of 8–13 × 6–12 μm polygonal to rectangular, thin-walled brown cells. Physes numerous, 2–3 μm wide, septate at 7- to 15-μm intervals, with thin septa, eguttulate, with slime coating. Asci numerous, saccate to broadly fusiform, 65–95 × 22–40 μm, with 8 irregularly clumped to tetraseriate ascospores. Ascospores obovoid, 25–38 × 10–16 μm, straight or gently curved, 1-septate, apical cell enlarged, septum complete and slightly constricted, submedian (0.57), hyaline, later brown when exposed on plant parts,

smooth to finely roughened, guttulate or not, with an inconspicuous sheath 1–2 μm wide.

HOST: *Arctagrostis latifolia* (R. Br.) Griseb.

COLLECTIONS EXAMINED: CANADA: N.W.T.: Dist. of Franklin: 70491, Aston Bay, 73°39′ N 94°45′ W, Somerset I., D. B. O. Savile 3759A, 9 Aug. 1958, as *Wettsteinina operculata* Barr; 88241, Viks Fiord, 76°00′ N 91°17′ W, Devon I., H. C. Honeyman, 19 July 1961, as *Wettsteinina macrotheca* (Rostr.) Müller; 88242, 72°36′ N 113°49′ W, Victoria I., W. D. Stretton 209, 7 Aug. 1960, as *Wettsteinina macrotheca* (Rostr.) Müller; 83508, 3 mi WNW of Isachsen, 78°48′ N 103°40′ W, Ellef Ringnes I., D. B. O. Savile 4370B, 4 Aug. 1960, as *Wettsteinina macrotheca* (Rostr.) Müller; 70502, Base Camp, 72°05′ N 94°10′ W, Somerset I., D. B. O. Savile 3816A, 13 Aug. 1958, as *Wettsteinina macrotheca* (Rostr.) Müller (sl. immature) det. M. E. Barr, HOLOTYPE (DAOM).

This species has a few subtle distinctions that are evident when understood. The opening is a very fine circular ostiole in a scarcely raised "beak." The upper wall is highly developed with thick "shoulders" at the margins. If the ostiole is missed, the whole upper wall might be misinterpreted as a cap. The lateral wall cells are fairly large. The ascospores are not remarkable. They have one septum below the middle and are brown and finely echinulate after discharge. None were observed with 3 septa. The inconspicuous sheath showed up best in 70502 but is not so evident as in *W. magnifica.*

Wettsteinina andromedae (Auersw.) Barr. var. *cassiopes* (Dearn. & House ex Barr) Barr, Can. J. Bot. 45: 1041. 1967

See excluded species *Lophiostoma sieversiae.*

Wettsteinina barrae n.sp. Figs. 25, 59, 89, 123, 124

Ascomata dispersa, immersa, globosa, glabra, 140–170 μm lat., 160–180 μm alt. Rostrum erumpens, teres, truncato–conicum, 60–80 μm long., 40–60 μm lat., cellulis brunneis, polygoniis, 4–6 × 4–6 μm compositum; ostiolum 25–35 μm diam., sine periphysibus. Paries ascomatis 12–17 μm lat., cellulis brunneis, polygoniis, tenui-tunicatis, 5–7 × 5–7 μm compositus. Physes 2–3 μm lat., multiseptatae, eguttulatae, mucosae. Asci copiosi, cylindrici, 120–150 × 30–36 μm, 8-spori. Ascosporae bi- vel tetraseriatae, fusiformes, 38–44 × 8–11 μm, 1-septatae, septo supramedio, constricto; hyalinae deinde brunneae et triseptatae, guttulatae, laeves vel echinulatae, strato mucoso 3–7 μm lat. circumdatae.

Hab. in caulibus et laminis *Coptidis trifoliae* var. *groenlandicae*—"CANADA: QUE: 74329, Mt. Albert, H. E. & M. E. Bigelow, M. E. Barr 1929B, 7 July 1957, *Wettsteinina mirabilis.*" TYPUS (DAOM).

Ascocarps scattered, immersed, subepidermal, in petiole and rarely in leaf blade, globose, glabrous, 140–170 μm wide, 160–180 μm high. Beak short, 60–80 μm long, 40–60 μm wide, composed of 2 or 3 layers of brown polygonal 4–6 × 4–6 μm cells around a 25–35 μm diameter ostiole, without periphyses or surface setae. Wall in longitudinal section uniform in thickness, 12–17 μm thick, of 2 to 4 layers of 5–7 × 5–7 μm polygonal, thin-walled brown cells. Physes numerous, 2–3 μm wide, septate at 10- to 20-μm intervals, with thin septa, eguttulate, with slime coating. Asci numerous, cylindrical, 120–150 × 30–36 μm, with 8 overlapping biseriate to tetraseriate ascospores. Ascospores broadly fusiform, 38–44 × 8–11 μm, straight, 1-septate, apical cell enlarged, septum complete and slightly constricted, submedian (0.53), hyaline, later brown and 3-septate when exposed on plant parts, smooth to finely roughened, guttulate or not, with a conspicuous sharply delimited sheath 3–7 μm wide.

HOST: *Coptis trifolia* (L.) Salisb. var. *groenlandica* (Oeder) Fern. as *C. groenlandica.*

COLLECTION EXAMINED: CANADA: QUE.: 74329, Mt. Albert, H. E. & M. E. Bigelow, M. E. Barr 1929B, 7 July 1957, as *Wettsteinina mirabilis,* TYPE (DAOM).

This species was considered by Barr (1961, p. 308) to be immature *W. mirabilis.* The other collection she cited (74323(*b*)) is *W. mirabilis* judged from the mature spores found on the leaf surface. The present species has much smaller spores that when fully mature and discharged on the leaf surface are 3-septate. While it is clear that it is not *W. mirabilis*, it is not easily aligned with any described species seen by us and is described as new.

Wettsteinina bupleuri n.sp. Figs. 30, 60, 101, 136

Ascomata dispersa, immersa, globosa, glabra, 150–250 μm lat., 150–250 μm alt. Rostrum erumpens, teres, truncato–conicum, curvatum, 50–85 μm long., 70–140 μm lat., cellulis brunneis, polygoniis, 4–6 × 4–6 μm compositum; ostiolum 40–70 μm diam., sine periphysibus. Paries ascomatis 15–20 μm lat., cellulis brunneis, polygoniis, tenui-tunicatis, 10–20 × 5–9 μm compositus. Physes 2–3 μm lat., multiseptatae, guttulatae, mucosae. Asci pauci, obclavati, 110–140 × 50–70 μm, 8-spori. Ascosporae tetraseriatae, fusiformes, 53–60 × 12–17 μm, 5-septatae, in ordinem 3:2:1:2:3, septo primo medio, constricto, hyalinae, guttulatae, laeves, strato mucoso 3–5 μm lat. circumdatae.

Hab. in caulibus *Bupleuri juncei*—"FRANCE: 91943, Rocca Miama, Tende, E. Müller, 27 June 1961." TYPUS (DAOM).

Ascocarps scattered, immersed, subepidermal, globose, glabrous, 150–250 μm wide, 150–250 μm high. Beak short, straight or curved, truncate–conical, terete, 50–85 μm long, 70–140 μm wide, composed of 2 or 3 layers of brown polygonal 4–6 × 4–6 μm cells around a 40–70 μm diameter ostiole filled with hyaline pseudoparenchyma, without periphyses or surface setae. Wall in longitudinal section uniform in thickness, 15–20 μm thick, of 2 or 3 layers of 10–20 × 5–9 μm polygonal thin-walled brown cells. Physes numerous, 2–3 μm wide, septate at 10- to 20-μm intervals, with thin septa, rarely guttulate, with slime coating. Asci few, from a central base, saccate, 110–140 × 50–70 μm, with 8 irregularly clumped ascospores. Ascospores broadly fusiform, 53–60 × 12–17 μm, straight, 5-septate, in sequence 3:2:1:2:3, third cell from apex enlarged, first septum complete and strongly constricted, median (0.50), often constricted at additional full septa, hyaline, later brown when exposed on plant parts, smooth, guttulate or not, with a conspicuous broad sharply delimited sheath, 3–5 μm wide.

HOST: *Bupleurum junceum* L.

COLLECTIONS EXAMINED: FRANCE: 91976, Tende, Alpes Maritimes, E. Müller & K. H. Richle, 5 Aug. 1953, ex ZT; 91943, Rocca Miama, Tende, E. Müller, 27 June 1961, TYPE (DAOM), source of culture 4588 from single ascospores and single asci giving specimen 92146.

This species on *Bupleurum junceum* has regularly 5-septate ascospores with a median first septum. It resembles *W. pachyasca*, which has regularly 6-septate ascospores with a supramedian first septum. The host association is not perfect

because *W. pachyasca* was found once on *Bupleurum ranunculoides*.

Wettsteinina callista (Rehm) Petrak, Sydowia, 1: 55. 1947 sensu Höhnel Fig. 35
≡ *Sphaerulina callista* Rehm, Hedwigia, 21: 122. 1882
≡ *Pseudosphaeria callista* (Rehm) Höhnel, Sitzungsber. Kaiserl. Akad. Wiss. Wien Math. Naturwiss. Kl. Abt. 1, 116. 129. 1907
≡ *Saccothecium callistum* (Rehm) Kirschst. Ann. Mycol. 37: 105. 1939

Ascocarps scattered, immersed, subepidermal, becoming erumpent, globose, glabrous, 270 μm wide, 270 μm high. Beak short, truncate–conical, terete, 30 μm long, 120 μm wide, composed of brown polygonal cells around a 35 μm diameter ostiole, without periphyses or surface setae. Wall in longitudinal section uniform in thickness, of 1 or 2 layers of 14- to 18-μm polygonal, thin-walled brown cells. Physes not recorded. Asci few, saccate, 140–160 × 120–150 μm, with 8 irregularly clumped ascospores. Ascospores broadly fusiform, 60–80 × 10–16 μm, straight to gently curved, 6-septate, in sequence 3:2:1:2:3:4, third cell from apex enlarged, central cells longer than others, first septum complete and slightly constricted, supramedian (0.43 to 0.44), not constricted at additional full septa, hyaline, smooth, guttulate, with a conspicuous broad sharply delimited sheath, 6–10 μm wide.

The above description was drawn from a slide from the Höhnel collection at FH with the following label information: A. n. 4371 (struck out and replaced in pencil by 4409), Neumarktl., Krain, 1886, *Pseudosphaeria callista*, *Campanula Scheuchzeri*. This is one of two specimens labelled *Sphaerulina callista* Rehm seen by Höhnel on loan from Rehm but is not the type specimen which was on *Minuartia* as *Alsines* from the Tyrol nor the original collection of *Sphaerulina pachyasca* var. *vossii* Rehm in Voss (1887, p. 220) which is on *Campanula caespitosa* Scop., bei Leibach, Anfangs November. The preparation is in fact from the collection of *Sphaerulina callista* (var. *callista*) from Katharinathal unweit Neumarktl im August, mentioned by Voss (1887, p. 220). It is not a type and of little consequence nomenclaturally but helps explain von Höhnel's concept of the genus *Pseudosphaeria* to know that he had *Wettsteinina pachyasca* under the name *Sphaerulina callista*. The cytoplasm of the spores appears brown most probably from the brown sealant used to preserve the slide. The spore walls and sheath are hyaline.

Wettsteinina candida n.sp. Figs. 29, 51, 81, 103, 135

Ascomata dispersa, immersa, globosa, glabra, 250–300 μm lat., 250–300 μm alt. Rostrum nullum. Operculum discoideum, candidum, 12–18 μm alt., 60–90 μm lat., cellulis hyalinis, columnaris, 6–9 × 4–5 μm compositum; ostiolum 60–90 μm diam., sine periphysibus. Paries ascomatis 10–15 μm lat., cellulis brunneis, oblongis, tenui-tunicatis, 6–10 × 3–5 μm compositus. Physes 2–3 μm lat., multiseptatae, eguttulatae, mucosae. Asci copiosi, cylindrici, 120–150 × 25–37 μm, 8-spori. Ascosporae bi- vel tetra-seriatae, fusiformes, 54–58 × 12–15 μm, 6-septatae, septo primo submedio, constricto; hyalinae deinde brunneae, eguttulatae, laeves, strato mucoso 2–3 μm lat. circumdatae.

Hab. in foliis *Caricis rostratae* Stokes—"CANADA: N.W.T.: 194835, Great Bear Lake, H. T. Shacklette 3275, 31 July 1948, ex MICH as *Wettsteinina niesslii*." TYPUS (DAOM), ISOTYPUS (MICH).

Ascocarps scattered, immersed, subcuticular centrally to intraepidermal laterally, globose, glabrous, 250–300 μm wide, 250–300 μm high. Beak none. Disc 12–18 μm high, 60–90 μm wide, composed of 2 or 3 layers of hyaline columnar 6–9 × 4–5 μm very thin walled cells, without periphyses or surface setae, opening circular from eruption of a centrally subcuticular disclike white cap. Wall in longitudinal section uniform in thickness except slightly wider at margin of disc where fungus invades epidermal cells, 10–15 μm thick, of 3 or 4 layers of 6–10 × 3–5 μm rectangular, thin-walled brown cells. Physes numerous, 2–3 μm wide, septate at 10- to 20-μm intervals, with thin septa, eguttulate, with slime coating. Asci numerous, cylindrical, 120–150 × 25–37 μm, with 8 overlapping biseriate to tetraseriate ascospores. Ascospores broadly fusiform, 54–58 × 12–15 μm, straight, 6-septate, in sequence 4:3:2:1:2:4, fourth cell from apex enlarged, first septum complete and slightly constricted, submedian (0.57), rarely constricted at additional full septa, hyaline, later brown when exposed on plant parts, smooth, guttulate or not, with a conspicuous sharply delimited sheath 2–3 μm wide.

HOST: *Carex rostrata* Stokes.

COLLECTION EXAMINED: CANADA: N.W.T.: 194835, Great Bear Lake, H. T. Shacklette 3275, 31 July 1948, ex MICH as *Wettsteinina niesslii*.

This species has a conspicuous white disc that fills the broad ostiole. The wall cells around the disc extend into one or two epidermal cells, but the disc area is covered only by the host cuticle without a trace of epidermal cells, which may have been displaced basally in the early stages of growth of the ascocarp as described in *Lophodermium* by Minter (1981). The wall is thin and composed of only a few layers of cells and becomes slightly thicker around the ostiole area. The cells filling the ostiole are hyaline, thin-walled, stacked vertically like short columns but only 2 or 3 cells high. The ascospores are suggestive of *W. pachyasca* but have a submedian first septum. The spores are 6-septate at maturity but often can be found with one septum. In the 1-septate stage, the spores resemble those of *W. niesslii* as illustrated from original material (as *Leptosphaeria gigaspora* Niessl) by Berlese (1894, pl. 57, 1) but are not a compelling match. The fungus is described as new. The epithet refers to the distinctive white area that fills the ostiole. The collection was reported briefly by Barr (1961, p. 308; 1972, p. 544) and allied with another collection under the name *W. niesslii* q.v.

Wettsteinina carinthiaca Petrak, Sydowia, 9: 577–578. 1955
See *Leptosphaerulina carinthiaca* (Petrak) Crivelli, Diss. ETH. 7318: 139. 1983. Type was requested from W, but not received on loan.

Wettsteinina carissae Ramchandra Rao, Sydowia, 25: 54. 1971. (1972)
Type was requested from M. S. G. College, Malegaon, Maharasthtra, India, but is not available.

Wettsteinina coryli Hansford, Proc. Linn. Soc. N.S.W. 81: 37. 1956
Type was requested from ADW but was not received on loan.

Wettsteinina douglasii n.sp. Figs. 7, 61, 141

Ascomata dispersa, immersa, globosa, glabra, 140–150 μm lat., 160–180 μm alt. Rostrum erumpens, teres, truncato-conicum, 60–80 μm long., 60–90 μm lat., cellulis brunneis, polygoniis, 5–7 × 4–5 μm compositum; ostiolum

35–45 μm diam., sine periphysibus. Paries ascomatis 12–16 μm lat., cellulis brunneis, polygoniis, tenui-tunicatis, 6–10 × 5–9 μm compositus. Physes 2–4 μm lat., multiseptatae, eguttulatae, mucosae. Asci pauci, obclavati, 140–150 × 70–100 μm, 8-spori. Ascosporae tetraseriatae, obovatae, (45)55–62(74) × 22–24 μm, 1-septatae, septo submedio, constricto; hyalinae, guttulatae, laeves vel echinulatae, strato mucoso 2–3 μm lat. circumdatae.

Hab. in caulibus *Saxifragae nivale*—"CANADA: N.W.T.: Dist. of Franklin: 75177, 2 mi. S of Isachsen 78°45′ N 103°33′ W, Ellef Ringnes I., D. B. O. Savile 4223A, 12 July 1960, *Wettsteinina mirabilis*." TYPUS (DAOM).

Ascocarps scattered, immersed, subepidermal, globose, glabrous, 140–150 μm wide, 160–180 μm high. Beak short, 60–80 μm long, 60–90 μm wide, composed of 1 or 2 layers of brown polygonal 5–7 × 4–5 μm cells around a 35–45 μm diameter ostiole filled with hyaline pseudoparenchyma, without periphyses or surface setae. Wall in longitudinal section uniform in thickness, 12–16 μm thick, of 1 or 2 layers of 6–10 × 5–9 μm polygonal, thin-walled brown cells. Physes numerous, 2–4 μm wide, septate at 10- to 20-μm intervals, with thin septa, eguttulate, with slime coating. Asci few, saccate, 140–150 × 70–100 μm, up to 270 μm long when extended for discharge, with 8 irregularly clumped ascospores. Ascospores obovate, (45)55–62(74) × 22–24 μm, straight, 1-septate, apical cell enlarged, septum complete and slightly constricted, submedian (0.53), constricted at two ringlike thickenings that simulate septa, hyaline, later brown when exposed on plant parts, smooth to finely roughened, granular, eguttulate, with a conspicuous sharply delimited sheath 2–3 μm wide.

HOST: *Saxifraga nivalis* L.

COLLECTION EXAMINED: CANADA: N.W.T.: Dist. of Franklin: 75177, 2 mi S of Isachsen 78°45′ N 103°33′ W, Ellef Ringnes I., D. B. O. Savile 4223A, 12 July 1960, as *Wettsteinina mirabilis*, TYPE (DAOM).

This species is distinctive in having large mainly 1-septate ascospores with a submedian septum. It was first determined as *W. mirabilis*, but the spores lack the characteristic supramedian full septum and three ringlike septa of that species. The spores approach those of *W. magnifica* which, however, has a prominent cap on the ascomata.

Named for Douglas B. O. Savile.

Wettsteinina dryadis (Rostrup) Petrak, Sydowia, 1: 322. 1947
Figs. 16, 41, 90, 109

≡ *Massarina dryadis* Rostrup, Medd. Groenl. 3: 560. 1888

≡ *Pleospora dryadis* (Rostrup) Petrak, Hedwigia, 68: 221. 1929

Ascocarps scattered, immersed, subepidermal, globose, glabrous, 100–200 μm wide, 120–200 μm high. Beak none, a broad circular opening from eruption of a white intraepidermal disclike cap 30–35 μm high, 80–90 μm wide, of 2 to 5 layers of pale brown polygonal 3–6 μm diameter cells, without periphyses or surface setae. Wall in longitudinal section uniform in thickness, 10–20 μm thick, of 2 or 4 layers of 5–11 × 3–7 μm polygonal to rectangular thin-walled hyaline to brown cells. Physes few, 2–3 μm wide, septate at 10- to 20-μm intervals, with thin septa, eguttulate, with slime coating. Asci few, saccate to broadly fusiform, 85–120 × 28–40 μm, with 8 irregularly tetraseriate ascospores. Ascospores broadly fusiform, 29–36 × 10–14 μm, straight or gently curved, 3-septate, in sequence 2:1:2, second cell from apex enlarged, slightly longer than end cell, third cell shorter than basal cell, first septum complete and slightly constricted, median (0.50), often constricted at additional ringlike internal thickenings in the wall that simulate septa or at occasional full septa, hyaline, later brown when exposed on plant parts, smooth, finely granular and guttulate, with a conspicuous thin sharply delimited sheath, 1.5–3 μm wide.

HOSTS: (*1*) *Dryas drummondii* Rich., (*2*) *D. integrifolia* M. Vahl., (*3*) *D. octopetala* L.

COLLECTIONS EXAMINED: CANADA: NFLD.: (63038), on *2*, William Wheeler Point, Humber Dist., E. Rouleau, 13–14 July 1948; (63487), on *2*, Hebron vicinity, Labrador, R. T. Wilce, 24 July 1954. QUE.: 63019(*b*), on *2*, Ile St. Charles, Archipel de Mingan, F. F. Marie-Victorin & R. Germain 21044, 12 Aug. 1925; (63037), on *2*, Riviere au Fusil, Ile Anticosti, F. F. Marie-Victorin, 20 July 1927. B.C.: 193868, on *1*, Field, J. M. Fogg, 11 Sept. 1925, ex UBC 1966, F 4101, as *Massarina Dryadis* Rostr. det. M. E. Barr; N.W.T.: Dist. of Franklin: 70500, on *2*, Four Rivers Bay, 72°50′ N 95°30′ W, Somerset I., D. B. O. Savile 3637A, 28 July 1958; (63093), on *2*, Head of Clyde Inlet, Baffin I., P., Dansereau, 23 July 1950; (63094), same data, 28 Aug. 1950; (74255), same data, 27 June 1950; (63413), same data, 4 Aug. 1950; (63423), same data, 7 June 1950; (63451), same data, 26 July 1950; (63434), same data, 2 July 1950; 63065, same data, 13 July 1950; (63273), on *2*, Alert, Ellesmere I., R. Schuster, 15 July 1955; 88240, on *2*, 72°36′ N 113°49′ W, Victoria I., W. D. Stretton 206, 7 Aug. 1961; 88239, on *2*, 72°0′ N 118°44′ W, Banks I., W. D. Stretton 157, 3 July 1960; 92322, on *2*, 1.5 mi N of Hazen Camp, 81°49′ N 71°21′ W, Ellesmere I., D. B. O. Savile 4793A, 31 July 1962; 92323, same data 1 mi W of Hazen Camp, Savile 4437A, 22 June 1962. DENMARK: GREENLAND: 193575, on *3*, Shannon-Oerne, 2. tyske Expedition 1869–1870, ex C, ex Herb. Rostrup 3, as *Massarina Dryadis* Rostr. TYPE; on *2*, John Murray I., Th. Wulf Thule Expedition Gronland Norkyst 1916–18, 3 July 1917, ex C, ex Herb. Wehmeyer; on *3*, Alten, T. M. Fries, 6 July 1864, ex C, ex Herb. Wehmeyer, Fl. Arctica. SWITZERLAND: 91984, on *3*, Airolo, Tessin, 1300 m., A. Volkart, 6 May 1943, ex ZT.

This species on old leaves of *Dryas* is quite distinctive. The ascocarps have a conspicuous white cap that includes host epidermal cells. The cap opens and white collapsed internal tissue is exposed. The physes are present and the spores are like those of several other *Wettsteinina* species with one complete central septum and two corrugations resembling septa. The spores may have a faint yellow color and the rigid sheath is 1.5–3 μm thick. The secondary septa are unequally spaced giving a characteristic long second cell and a short third cell.

Wettsteinina dryadis is somewhat variable in gross appearance. The globose ascomata develop within and below the epidermis and are for a long time covered and protected by the thick cuticle and upper part of the epidermal cells. The lateral wall development is usually slight; influenced by the protective decay-resistant host cells. The opening is often caplike and includes some epidermal cell remnants, a white disc of cuticle and upper layer of epidermis cells. There is usually no beak, but some ascomata in some collections show a projecting "beak" erumpent through a break in the cuticle. This "beak" is nearly as broad as the ascoma and is, in our view, a raised disc. It is admitted that superficially it looks like an ordinary short broad beak, but sections support the view that it is a cap or disc. No evidence was found to support the view that it is a

beak with a central ostiolar canal. Under the dissecting microscope it looks like a "rather coarse protruding neck" as described by Holm (1979, p. 90).

Wettsteinina dryadis occurs in various stages of maturity mixed with numerous pyrenomycetes on old leaves of *Dryas*. To find the fungus in good mature condition is extremely difficult. A number of collections cited above have the accession number placed in parentheses to indicate that although ascomata may be present, the identification could not be confirmed by our own observation of mature ascospores.

Wehmeyer studied the type of *M. dryadis* from C and made herbarium notes as follows. "On leaves as rather thickly scattered circular black spots with a central perforate ostiole. Perithecia globose, 200 μm diam., immersed in the leaf. Wall thick, 30–50 μm, of black coarse parenchyma. Asci stout, cylindrical–clavate, with a thickened wall and a knob-like base, 90–125 × 30–33 μm, few, in a fascicle, without paraphyses. Spores crowded biseriate to triseriate, oblong–cylindric, granular, yellowish-hyaline, ends rounded, 30–34 × 12.5–14 μm, somewhat tapered but broadly rounded at the ends, strongly constricted at the septa. Only seen in the ascus—no gel envelope seen."

Wehmeyer (1961, p. 354) considered that *Sphaerulina dryadis* Starback 1887 and *Pleospora hazslinskyana* Sacc. & Syd. (≡ *Pleospora dryadis* Hazsl.) were synonyms of *M. dryadis* Rostrup. No material of either of the latter two was located in Wehmeyer's slide collection, nor were notes found to indicate he had studied the material personally. From the descriptions of the latter two taxa we do not believe they could be the same as *M. dryadis*.

Wettsteinina duplex n.sp. Figs. 12, 49, 62, 94, 110

Ascomata dispersa, immersa, erumpentia, globosa, tomentosa, setis 100–150 × 4–6 μm, 200–370 μm lat., 200–370 μm alt. Rostrum erumpens, teres vel compressum, truncato–conicum, 50–70 μm long., 27–100 μm lat., cellulis brunneis, polygoniis, 4–7 × 4–7 μm compositum; ostiolum 23–30 μm diam., sine periphysibus. Paries ascomatis 20–27 μm lat., cellulis brunneis, polygoniis, tenui-tunicatis, 6–10 × 3–6 μm compositus. Physes 2–3 μm lat., multiseptatae, eguttulatae, mucosae. Asci copiosi, cylindrici, 150–180 × 24–30 μm, 16-spori. Ascosporae biseriatae, fusiformes, rectae vel curvatae, 33–42 × 8–13 μm, 1-(3-)septatae, septo primo medio, constricto, hyalinae, guttulatae, laeves, strato mucoso 3–4 μm lat. circumdatae.

Hab. in caulibus *Lupini lyalii*—"UNITED STATES OF AMERICA: WASHINGTON: 193739(*a*), Mazama Ridge, 5700 ft., Mt. Rainier National Park, E. G. Simmons 1601, 21 July 1948, ex MICH, *Eriosphaeria herbarum* Wehm., PARATYPE fide Wehmeyer (1952, p. 418–419)." TYPUS (DAOM), ISOTYPUS (MICH).

Ascocarps scattered, immersed, subepidermal, becoming superficial, globose, 200–370 μm wide, 200–370 μm high, tomentose around apex, hairs 100–150 × 4–6 μm. Beak truncate–conical, terete or laterally compressed, 50–70 μm long, 27–100 μm wide, of 2 to 4 layers of brown polygonal 4–7 × –7 μm cells around a 23–30 μm diameter ostiole, without periphyses or surface beak setae. Wall uniform in thickness or slightly wider at basal margin, 20–27 μm wide, of 2 to 4 layers of 6–10 × 3–6 μm polygonal to rectangular thin-walled brown cells. Physes numerous, 2–3 μm wide, septate at 10- to 25-μm intervals, with thin septa, eguttulate, with slime coating. Asci numerous, cylindrical, 150–180 × 24–30 μm, with 16 biseriate ascospores. Ascospores broadly fusiform, 33–42 × 8–13 μm, straight or gently curved, 1-septate, first septum complete, median (0.50) and slightly constricted, often constricted at two ringlike internal thickenings in the wall that simulate septa, hyaline, later brown when exposed on plant parts, smooth, eguttulate, with a conspicuous broad sharply delimited sheath, 3–4 μm wide, constricted at the septum and widest at the second cell.

HOSTS: (*1*) *Anemone* sp., (*2*) *Erigeron* sp., (*3*) *Lupinus lyalii* (Gray), (*4*) *Valeriana sitchensis* Bong., (*5*) unknown, (*6*) unknown Asteraceae.

COLLECTIONS EXAMINED: UNITED STATES OF AMERICA: WASHINGTON: 193739(*a*), on *3*, Mazama Ridge, 5700 ft., Mt. Rainier National Park, E. G. Simmons 1601, 21 July 1948, ex MICH, as *Eriosphaeria herbarum* Wehm. (PARATYPE fide Wehmeyer (1952, pp. 418–419)), TYPE of *W. duplex* (DAOM), ISOTYPE (MICH), also 193021 Wehmeyer slide R 1601; 193738, on *4*, Mazama Ridge, Mt. Rainier National Park, E. G. Simmons 2338*d*, 21 July 1948, ex MICH, as *Eriosphaeria herbarum* Wehm., PARATYPE; 193735, on *5* dead stems, Eagle Peak, Mt. Rainier National Park, E. G. Simmons 2353, 29 July 1948, ex MICH, as *Eriosphaeria herbarum* Wehm., PARATYPE; 120192(*b*), on *6* composite stems, Indian Henry's Hunting Grounds, 5500 ft., E. G. Simmons 1746(*b*), 2 Aug. 1948, ex Herb. Wehmeyer, with and as *Eriosphaeria macrospora* Wehm., TYPE; 121538(*b*), on *2*, Timberline Camp, Mt. St. Helens, Skamania Co., W. B. & V. G. Cooke 28378, 22 July 1951, ex Herb. Wehmeyer with and as *Eriosphaeria macrospora* Wehm.; 121567(*a*) on *1*, Sunrise Pt., Yakima Park Rd., Mt. Rainier Nat. Park, 5700 ft., W. B. Cooke 24280, 13 July 1948, ex Herb. Wehmeyer, as *Eriosphaeria macrospora* Wehm. with *Pleospora ambigua* (Berl. & Bres.) Wehm.

This composite description is based on three specimens cited from MICH. The collection, Simmons 2353, was mistaken as type of *E. herbarum* by Barr (1972, p. 549) so *E. herbarum* was treated as a synonym of *W. anomala* (Ell. & Ev.) Barr. The type of *Eriosphaeria herbarum*, Simmons 1934, as designated by Wehmeyer (1952, p. 419) is a different species, to which the name *Lophiostoma herbarum* should apply.

Wettsteinina eliassonii Petrak, Sydowia, 9: 491. 1955

The type was requested from W but not received on loan. The description matches *W. mirabilis*.

Wettsteinina ellisii Barr, Contrib. Univ. Mich. Herb. 9: 546–547. 1972

See excluded species *Dothiora ellisii*.

Wettsteinina engadinensis E. Müller, Sydowia, 4: 202–203. 1950

See additional study on *Nodulosphaeria* (Shoemaker and Babcock 1987).

Wettsteinina eucarpa (Karsten) E. Müller & von Arx, Ber. Schweiz. Bot. Ges. 60: 335. 1950 Figs. 18, 63, 86, 111

≡ *Sphaerella eucarpa* Karsten, Ofvers. K. Vetenskapsakad. Foerh. 2: 103. 1872

Ascocarps scattered, immersed, subepidermal, globose, glabrous, 100–180 μm wide, 100–180 μm high. Beak short, truncate–conical, terete, 10–17 μm long, 30–60 μm wide, composed of 4 or 5 layers of brown polygonal 4 × 8 μm cells around a 10–15 μm diameter ostiole, without periphyses or surface setae. Wall in longitudinal section uniform in thick-

ness, 20–27 μm thick, of 2 to 5 layers of 6–10 × 5–7 μm polygonal to rectangular thin-walled brown cells. Physes numerous 2–3 μm wide, septate at 10- to 15-μm intervals, with thin septa, rarely guttulate, with slime coating. Asci few, from a central base, saccate, 70–95 × 32–50 μm, with 8 irregularly clumped ascospores. Ascospores broadly fusiform, 30–46 × 10–15 μm, straight or gently curved, 1- to (rarely) 3-septate, in sequence (2):1:(2), first septum complete and slightly constricted, supramedian (0.48), sometimes constricted at internal thickened constrictions in the wall that simulate septa, hyaline, later brown when exposed on plant parts, smooth, guttulate or not, with a conspicuous thin sharply delimited sheath, 1.5–3 μm wide.

HOST: *Polygonum viviparum* L.

COLLECTIONS EXAMINED: CANADA: N.W.T.: Dist. of Franklin: 70501, Base Camp, 72°05′ N 94°10′ W, Somerset I., D. B. O. Savile 3591A, 22 July 1958; 83507, 3 mi S of Isachsen, 78°45′ N 103°33′ W, Ellef Ringes I., D. B. O. Savile 4301A, 26 July 1960; 91228, on hummocks in marsh, Skeleton L., 1½ mi WNW of Camp, Hazen Camp, Ellesmere I., D. B. O. Savile 4636A, 16 July 1962; 63404*b*, Head of Clyde Inlet, Baffin I., P. Dansereau, 25 June 1950. NORWAY: Spitzbergen: 193723, Adventbay, Exp. Arct. Suec., 8.VIII.1868, ex UPS, ex Herb. E. Fries, LECTOTYPE, as *Sphaerella eucarpa* Karst; Crossbay, Exp. Arct. Suec., 1861, ex UPS, ex Herb. E. Fries, PARATYPE, as *Sphaerella eucarpa* Karst.

The last collection cited appeared to be a fungus with smaller ascomata than described for *S. eucarpa*, and is probably a *Mycosphaerella*. In view of the scanty material, no preparation was made. The collection from Adventbay had been examined previously and the part with ascomata in the range of 150 μm had been segregated into a cellophane envelope. In view of this segregation, and the good match to the original description, the Adventbay collection is designated lectotype. The Crossbay collection has ascomata much smaller than given by Karsten and would not be a good choice. Both collections were cited by Karsten.

Wettsteinina gentianae (Wehmeyer) Barr, Contrib. Univ. Mich. Herb. 9: 549. 1972
Figs. 26, 42, 50, 74, 100, 131, 132, 143
≡ *Sphaerulina gentianae* Wehm. Mycologia, 38: 166–167. 1946

Ascocarps scattered, immersed, subepidermal, becoming erumpent, or appearing superficial, globose or conoid, glabrous, 400–500 μm wide, 400–500 μm high, often with brown parallel mycelium in host cells and sometimes from an enlarged flangelike base. Beak none; a broad circular opening from eruption of an intraepidermal disclike cap 80–100 μm in diameter of dark brown central cells and hyaline marginal cells 6–8 μm in diameter, without periphyses or surface setae, at times appearing beaklike from the eruption of one edge of the disc. Wall in longitudinal section uniform in thickness, 35–50 μm thick, of 3 to 5 layers of 8–15 × 6–12 μm polygonal thin-walled brown cells with a dark brown external crust and some compressed hyaline internal cells. Physes few, 2.5–3.5 μm wide, septate at 20- to 30-μm intervals, with thin septa, eguttulate, with slime coating. Asci moderately numerous, from a central base, cylindrical, 170–200 × 30–50 μm, with 8 biseriate ascospores. Ascospores broadly fusiform, 44–56 × 17–21 μm, straight, 3-septate, in sequence 2:1:2, second cell from apex enlarged, central cells shorter than end cells, first septum complete, slightly constricted and median (0.50), often constricted at additional ringlike internal thickenings in the wall that simulate septa and thickened external to the rings, hyaline to pale yellow, later brown when exposed on plant parts, smooth or wrinkled after discharge, guttulate, sometimes with a conspicuous broad sharply delimited sheath, 2–3(4.5) μm wide.

HOST: *Gentiana calycosa* Griseb.

COLLECTIONS EXAMINED: UNITED STATES OF AMERICA: WYOMING: 120266, Skyline Trail, Teton National Park, 10,000 ft., L. E. Wehmeyer 1174, 24 July 1940, ex Herb. L. E. Wehmeyer (9245), as *Sphaerulina gentianae*, TYPE; 193581, Skyline Trail, at Overlook, Teton National Park, above 9000 ft., L. E. W. 1210, 5 Aug. 1940.

A reexamination of the type revealed that the fruit bodies have a caplike opening mechanism. A detailed superficial view seems to indicate the presence of conic beaks in some. However, a series of sections through the discharge area demonstrated the presence of a well-developed cap. The apparent "beaks" were the result of extension of one edge of the cap at a weak spot in the circular fracture zone. The other features were much as described by Wehmeyer (1946) and Barr (1972) except that the physes were conspicuous even in mature fruit bodies and the spore sheath did not usually expand beyond 3 μm, whereas Barr gave 4.5–6 μm. A few oily yellow spherical guttules were present in spores. Occasionally an angular lumen was observed in partly mature ascospores. In Wehmeyer's original slide mounted in polyvinyl alcohol, the guttules now appear circular in outline, not angular as first described and illustrated. After comparison of Wehmeyer slides Wyoming 1210 and Wyoming 1174 (holotype) these two collections are considered conspecific.

Wettsteinina gigantospora (Rehm in Voss) Höhnel, Sitzungsber. Kaiserl. Akad. Wiss. Wien Math. Naturwiss. Kl. Abt. 1, 116: 129. 1907
See *Wettsteinina mirabilis* (Niessl) Höhnel.

Wettsteinina gigaspora Höhnel, Sitzungsber. Kaiserl. Akad. Wiss. Wien Math. Naturwiss. Kl. Abt. 1, 116. 126. 1907
Figs. 37, 48, 52, 75, 142
≡ *Pleospora hoehneliana* Petrak, Ann. Mycol. 25: 207. 1927. non *Pleospora gigaspora* Karsten

Ascocarps scattered, immersed, subepidermal, becoming superficial with thin epidermis covering, depressed, broadly ellipsoidal, glabrous, 560–700 μm long, 350–550 μm wide, 180–350 μm high. Beak very short, truncate–conical, terete, 10–80 μm long, 100–170 μm wide, composed of 2 to 8 layers of brown polygonal 4- to 10-μm cells around a 25–45 μm diameter ostiole filled with hyaline pseudoparenchyma, without periphyses or surface setae. Wall in longitudinal section not uniform in thickness, wider at basal margin, laterally 80–165 μm thick, of 7 to 12 layers of 10–22 × 10–22 μm polygonal thin-walled yellow cells with one layer of smaller brown exterior (rind) cells. Physes moderately numerous, 3–5 μm wide, septate at 10- to 20-μm intervals, with thin septa, rarely guttulate, with slime coating. Asci few, from a central base, saccate, 140–220 × 90–180 μm, with 8 irregularly clumped ascospores. Ascospores broadly fusiform, blunt at the ends when fully mature, (73)100–120 × 28–40 μm (excluding sheath) straight, 4-septate, very rarely 5-septate, in sequence (3):2:1:2:3, second (third) cell from apex enlarged, central cells no shorter than end cells, first septum complete

and slightly constricted, supramedian (0.42 to 0.44), sometimes constricted at additional ringlike internal thickenings in the wall that simulate septa, hyaline, later brown when exposed on plant parts, smooth, guttulate or not, with a conspicuous broad sharply delimited sheath, 5–11 μm wide.

HOSTS: (*1*) *Arnica cordifolia* Hook., (*2*) *Campanula cochleariifolia* Lam., (*3*) *Dianthus superbus* L., (*4*) *Myosotis alpestris* F. W. Schmidt, (*5*) *Trifolium* sp., (*6*) unknown.

COLLECTIONS EXAMINED: CANADA: B.C.: 107856, Mt. Revelstoke, 6300 ft., Trail to Millar Lake, R. A. Shoemaker, 7 Aug. 1963. AUSTRIA, on *4*, Oetzthal, Tirol, A. Willi, 3/8 1898, FH, Herb. Höhnel slides 4409, as unreif ? *Wettsteinina alpina*, original label of specimen (sheet 7703 FH) as *Bresadolella cinctospora* n.g. et sp., an *Seynesia* ? __. ROMANIA: 193582, on *6*, An dürren Krauterstengeln (monocot), bei Gurschewy und Cej, Loitlesberger, 1897, ex FH, ex Herb. Höhnel A. n. 4409, as *Wettsteinina alpina*, TYPE. SWITZERLAND: GRAUBÜNDEN: 91944, on *2*, Alteinalp, Arosa, E. Müller, 18 July 1958, ex ZT; 121289, same as preceding ex Herb. Wehmeyer; 91983, on *3*, Vo, Val Tuors, 2000 m., near Bergün, E. Müller & R.A.S., 22 Aug. 1961, culture 4616; 91979, on *5*, Vo, Val Ravais-ch, 2000 m., R.A.S., 12 July 1961, culture 4577.

The type is an excellent match to Höhnel's (1907*a*) ample published description with illustrations and to notes and sketches on the packet. The name on the packet was *Wettsteinina alpina*, but he changed the epithet to '*gigaspora*'' in the published description, although for the figure legend *W. alpina* was not changed. Very little material remains. Only one fruit body was examined. Consequently, the full range of ascospore septation recorded by Höhnel was not observed. It is of considerable interest that in vertical sections the interthecial tissue illustrated by Höhnel for *W. gigaspora* is much as he drew it. Höhnel considered the ascocarp to have single-ascus locules in one plane partitioned by cells that were somewhat stretched. Transverse sections were not made by us because of the scantiness of the type. An original slide at FH shows transverse sections with compressed pseudoparenchyma around the asci. From our vertical sections and also from Höhnel's slide of vertical sections, the interthecial tissue is just like pseudoparaphyses found in *Leptosphaeria, Pleospora,* and *Pyrenophora.* However, the nature of the ascocarp centrum of *Pseudosphaeria callista* (Rehm) Höhnel is more cogent because it is the type of the genus *Pseudosphaeria,* upon which the family Pseudosphaeriaceae is typified, although *Wettsteinina* was the one other genus included when the family was described.

This species has spores that are similar to those of *W. mirabilis* but that are slightly longer, markedly wider, and broadly rounded at the ends. The most notable distinction between the species is in the ascoma wall. In *W. gigaspora* the wall is very thick, mainly composed of large polygonal cells with a dark brown rind layer of smaller cells, whereas in *W. mirabilis* the wall is thin and made up of a few layers of nearly rectangular cells.

In 1961–1962, *W. gigaspora* was isolated using single ascospores. Ascomata formed in culture in malt agar and on straw agar at 16°C. Straw agar was better for the production of ascospores, which were 78–95 × 23–28 μm with one full septum and three rings. The ascomata varied in form and rarely matched the depressed ellipsoidal short-beaked fruit bodies seen in nature. They varied from globoid to pyriform with a beak that could be erect or lateral in the agar. The wall regularly had the rind layer but was never as wide as in nature. Pseudoparaphyses developed before the few asci matured.

The main conclusion from the culture study is that *W. gigaspora* is homothallic, apparently lacks an anamorph, and has a centrum of the *Pleospora* type. In nature, a large multicellular pseudoparenchymatic ascoma initial forms in which pseudoparaphyses and large bitunicate asci develop. The asci eject through a simple beak that is at first filled with hyaline pseudoparenchyma and is devoid of periphyses or beak setae. The development seems closest to *Pyrenophora* as noted by Höhnel (1907*b*). In our view, the family names Pseudosphaeriaceae Höhnel (1907*a*) and Wettsteininaceae Locquin nom.illeg. (as Wettsteiniaceae) (1974, table) published without indication of type are synonyms of Pleosporaceae Nitschke.

Eriosphaeria herbarum Wehmeyer, Sydowia, 6: 418–419. 1952

See excluded species *Lophiostoma herbarum*.

Wettsteinina junci n.sp. Figs. 9, 64, 99, 112

Ascomata dispersa, immersa, globosa, glabra, 140–160 μm lat., 140–160 μm alt. Rostrum erumpens, teres, truncato–conicum, 15–20 μm long., 45–55 μm lat., cellulis brunneis, polygoniis, 2–4 × 2–4 μm compositum; ostiolum 20–25 μm diam., sine periphysibus. Paries ascomatis 10–14 μm lat., cellulis brunneis, polygoniis, tenui-tunicatis, 4–9 × 2–4 μm compositus. Physes 1.5–2 μm lat., multiseptatae, guttulatae, mucosae. Asci pauci, cylindrici, 70–85 × 18–30 μm, 8-spori. Ascosporae tetraseriatae, fusiformes, 26–31 × 9–11 μm, 1- vel 3-septatae, in ordinem (2):1:(2), septo primo supramedio, constricto, hyalinae, guttulatae, laeves, strato mucoso 1.5–2 μm lat. circumdatae.

Hab. in caulibus *Junci castanei*—''CANADA: N.W.T.: Dist. of Keewatin: 70493(*b*), Coral Harbour, Southampton I., D. B. O. Savile 4095(*b*) et al., 16 Aug. 1959, as *Wettsteinina* sp.'' TYPUS (DAOM).

Ascocarps scattered, immersed, subepidermal, globose, glabrous, 140–160 μm wide, 140–160 μm high. Beak short, truncate–conical, terete, 15–20 μm long, 45–55 μm wide, composed of 2 or 3 layers of brown polygonal 2–4 × 2–4 μm cells around a 20–25 μm diameter ostiole, without periphyses or surface setae. Wall in longitudinal section uniform in thickness, 10–14 μm thick, of 2 or 3 layers of 4–9 × 2–4 μm polygonal thin-walled brown cells. Physes moderately numerous, 1.5–2 μm wide, septate at 15- to 20-μm intervals, with thin septa, rarely guttulate, with slime coating, brown near beak. Asci few, from a central base, cylindrical, 70–85 × 18–30 μm, with 8 tetraseriate ascospores. Ascospores broadly fusiform, 26–31 × 9–11 μm, straight, 1- to 3-septate, in sequence (2):1:(2), second cell from apex enlarged, central cells no shorter than end cells, first septum complete and slightly constricted, supramedian (0.43), sometimes constricted at additional ringlike internal thickenings in the wall that simulate septa, hyaline, later brown when exposed on plant parts, smooth, guttulate or not, with a conspicuous sheath, 1.5–2 μm wide.

HOST: *Juncus castaneus* Sm.

COLLECTION EXAMINED: CANADA: N.W.T.: Dist. of Keewatin: 70493(*b*), Coral Harbour, Southampton I., D. B. O. Savile 4095(*b*) et al., 16 Aug. 1959, as *Wettsteinina* sp., TYPE (DAOM).

This species occurs on flowering stalks of *Juncus*. It is not conspicuous; only the beak shows. The walls are very thin. The asci are fairly numerous. The ascospores have one full

septum and two rings and are smaller than in most of the accepted species. The sheath is evident but lacks a clearly defined margin. The fungus might have been named previously in some other genus like *Massarina*. It is named for the host genus.

Wettsteinina kashmirensis n.sp. Figs. 6, 125

Ascomata dispersa, immersa, globosa, glabra, 200 μm lat., 150 μm alt. Rostrum nullum. Operculum discoideum, 15–20 μm alt., 60–70 μm lat., cellulis brunneis, polygoniis, 4–6 × 4–6 μm compositum; ostiolum sine periphysibus. Paries ascomatis 15–20 μm lat., cellulis brunneis, polygoniis, tenui-tunicatis, 7–10 × 5–7 μm compositus. Physes 2–3 μm lat., multiseptatae, eguttulatae, mucosae. Asci pauci, obclavati, 100–120 × 40–50 μm, 8-spori. Ascosporae tetraseriatae, fusiformes, 49–52 × 15–17 μm, 1-septatae, septo primo supramedio, constricto, hyalinae, guttulatae, laeves, strato mucoso 2–3 μm lat., circumdatae.

Hab. in caulibus *Polygoni affine*—"INDIA: 123890, Sonamarg, Sind River, 50 mi ENE of Sringigar, Kashmir, 10,500 ft., F. G. Dickason 30, July–Aug. 1928, ex Herb. L. E. Wehmeyer, as *Wettsteinina eucarpa* (Karst.) Müll. & v. Arx." TYPUS (DAOM).

Ascocarps scattered, immersed, subepidermal, globose, glabrous, 200 μm wide, 150 μm high. Beak none; a broad circular opening from eruption of an intraepidermal disclike cap, 15–20 μm high, 60–70 μm wide, composed of 2 or 3 layers of brown polygonal 4 × 6 μm cells, without periphyses or surface setae. Wall in longitudinal section uniform in thickness, 15–20 μm thick, of 2 to 4 layers of 7–10 × 5–7 μm polygonal to rectangular thin-walled brown cells. Physes numerous, 2–3 μm wide, septate at 10- to 15-μm intervals, with thin septa, rarely guttulate, with slime coating. Asci few, saccate, 100–120 × 40–50 μm, with 8 irregularly clumped ascospores. Ascospores broadly fusiform, 49–52 × 15–17 μm, straight, 1-septate, first septum complete and constricted, supramedian (0.46), often constricted at internal thickenings in the wall that simulate septum initials, hyaline, smooth, guttulate, with a conspicuous sharply delimited sheath, 2–3 μm wide.

HOST: *Polygonum affine* D. Don.

COLLECTION EXAMINED: INDIA: 123890, Sonamarg, Sind River, 50 mi ENE of Sringigar, Kashmir, 10,500 ft., F. G. Dickason 30, July–Aug. 1928, ex Herb. L. E. Wehmeyer, as *Wettsteinina eucarpa* (Karst.) Müll. & v. Arx. TYPE (DAOM).

This species differs from *W. eucarpa* in having a cap on the ascocarps and in having much larger ascospores.

Wettsteinina kobresiae n.sp. Figs. 11, 43, 65, 87, 113

Ascomata dispersa, immersa, globosa, glabra, 100–160 μm lat., 100–160 μm alt. Rostrum erumpens, teres, minutum, 0–15 μm long., 20–30 μm lat., cellulis brunneis, polygoniis, 5 × 7 μm compositum; ostiolum 8–10 μm diam., sine periphysibus. Paries ascomatis 15–18 μm lat., cellulis brunneis, polygoniis, tenui-tunicatis, 5–8 × 4–5 μm compositus. Physes 2–4 μm lat., multiseptatae, eguttulatae, mucosae. Asci pauci, fusiformes, 70–90 × 25–30 μm, 8-spori. Ascosporae tetraseriatae, fusiformes, 33–38 × 10–13 μm, 1- vel (3-)septatae, in ordinem (2):1:(2), septo primo medio, constricto, hyalinae, guttulatae, laeves, strato mucoso 1.5–2 μm lat. circumdatae.

Hab. in caulibus *Kobresiae schoenoides*—"INDIA: 123835(*b*), Bara Lacha La, Lahul, Kangra, Punjab, 16,500 ft., W. Koelz 6797, 26–29 Aug. 1933, ex Herb. L. E. Wehmeyer, *Wettsteinina eucarpa* (Karst.) Müll. & von Arx." TYPUS (DAOM).

Ascocarps scattered, immersed, subepidermal, globose, glabrous, 100–160 μm wide, 100–160 μm high. Beak very short, truncate–conical, terete, 0–15 μm long, 20–30 μm wide, composed of 4 or 5 layers of brown polygonal 5 × 7 μm cells around a 8–10 μm diameter ostiole, without periphyses or surface setae. Ascocarp wall in longitudinal section uniform in thickness, 15–18 μm thick, of 4 to 6 layers of 5–8 × 4–5 μm polygonal to rectangular thin-walled brown cells. Physes few, 2–4 μm wide, septate at 10- to 15-μm intervals, with thin septa, eguttulate, with slime coating. Asci few (up to 10), broadly fusiform, 70–90 × 25–30 μm with 8 irregularly clumped ascospores. Ascospores broadly fusiform, 33–38 × 10–13 μm, straight or gently curved, 1- to (3-)septate, in sequence (2):1:(2), first septum complete and slightly constricted, median (0.50), often constricted at ringlike internal thickenings in the wall that simulate septa, hyaline, later brown when exposed on plant parts, smooth, guttulate, with a conspicuous sharply delimited sheath 1.5–2 μm wide.

HOST: *Kobresia schoenoides* Boeck.

COLLECTION EXAMINED: INDIA: 123835(*b*), Bara Lacha La, Lahul, Kangra, Punjab, 16,500 ft., W. Koelz 6797, 26–29 Aug. 1933, ex Herb. L. E. Wehmeyer, as *Wettsteinina eucarpa* (Karst.) Müll. & von Arx. TYPE (DAOM).

This species is near *W. eucarpa*. It is very delicate in structure with small ascomata with multicellular soft walls. The asci fill most of the centrum and are interspersed with some physes. The ascospores have one full septum and two ringlike thickenings. The sheath is well defined but not very thick. *Wettsteinina macrotheca* occurs on the closely related host *Carex*, but the ascospores are longer with short central cells.

Wettsteinina luzulae n.sp. Figs. 19, 39, 78, 95, 114

Ascomata dispersa, immersa, deinde erumpentia, globosa, glabra, 225–280 μm lat., 225–280 μm alt. Rostrum nullum. Operculum discoideum, 30–35 μm alt., 85–100 μm lat., cellulis brunneis, polygoniis, 3–5 × 3–5 μm compositum; ostiolum 60–70 μm diam., sine periphysibus. Paries ascomatis 35–40 μm lat., cellulis brunneis, polygoniis, tenui-tunicatis, 10–14 × 5–8 compositus. Physes 3–4 μm lat., multiseptatae, eguttulatae, mucosae. Asci copiosi, cylindrici, 120–160 × 22–34 μm, 8-spori. Ascosporae tetraseriatae, obovatae, 31–38 × 12–16 μm, 3-septatae, in ordinem 2:1:2, septo primo supramedio, constricto, hyalinae, guttulatae, laeves vel echinulatae, strato mucoso 5–8 deinde 2–3 μm lat. circumdatae.

Hab. in caulibus *Luzulae spadiceae*—"FRANCE: 91889, Val Fontanalba oberhalb Lac Verde, 2350 m., E. Müller, 28 June 1961, culture 4557, *Wettsteinina macrotheca*." TYPUS (DAOM).

Ascocarps scattered, immersed, subepidermal, finally appearing superficial, globose, glabrous, 225–280 μm wide, 225–280 μm high. Beak none, a raised cap, 30–35 μm high, 85–100 μm wide, composed of 4 or 5 layers of brown nearly opaque polygonal 3–5 × 3–5 μm cells above a 60–70 μm diameter ostiole, subtended by hyaline pseudoparenchyma from which pseudoparaphyses descend, without periphyses or surface setae. Wall in longitudinal section uniform in thickness, 35–40 μm thick, of 4 or 5 layers of 10–14 × 5–8 μm polygonal to prismatic to rectangular thin-walled brown cells. Physes numerous, 3–4 μm wide, septate at 10- to 15-μm intervals, with thin septa, eguttulate, with slime coating. Asci

numerous, cylindrical, 120−160 × 22−34 μm, with 8 overlapping biseriate ascospores. Ascospores obovoid, 31−38 × 12−16 μm, straight, 3-septate, in sequence 2:1:2, second cell enlarged, first septum complete and slightly constricted, supramedian (0.46), constricted at upper septum, hyaline, later brown when exposed on plant parts, smooth to finely roughened, finely guttulate, with a conspicuous sharply delimited sheath 2−3 μm wide, but up to 5−8 μm wide from fresh material.

HOST: *Luzula spadicea* DC.

COLLECTION EXAMINED: FRANCE: 91889, Val Fontanalba oberhalb Lac Verde, 2350 m., E. Müller, 28 June 1961, culture 4557, as *Wettsteinina macrotheca*. TYPE (DAOM).

The unusual features of this species are the circular caplike opening, the robust wall of the ascoma composed of large cells, and the somewhat clavate ascospores with three full septa and a distinct sheath. The mature discharged spores have orange pigment in the sheath when observed on the leaf surface, but the spore wall and contents remain hyaline. The specimen was studied fresh in 1961. The viable spores appeared thin walled with a broad sheath that was wider on the upper half. Dried spores appear to have thick septa with a thin connection zone between the central and end cells. The sheath does not expand beyond 2−3 μm in dried material. Cultures made on 10 July 1961 produced ascomalike initials but no asci or spores. No anamorph was found. The ascospore germination was remarkable in that low temperature was required. Spores did not germinate at room temperature (20°) exposed to light and darkness but did germinate at 8°C in the dark. The fungus was first determined as *W. macrotheca* but differs in having clavate ascospores that do not tend to separate at the septa. The ascospores of *W. macrotheca* are more nearly cylindrical.

Crivelli (1983, p. 118) included this collection in *Pyrenophora ephemera* Crivelli but with a different type. We consider *W. luzulae* to be distinct from *P. ephemera*, which seems to be based on a genuine *Pyrenophora* (Crivelli 1983, Fig. 25B2) plus the small-spored *W. luzulae* (Crivelli 1983, Fig. 25B1) with one complete and two incomplete transverse septa in the ascospores.

Wettsteinina macrospora (Wehmeyer) Petrak, Sydowia, 11: 341. 1957 (1958) Figs. 28, 66, 105, 133
≡ *Eriosphaeria macrospora* Wehm. Sydowia, 6: 419−420. 1952

Ascocarps scattered, immersed, subepidermal, becoming superficial, globose, tomentose, hairs 200−400 × 6−7 μm at base, 370−500 μm wide, 370−500 μm high. Beak none; a broad circular opening from eruption of an intraepidermal disclike cap 70−100 μm wide, 25−30(60) μm high, of 1 or 2 layers of brown polygonal 5−7 μm cells. Wall in longitudinal section uniform in thickness, 17−31 μm thick, of 3 or 4 layers of 5−7 × 4−6 μm polygonal thin-walled brown cells. Physes few, 2−3 μm wide, septate at 10- to 15-μm intervals, with thin septa, rarely guttulate, with slime coating. Asci few, from a central base, cylindrical, 170−200 × 40−60 μm, with 8 biseriate ascospores. Ascospores ellipsoidal, 48−54 × 15−18 μm, straight, 3-septate, in sequence 2:1:2, second cell from apex enlarged, central cells no shorter than end cells, first septum complete and slightly constricted, median (0.50), often constricted at ringlike internal thickenings in the wall that simulate septa, hyaline, smooth, guttulate, with a conspicuous broad sharply delimited sheath, 4−5.5 μm wide, widest at the apical septum with a band of demarcation at the central septum.

HOST: Asteraceae, *Erigeron* sp.

COLLECTIONS EXAMINED: UNITED STATES OF AMERICA: WASHINGTON: 120192(*a*), on composite stems, Indian Henry's Hunting Ground, 5500 ft., Mt. Rainier National Park, E. G. Simmons 1746, 2 Aug. 1948, ex Herb. Wehmeyer, as *Eriosphaeria macrospora*, TYPE; 121538(*a*), on *Erigeron* sp., Timberline Camp, Mt. St. Helens, Skamania Co., W. B. & V. G. Cooke 28378, 22 July 1951, ex Herb. Wehmeyer, as *Eriosphaeria macrospora* Wehm.

Our redescription of this species agrees closely with Wehmeyer's original description. The opening of the ascocarp on first glance looks like a short truncate beak. It is, however, a thin cap about 100 μm in diameter that is glabrous and much thinner than the walls. Vertical sections through the cap area when placed in water soon became swollen and circular and the nature of the cap was obscured. Sections placed directly in lactic acid did not swell and the structure of the cap was retained. All the ascocarps seen were moderately mature with numerous ascospores. None had discharged spores to any extent and the opening of the ascocarps was not seen in a partially opened condition. The cap is like that of *W. gentianae*.

Some confusion existed about the true identity of this species. Petrak (1957, p. 341) merged *E. herbarum* with *W. macrospora*, but they differ in many features. Barr (1972) had a broader species concept and included both Wehmeyer's species under *W. anomala*. However, we think the two species described as *Eriosphaeria herbarum* and *E. macrospora* are distinct from *W. anomala* (Ell. & Ev.) Barr.

A further complication is the presence of *Wettsteinina duplex* with spores mostly 38−40 × 9−12 μm (120192(*b*)) on the type of *W. macrospora*. This former species may have been seen instead of the true *E. herbarum* and *E. macrospora* and produced the confusion about these two distinctive species. *Eriosphaeria herbarum* is excluded as a *Lophiostoma* because of the nature of its type specimen.

Wettsteinina macrotheca (Rostrup) E. Müller, Sydowia, 12: 203. 1958 (1959) (25 Mar.) Figs. 23, 53, 67, 96, 134
≡ *Wettsteinina macrotheca* (Rostrup) Barr, Contrib. Inst. Bot. Univ. Montreal, 73: 11. 1959 (After distribution of Sydowia 12 according to footnote reference on page 7.)
≡ *Metasphaeria macrotheca* Rostrup, Medd. Groenland, 3: 561. 1888
≡ *Massaria macrotheca* (Rostr.) Lind, Skrift om Svalbarg og Ishavet, 13: 31. 1928
≡ *Leptosphaeria macrotheca* (Rostr.) L. Holm, Sven. Bot. Tidskr. 46: 38. 1952

Ascocarps scattered, immersed, subepidermal, globose, glabrous, (150)250−350 μm wide, (150)250−350 μm high. Beak none, a broad circular opening from eruption of a white intraepidermal disclike cap 40−95 μm wide, composed of 2 to 7 layers of pale brown, polygonal, 5−9 μm cells. Wall in longitudinal section uniform in thickness, 28−45 μm thick, of 3 to 7 layers of 5−12 × 5−12 μm polygonal, thin-walled, brown cells with a few crushed colorless internal layers. Physes numerous, 2−5 μm wide, septate at 10- to 20-μm intervals, with thin septa, eguttulate, with slime coating. Asci moderately numerous, saccate to broadly fusiform, 120−170 × 40−50 μm, with 8 irregularly clumped or tetraseriate to biseriate ascospores. Ascospores cylindroid,

36–47 × 10–17 μm, straight, 3-septate, in sequence 2:1:2, second cell from apex enlarged and shortest, first septum complete, not constricted, supramedian (0.46), not constricted at additional full septa, hyaline to pale yellow, later brown when exposed on plant parts, with central cells separated markedly at upper and lower septa and cells appearing cubical, smooth, guttulate or not, with a conspicuous wall 1.5–2 μm wide resembling a sheath.

HOSTS: (*1*) *Carex hyperborea* Drej., (*2*) *Carex rigida* Good., (*3*) *Carex* sp.

COLLECTIONS EXAMINED: CANADA: B.C.: 193818, 34152, on *3*, Cathedral Lakes, M. E. Barr, 2 Aug. 1951, ex UBC 1963, F. 4098, as *Massaria macrotheca* (Rostr.) Lind. DENMARK: GREENLAND: 193574, on *1*, Sukkertoppen, Th. Holm, 9/8 1886, ex C no. 1, *Metasphaeria macrotheca* Rostr., SYNTYPE; 193573, on *1*, Ingiteilfjord, Eberlin, 8 1884, ex C no. 2, *Metasphaeria macrotheca* Rostr., LECTOTYPE; 193572, on *2*, Sukkertoppen, W. et H., 16.8.1884, ex C (annotated Sydow 134), *Metasphaeria macrotheca* Rostr., SYNTYPE. SWEDEN: 91904, on *2*, Lule lappmark, Sarek, Skaitetjakko, Tycho Vestergren, 8.VII.1900, ex S, ex ZT, as *Wettsteinina macrotheca* (Rostr.) E. Müller (≡ *Metasphaeria macrotheca* Rostr.).

The particular specimen from which the above description was mainly drawn is one of three cited by Rostrup (1888) and conserved at C. It bears a sketch of an 8-spored ascus noted "130–135 μm l. 30–33 μm cr." and of one free spore marked "32–35 μm l. 12–13 μm cr. hyalinae," all features given in the description. The fungus found matches the description well except in the microscopic measurements which were larger by one-sixth to one-third. It is designated the lectotype. Two additional original collections were studied. The spores measured 36–45 × 11–16 μm from *Carex hyperborea* no. 1 and 33–39 × 9–13 μm from *Carex rigida*.

The unusual features of this species are the pale almost white cap that opens for discharge of ascospores, and the large ascospores with cubical content in the central cells that soon separate from the hemispherical end cells but are retained within a firm wall about 1.5 μm thick. Nothing corresponding to a gelatinous sheath was observed. Müller (1958, Fig. 2) illustrated a centrally inflated sheath in this species, but his collection is redescribed as *W. oreophila*.

Wettsteinina magnifica n.sp. Figs. 5, 54, 79, 104, 126, 150

Ascomata dispersa, immersa, globosa, glabra, 250–350 μm lat., 250–350 μm alt. Rostrum nullum. Operculum discoideum, 35–45 μm alt., 100–140 μm lat., cellulis hyalinis vel brunneis, polygoniis, 4–6 × 4–6 μm compositum; ostiolum 100–140 μm diam., sine periphysibus. Paries ascomatis 40–50 μm lat., cellulis brunneis, polygoniis, tenuitunicatis, 10–14 × 6–8 μm compositus. Physes 2–3 μm lat., multiseptatae, eguttulatae, mucosae. Asci copiosi, fusiformes, 150–170 × 27–33 μm, 8-spori. Ascosporae aggregatae vel tetraseriatae, obovatae, 39–46 × 12–17 μm, 1-septatae, septo submedio, constricto, hyalinae, guttulatae, laeves, strato mucoso 3–6 μm lat. circumdatae.

Hab. in caulibus *Poae* sp.—"CANADA: YUKON TERRITORY: 191260, 10 miles SW of Mt. Gibben, 64°37′ N 139°24′ W, alt. 4700 ft. Ogilvie & Wernecke Mountains, W. J. Cody & J. H. Ginns 33691, 6 July 1984, as *Wettsteinina operculata* Barr." HOLOTYPUS (DAOM).

Ascocarps scattered, immersed, subepidermal, but appearing superficial, globose to ovoid and depressed, flattened above, glabrous, 250–350 μm wide, 250–300 μm high. Beak none, a broad circular opening from eruption of an intraepidermal disklike cap, 35–45 μm high, 100–140 μm wide, composed of 5 to 9 layers of brown exterior and hyaline interior polygonal 4–6 × 4–6 μm cells, without periphyses or surface setae. Wall in longitudinal section uniform in thickness, 40–50 μm thick, of 4 to 6 layers of 10–14 × 6–8 μm polygonal to prismatic thin-walled brown cells. Physes numerous, 2–3 μm wide, septate at 20- to 25-μm intervals, with thin septa, rarely guttulate, with slime coating. Asci numerous, from a central base, broadly fusiform, 150–170 × 27–33 μm, with 8 irregularly clumped or tetraseriate ascospores. Ascospores obovate to fusiform, 39–46 × 12–17 μm, straight or gently curved, 1-septate, apical cell enlarged, first septum complete and slightly constricted, submedian (0.58), septum middle lamella and marginal dots blue in cotton blue, hyaline, later brown when exposed on plant parts, smooth, guttulate or not, finely granular, with a delicate wavy sheath, 3–6 μm wide constricted at the septum.

HOSTS: (*1*) *Poa* sp., (*2*) *Puccinellia angustata* (R. Br.) Rand. & Redf.

COLLECTIONS EXAMINED: CANADA: YUKON TERRITORY: 191260, on *1*, 10 miles SW of Mt. Gibben, 64°37′ N 139°24′ W, alt. 4700 ft. Ogilvie & Wernecke Mountains, W. J. Cody & J. H. Ginns 33691, 6 July 1984, as *Wettsteinina operculata* Barr. HOLOTYPE (DAOM). N.W.T.: Dist. of Franklin: 88244, on *2*, Christopher Peninsula, 78°58′ N 101°35′ W, Ellef Ringnes I., D. B. O. Savile 4191G, 7 July 1960, as *Wettsteinina operculata* Barr. PARATYPE (DAOM).

This attractive species has large ascomata with a glistening dark brown, disc-shaped, raised operculum surrounded by a lighter zone, which in turn is set off by a circle of smaller dark brown wall cells. In section the disc has one or two upper layers of dark brown small cells that are almost opaque, subtended by several layers of hyaline thin-walled small cells. The ascoma wall is moderately thick of large polygonal to prismatic cells. The ascospores are moderately large, larger than those in the type of the fungus described as *W. operculata*. The ascospore sheath is not very conspicuous and swells out to 6 μm with an irregular faint outline but is narrowed at the septum. The septum middle lamella stains blue in cotton blue, as do the dots at the margin of the septum.

The epithet is proposed to denote the impressive appearance of the ascomata.

Wettsteinina mediterranea E. Müller, Sydowia, 18: 91–93. 1965

See excluded species *Kriegeriella mediterranea*.

Wettsteinina mirabilis (Niessl) Höhnel, Sitsungsber. Kaiserl. Akad. Wiss. Wien Math. Naturwiss. Kl. Abt. 1, 116: 635. 1907 Figs. 36, 55, 68, 106, 138

≡ *Leptosphaeria mirabilis* Niessl, Hedwigia, 20: 97. 1881

≡ *Pleospora mirabilis* (Niessl) Petrak, Ann. Mycol. 25: 207. 1927

=*Wettsteinina callista* (Rehm) Petrak, Sydowia, 1: 55. 1947

≡ *Sphaerulina callista* Rehm, Hedwigia, 21: 122. 1882

≡ *Pseudosphaeria callista* (Rehm) Höhnel, Sitzungsber. Kaiserl. Akad. Wiss. Wien Math. Naturwiss. Kl. Abt. 1, 116. 129. 1907

≡ *Saccothecium callistum* (Rehm) Kirschst. Ann. Mycol. 37: 105. 1939

=*Wettsteinina gigantospora* (Rehm in Voss) Höhnel, Sit-

zungsber. Kaiserl. Akad. Wiss. Wien Math. Naturwiss. Kl. Abt. 1, 116: 129. 1907

≡ *Massarina gigantospora* Rehm in Voss, Verh. Zool. Bot. Ges. Wien, 37: 216. 1887

=*Wettsteinina vossii* (Rehm in Voss) Höhnel, Sitzungsber. Kaiserl. Akad. Wiss. Wien Math. Naturwiss. Kl. Abt. 1, 116: 129. 1907

≡ *Sphaerulina callista* var. *vossii* Rehm in Voss, Verh. Zool. Bot. Ges. Wien, 37: 220. 1887

=*Saccothecium hercynicum* Kirschstein, Ann. Mycol. 37: 104. 1939

Ascocarps scattered, immersed, subepidermal, globose to conoid, rarely depressed, glabrous, 150−300 μm wide, 150−300 μm high. Beak short, truncate−conical, terete, 25−90 μm long, 80−120 μm wide, composed of 1 to 8 layers of brown polygonal 3−11 × 4−7 μm cells around a 25−70 μm diameter ostiole, without periphyses or surface setae, filled with hyaline pseudoparenchyma exposed by eruption of a thin intraepidermal disclike cap seen attached to naked cuticle in many places. Wall in longitudinal section uniform in thickness, 10−30 μm thick, of 2 to 5 layers of 4−14 × 4−8 μm polygonal to rectangular thin-walled brown cells. Physes few, distorted by many large asci in a small centrum, 2−5 μm wide, septate at 5- to 20-μm intervals, with thin septa, eguttulate, with slime coating. Asci moderately numerous (12−15), from a central base, saccate, 140−200 × 70−100 μm, with 8 irregularly clumped ascospores. Ascospores broadly fusiform, 70−96 × 18−31 μm, straight, 4-septate, in sequence 2:1:2:3, second cell from apex enlarged, first septum complete and slightly constricted, supramedian (0.39 to 0.44), usually constricted at ringlike internal thickenings in the wall that simulate septa, hyaline, later brown when exposed on plant parts, smooth, densely finely guttulate, with a conspicuous broad sharply delimited sheath, 3−9 μm wide.

HOSTS: (*1*) *Adonis vernalis* L., (*2*) *Artemisia borealis* Pull. as *A. campestris*, (*3*) *Astragalus glycyphyllos* L., (*4*) *Bupleurum ranunculoides* L., (*5*) *Campanula caespitosa* Scop., (*6*) *Centaurea nervosa* Willd., (*7*) *Euphorbia cyparissias* L., (*8*) *Genista sagittalis* L., (*9*) *Hieraceum bupleuroides* Gmel., (*10*) *Primula auricula* L., (*11*) *Trifolium* sp., (*12*) *Urtica* sp., (*14*) *Valeriana tripteris* L.

COLLECTIONS EXAMINED: CANADA: QUE.: 74323(*b*), on *2*, top of Mt. Albert, H. E. & M. E. Bigelow, M. E. Barr 2266, 22 Aug. 1957. AUSTRIA: 193725, on *12*, Kreuzkugel bei Grith am Brener, Tirol, Dr. Rehm, 8.IX.1907, ex S, ex Herb. Rehm, as *Wettsteinina callista* (Rehm) Höhnel, revised to *W. mirabilis* by L. Holm, 1957; 193690, on *1*, Niederosterreich, Hainburg, Hundsheimerkogel, A. Patzak, 6.1957, ex S, Reliquiae Petrakianae 262, revised to *W. mirabilis* by L. Holm 1957; 193651, on *10*, N. O., Paulmauer bei St. Aegyd, K. R., 27.V.1900, ex W 18092, as *Wettsteinina* sp.; 91987, on *13*, N. O., Linz, zwischen Mittel und Obersee, F. Petrak, VII. 1944, ex ZT. FRANCE: 91981, on *3*, Tende, Alpes Maritimes, R. Corbaz, 25 June 1955, ex ZT, culture ETH M 2596; 89431, on *4*, Tende, Alpes Maritimes, E. Müller & K. H. Richle, 15.8.1953, ex ZT. GERMANY: 194814, on *7*, Im Harz bei Stiege, Kirschstein, 29.5.1912, HOLOTYPUS *Saccothecium hercynicum* Kirschstein, ex B. JUGOSLAVIA: 193689, on *5*, Mt. Grosskahlenberg bei Laibach, Voss, 2 Nov. 1886, ex S, ex Herb. Rehm, as *Sphaerulina callista* Rehm var. *vossii* Rehm (in Voss), HOLOTYPUS, revised to *W. mirabilis* by L. Holm 1957; 193688, on *8*, Postojna (=Adelsberg), Stapf., pre 21.XI.1886, ex S, ex Herb. Rehm, Flora exs. Austro-Hung. 1235. III., as *Massarina gigantospora* Rehm nov.spec., HOLOTPYUS, 21.XI.1886, revised to *W. mirabilis* by L. Holm, 1957; 193667 part of same collection, ex Herb. Höhnel, ex FH. SWITZERLAND: 123579, on *4*, Kt. Glarus, Raumtispitze, E. Müller, 2.7.1950, ex ZT; 123581, on *6*, Graubünden, Bergün, Palpuogna-See, E. Müller, 5.8.1949, ex ZT; 91977, on *9*, Graubünden, Ardez, E. Müller, 16 July 1949, ex ZT; 121741, on *10*, below Zermatt, 5000 ft., L. E. Wehmeyer 9337, 7 July 1953.

The ascocarps are globose to conoid and appear to have a very short broad beak.

Most of the synonym was indicated previously by Holm in annotations of the specimens in S. We have not seen the type of *W. mirabilis*, only a slide from the Wehmeyer slide collection 1106. The slide was marked type, but the label information is insufficient to establish a firm connection with Niessl's original material.

The species is similar in spore form to *W. gigaspora* but differs in having thin-walled ascomata with narrow rectangular wall cells. *Wettsteinina mirabilis* at times has a very short beak that was mistaken for a broad cap. However, a beak does develop and is representative of the species.

Wettsteinina niesslii E. Müller, Sydowia, 4: 204. 1950 sensu Barr non Niessl

≡ *Leptosphaeria gigaspora* Niessl in Rabenh. Fungi Eur. 2998. 1882. non *Wettsteinina gigaspora* Höhnel

See excluded species.

Wettsteinina niesslii E. Müller, Sydowia, 4: 204. 1950 sensu Müller non Niessl

≡ *Leptosphaeria gigaspora* Niessl in Rabenh. Fungi. Eur. 2998. 1882. non *Wettsteinina gigaspora* Höhnel

See excluded species *Lophiostoma* sp. 2.

Wettsteinina operculata Barr, Contrib. Univ. Mich. Herb. 9: 547. 1972 Figs. 10, 44, 69, 97, 115

Ascocarps scattered, immersed, subepidermal, globose, glabrous, 120−200 μm wide, 120−200 μm high. Beak none or a mere papilla, covered by a white disc of host cuticle, 25−35 μm wide, composed of 2 or 3 layers of brown polygonal 3−5 × 3−4 μm cells around a 20−30 μm diameter ostiole, without periphyses or surface setae, or a simple ostiole. Wall in longitudinal section uniform in thickness except for a slightly wider and darker area below the opening, 12−16 μm thick, of 1 or 2 layers of 8−10 × 4−5 μm polygonal to rectangular thin-walled brown cells. Physes numerous, 2−4 μm wide, septate at 10- to 15-μm intervals, with thin septa and cytoplasm accumulated at the septa, rarely guttulate, with slime coating. Asci numerous, from a central base, saccate to broadly fusiform, 90−110 × 28−32 μm, with 8 tetraseriate to biseriate ascospores. Ascospores broadly fusiform, straight, 1- to 3-septate, in sequence (2):1:(2), apical cell enlarged, first septum complete and slightly constricted, submedian (0.55), with a blue dot at margin of septum when stained in cotton blue, often constricted at ringlike internal thickenings in the wall that simulate septa, hyaline, later brown when exposed on plant parts, smooth, rarely guttulate, with a conspicuous broad sharply delimited sheath, 2−3 μm wide.

HOST: *Triglochin maritima* L.

COLLECTION EXAMINED: CANADA: NFLD.: 191893, Seal Cove Point, R. T. Wilce 117, 11 July 1957, ex MASS, as

Wettsteinina operculata Barr, HOLOTYPE (DAOM), ISOTYPE (MASS).

When Barr described this species, she included three specimens. One, 88244, has a distinct operculum. The other two do not. Her note with 88244 indicated that there were some distinctions in the ascospores between it and some collections from Labrador and Gaspé. It is our belief that three species were merged. The most obvious difference is the lack of a well-developed operculum on the ascomata on the type of *W. operculata*. The wall of the ascomata is quite thin. The ascospores have a thin wall and a very conspicuous uniformly thick sheath that does not expand to any degree when the spores are left in water for a long time. The young spores are variable in shape, but the mature spores are fairly regular in appearance. The typification stated at the time of publication results in the epithet *operculata* being applied to this species, which does not have a caplike opening to the ascoma. The species with the operculate ascomata is referred to *W. magnifica*. The other species is *W. arctica*.

Wettsteinina oreophila n.sp. Figs. 22, 45, 70, 98, 127

Ascomata dispersa, immersa, globosa, glabra, 100–250 μm lat., 100–250 μm alt. Rostrum nullum. Operculum discoideum, 20–30 μm alt., 40–60 μm lat., cellulis brunneis, polygoniis, 5 × 5 μm compositum; ostiolum 40–60 μm diam., sine periphysibus. Paries ascomatis 15–50 μm lat., cellulis brunneis, polygoniis, tenui-tunicatis, 7–13 × 7–13 μm compositus. Physes 2–4 μm lat., multiseptatae, eguttulatae, mucosae. Asci copiosi, obclavati, 85–130 × 24–37 μm, 8-spori. Ascosporae aggregatae vel tetraseriatae, fusiformes, (25)30–38(42) × 11–14 μm, 3-septatae, in ordinem 2:1:2, septo primo medio, nonconstricto, hyalinae, guttulatae, laeves, strato mucoso 1.5–2 μm lat. in medio circumdatae.

Hab. in caulibus *Caricis parviflorae* Host.—"SWITZERLAND: 90910, Vo, Val Tuors, Bergün, Graubünden, E. Müller, 21 July 1949, ex ZT, as *Wettsteinina macrotheca* (Rostrup) E. Müller." TYPUS (DAOM), ISOTYPUS (ZT).

Ascocarps scattered, immersed, subepidermal, globose, glabrous, 100–250 μm wide, 100–250 μm high. Beak none, a broad circular opening from eruption of a white intraepidermal disclike cap 20–30 μm high, 40–60 μm wide, composed of 8–10 layers of hyaline polygonal 5 × 5 μm cells, without periphyses or surface setae. Wall in longitudinal section uniform in thickness, 15–50 μm thick, of 2 to 6 layers of 7–13 × 7–13 μm polygonal, thin-walled, brown cells with a few crushed colorless internal layers. Physes numerous, 2–4 μm wide, septate at 10- to 15-μm intervals, with thin septa, guttulate, with slime coating. Asci moderately numerous, saccate, 85–130 × 24–37 μm, with 8 irregularly clumped to tetraseriate ascospores. Ascospores broadly fusiform, (25)30–38(42) × 11–14 μm, straight, 3-septate, in sequence 2:1:2, second cell from apex enlarged, with swollen zone adjacent to primary septum, first septum complete, not constricted, median (0.50), not constricted at additional full septa, hyaline, later brown when exposed on plant parts, never with central cells separated markedly at upper and lower septa, in age with all cells separated, smooth, guttulate or not, with a uniform sheath and a conspicuous band 1.5–2 μm wide just above the first septum.

HOSTS: (*1*) *Carex atrata* L., (*2*) *Carex melonantha* C. A. Mey., (*3*) *Carex parviflora* Host. = *C. nigra* Bell.

COLLECTIONS EXAMINED: INDIA: 123926(*b*), on *1*, Jispa Lahul, Punjab, 13,000 ft., W. Koelz 994, 11 Aug. 1930, ex Herb. Wehmeyer as *Wettsteinina macrotheca* (Rostr.) Barr; 123806, on *2*, Kolahoi Mt. Glacier, 50 mi N of Islamabad, Kashmir, F. G. Dickason 8, July–Aug. 1927, ex Herb. Wehmeyer, as *Wettsteinina macrotheca* (Rostr.) Barr. SWITZERLAND: 90910, on *3*, Vo, Val Tuors, Bergün, Graubünden, E. Müller, 21 July 1949, ex ZT, as *Wettsteinina macrotheca* (Rostrup) E. Müller, TYPE (DAOM), ISOTYPUS (ZT).

Müller (1958, p. 201) illustrated this species from part of collection 90910 under the name *W. macrotheca*. *Wettsteinina oreophila* differs from *W. macrotheca* in having smaller ascomata, slightly smaller ascospores with a sheath enlarged near the first-formed septum and sometimes flattened at one end, probably from pressure in the ascus. The cells of the ascospores separate in old spores but not regularly between the apical and central cells as is characteristic of *W. macrotheca*.

Wettsteinina pachyasca (Niessl) Petrak, Sydowia, 1: 56. 1947 Figs. 31, 56, 71, 102, 137, 148

≡ *Leptosphaeria pachyasca* Niessl, Oesterr. Bot. Z. 31: 345. 1881. as "*pachyascus*"

≡ *Metasphaeria pachyasca* (Niessl) Sacc. Syll. Fung. 2: 171. 1883

≡ *Pseudosphaeria pachyasca* (Niessl) Höhnel, Sitzungsber. Kaiserl. Akad. Wiss. Wien Math. Naturwiss. Kl. Abt. 1, 116: 129. 1907

≡ *Saccothecium pachyasca* (Niessl) Kirschstein, Ann. Mycol. 37: 105. 1939

Ascocarps scattered, immersed, subepidermal, becoming erumpent, globose to pyriform, glabrous, 170–220 μm wide, 210–230 μm high. Beak short, truncate–conical, terete, 50–80 μm long, 70–100 μm wide, composed of 2 to 4 layers of brown polygonal 5–8 × 5–8 μm cells around a 25–30 μm diameter ostiole, filled with hyaline pseudoparenchyma initially, without periphyses or surface setae. Wall in longitudinal section uniform in thickness, 15–25 μm thick, of 2 to 4 layers of 8–12 × 4–6 μm polygonal to rectangular thin-walled brown cells. Physes few, 2–3 μm wide, septate at 15- to 20-μm intervals, with thin septa, rarely guttulate, with slime coating. Asci few, from a central base, saccate to pyriform, 110–170 × 54–77 μm, with 8 irregularly clumped ascospores. Ascospores broadly fusiform, 50–69 × 14–19 μm, straight, 6-septate (sometimes 7- or 8-septate from extra septum in end cells), in sequence (5):3:2:1:2:3:4:(5), third cell from apex enlarged, first septum complete and slightly constricted, supramedian (0.45), often constricted at additional full septa, hyaline, later brown when exposed on plant parts, smooth, guttulate or not, with a conspicuous broad sharply delimited sheath, 5–7 μm wide.

HOSTS: (*1*) *Bupleurum ranunculoides* L., (*2*) *Doronicum clusii* (All.) Tausch, (*3*) *Primula auricula* L., (*4*) *Valeriana tripteris* L.

COLLECTIONS EXAMINED: AUSTRIA: 92000, on *4*, N. O., Linz, zwischen Mittle und Obersee, F. Petrak, VII. 1944, ex ZT. SWITZERLAND: 123572, on *2*, Val Tuors, Bergün, Graubünden, E. Müller, 2.8.1949, ex Herb. Wehmeyer, ex ZT; 91980, on *3*, Hinterruck, St. Gallen, E. Müller, 2 July 1951, ex ZT; 123571, on *3*, Selun. St. Gallen, E. Müller, 29.7.1950, ex Herb. Wehmeyer, ex ZT; 123648, on *3*, Risetenpass, Glarus, E. Müller, 23.7.1950, ex Herb. Wehmeyer, ex ZT; 123649, on *1*, Selun, St. Gallen, E. Müller, 29.7.1950, ex Herb. Wehmeyer; all as *Wettsteinina pachyasca*

(Niessl) Petrak det. E. M.

This species is not easily distinguished on macroscopic features. The pyriform, medium-sized ascomata are immersed to erumpent with a short beak that is often curved slightly. The wall is not very thick. The asci are pyriform when free from the ascoma. The ascospores are fairly uniform with usually six full septa. An additional septum can occur in either end cell very near the end. The sheath is evident and slightly wider at the widest point of the spore. This species is the type of the genus *Pseudosphaeria*. It differs from *W. bupleuri* on *Bupleurum junceum* from southern France. The latter fungus has regularly 5-septate ascospores and the first septum is median, not supramedian.

Wettsteinina papuana Otani, Bull. Nat. Sci. Mus. Tokyo, 16: 484. 1973

Type was requested from TNS but not received on loan.

Wettsteinina phragmosporae Otani, Bull. Nat. Sci. Mus. Tokyo, 16: 484. 1973

Type was requested from TNS but not received on loan.

Wettsteinina phoenicis Tilak, Sydowia, 20: 271–272. 1966 (1968)

Type was requested from Marathwada University, Aurangabad, India, but was not received on loan.

Wettsteinina sabalicola (Earle) Barr, Contrib. Univ. Mich. Herb. 9: 548. 1972

See excluded species *Gnomonia sabalicola*.

Wettsteinina savilei n.sp. Figs. 13, 46, 72, 116

Ascomata dispersa, immersa, globosa, glabra, 90–150(200) μm lat., 90–150(200) μm alt. Rostrum erumpens, minutum, teres, 20–30 μm lat., cellulis brunneis, polygoniis, 4–6 × 4–6 μm compositum; ostiolum 10–15 μm diam., sine periphysibus. Paries ascomatis 15–18 μm lat., cellulis brunneis, polygoniis, tenui-tunicatis, 4–8 × 4–5 μm compositus. Physes 2–3 μm lat., multiseptatae, raro guttulatae, mucosae. Asci pauci, obclavati, 80–95 × 30–40 μm, 8-spori. Ascosporae aggregatae vel tetraseriatae, fusiformes, 32–37 × 9–12 μm, 1- vel 3-septatae, in ordinem 2:1:2, septo primo medio, constricto, hyalinae, guttulatae, laeves, strato truncato et in medio dilato mucoso 2 μm lat. circumdatae.

Hab. in caulibus *Caricis misandrae*—"CANADA: N.W.T.: Dist. of Franklin: 88243, Aston Bay, 73°39′ N, 94°45′ W, Somerset I., D. B. O. Savile 3738A, 8 Aug. 1958, *Wettsteinina macrotheca* (Rostr.) Müller (immature)." TYPUS (DAOM).

Ascocarps scattered, immersed, subepidermal, globose, glabrous, 90–150(200) μm wide, 90–150(200) μm high. Beak inconspicuous, 20–30 μm wide, composed of 2 or 3 layers of brown polygonal 4–6 × 4–6 μm cells around a 10–15 μm diameter ostiole, without periphyses or surface setae. Wall in longitudinal section uniform in thickness, 15–18 μm thick, of 2 or 3 layers of 4–8 × 4–5 μm polygonal to rectangular thin-walled brown cells. Physes numerous, 2–3 μm wide, septate at 10- to 15-μm intervals, with thin septa, rarely guttulate, with slime coating. Asci few, from a central base, saccate to broadly fusiform, 80–95 × 30–40 μm, with 8 irregularly clumped or tetraseriate ascospores. Ascospores broadly fusiform, 32–37 × 9–12 μm, straight or gently curved, 1- to 3-septate, in sequence 2:1:2, second cell from apex enlarged, first septum complete and slightly constricted, median (0.50), often constricted at ring-like internal thickenings in the wall that simulate septa, hyaline, later brown when exposed on plant parts, smooth, guttulate, with a conspicuous sharply delimited sheath, 2 μm wide, broader at the first-formed septum and much enlarged at ends, at times appearing truncate at ends, with a blue dot at margins of midseptum in cotton blue stain.

HOST: *Carex misandra* R. Br.

COLLECTION EXAMINED: CANADA: N.W.T.: Dist. of Franklin: 88243, Aston Bay, 73°39′ N, 94°45′ W, Somerset I., D. B. O. Savile 3738A, 8 Aug. 1958, as *Wettsteinina macrotheca* (Rostr.) Müller (immature). TYPE (DAOM).

This species is very distinctive in microscopic features of the ascospores. It is distinct from *W. macrotheca*, which occurs on arctic species of *Carex* in having ascospores with one full septum and two ringlike thickenings. The cells do not separate as in *W. macrotheca*. The sheath in water mounts becomes conspicuously wider at the first-formed septum and much enlarged at the ends. Dr. Barr's notes with specimen indicate that the fungus shows a peculiar outer wall and secondary constrictions when the spores are mounted in water. It is close to *W. oreophila* but does not develop secondary septa in the ascospores.

Wettsteinina sieversiae (Peck) Barr, Can. J. Bot. 45: 1042. 1967

See excluded species *Lophiostoma sieversiae*.

Wettsteinina vossii (Rehm in Voss) Höhnel

See *W. mirabilis*.

Wettsteinina winteri (Niessl) E. Müller, Sydowia, 4: 203. 1950

See *Nodulosphaeria winteri* (Niessl) Crivelli, Diss. ETH. 7318: 168. 1983.

Wettsteinina yuccaegena Barr, Contrib. Univ. Mich. Herb. 9: 547–548. 1972

See excluded species.

Excluded species

Didymella anomala (Ell. & Ev.) n.comb. Figs. 4, 82, 118

≡ *Leptosphaeria anomala* Ell. & Ev. J. Mycol. 3: 117. 1887

≡ *Didymosphaeria anomala* (Ell. & Ev.) Sacc. Syll. Fung. 9: 730. 1891

≡ *Wettsteinina anomala* (Ell. & Ev.) Barr, Contrib. Univ. Mich. Herb. 9(8): 548–549. 1972

≡ *Microthelia anomala* (Ell. & Ev.) Kuntze, Rev. Gen. Pl. 3(2): 498. 1898

Ascocarps scattered, immersed, depressed globose, glabrous or with a few basal hairs 6–9 μm wide, 270–330 μm wide, 200–250 μm high. Beak a mere papilla in a depressed zone, terete, 10–25 μm long, 20–25 μm wide, composed of 6 or 7 layers of brown polygonal 5 × 7 μm cells around a 10–15 μm diameter ostiole, without periphyses or surface setae. Wall in longitudinal section uniform in thickness, 28–32 μm thick, of 4 or 5 layers of 8–11 × 8–11 μm polygonal thin-walled brown cells. Physes few, 3–3.5 μm wide, septate at 14- to 18-μm intervals, with thin septa, eguttulate, without slime coating. Asci numerous, in a broad hymenium, with croziers, medium-stalked, bitunicate, cylindrical, 100–140 × 20–25 μm, with 8 (rarely less than 8 and larger spores) overlapping linearly biseriate ascospores. Ascospores fusiform, 30–40(44) × 8–10(11) μm gently curved or straight, 1-septate, upper cell enlarged, septum complete and slightly constricted, supramedian (0.47), yellowish brown, smooth or

finely striped, eguttulate, without a sheath.

HOST: Herb.

COLLECTION EXAMINED: UNITED STATES OF AMERICA: UTAH: 192846, dead herbaceous stems, (Scofield), S. J. Harkness, June 1887, ex NY, *Leptosphaeria anomala* Ellis & Everhart, HOLOTYPE.

This species is not a *Wettsteinina*. Müller and von Arx (1950, p. 349) treated it as a *Didymosphaeria*. The species is closest to *Didymella festucae* Wegelin. Barr (1972, p. 548) considered that it provided an earlier name for *Wettsteinina macrospora* and *Lophiostoma herbarum* and may have been influenced by Wehmeyer's suggested synonymy recorded by E. G. Simmons but not endorsed by him under *Eriosphaeria herbarum*. The three taxa can be separated macroscopically. *Didymella anomala* has a terete papillate beak with a small circular ostiole in ascocarps less than 350 μm in diameter and basal surface hyphae. *Wettsteinina macrospora* has a large beak, ascocarps exceeding 350 μm in diameter with hyphae all over the surface. In *L. herbarum* the opening is reduced to a slit, the ascocarps are larger than 350 μm, and the surface hyphae are distributed over most of the ascocarp. Microscopic differences are as follows. *Didymella anomala* has yellowish brown 1-septate ascospores that lack a sheath. *Lophiostoma herbarum* has hyaline 1- to 3-septate ascospores that are sometimes appendaged at the ends with a thin sheath. *Wettsteinina macrospora* has hyaline (including pale yellow) 3-septate ascospores with a broad sheath widest at the apical septum.

Dothiora ellisii (Barr) n.comb. Figs. 21, 76, 92, 128

≡ *Wettsteinina ellisii* Barr. Contrib. Univ. Mich. Herb. 9: 546–547. 1972

Ascocarps compound to clustered in groups of 3–10, immersed becoming erumpent, appearing superficial, globose, depressed, glabrous, 100–150 μm wide, 150–200 μm high. Beak short, truncate–conical, terete, 20–25 μm long, 60–70 μm wide, composed of 2 or 3 layers of brown polygonal 7–10 × 6–8 μm cells around a 20–25 μm diameter ostiole, without periphyses or surface setae. Wall in longitudinal section uniform in thickness, 15–20 μm thick, of 2 or 3 layers of 6–10 × 4–5 μm polygonal to rectangular thin-walled brown cells. Physes not seen. Asci numerous, from a central base, bitunicate, broadly fusiform, 70–85 × 25–30 μm, with 8 tetraseriate to biseriate ascospores. Ascospores broadly fusiform to obovoid, straight, 3-septate, in sequence 2:1:2, second cell from apex enlarged, first septum complete and slightly constricted, median (0.50), not constricted at additional full septa, brown, smooth, guttulate, with a conspicuous sharply delimited sheath constricted at first septum, 1.5–2 μm wide, or wider if exposed to water for a long time.

HOST: *Pinus contorta* Dougl. var. *latifolia* Engelm. as *Pinus murrayana* Grev. & Balf.

COLLECTION EXAMINED: UNITED STATES OF AMERICA: MONTANA: 192843, summit of Mt. Helena, Lewis & Clarke County, F. W. Anderson, 14 Sept. 1887, ex NY, ex Herb. Ellis, holotype *Wettsteinina ellisii* Barr, Parasitic Fungi of Montana 403, with (and as) *Didymosphaeria euryasca* Ellis & Galloway TYPE of *Dothiora ellisii*.

The fruit bodies resemble those of *Dothiora*, and the ascospores are very like those of some *Dothiora* species but resemble those of *Scleropleella* as well. It is not a good *Wettsteinina* and is transferred to *Dothiora*. It is growing on very decayed needles of *Pinus contorta* Dougl. var. *latifolia* Engelm. (=*Pinus murrayana* Grev. & Balf.) and is known only from the type.

Gnomonia sabalicola Earle, Bull. Torrey Bot. Club, 25: 361. 1898 Figs. 15, 129, 145

≡ *Wettsteinina sabalicola* (Earle) Barr, Contrib. Univ. Mich. Herb. 9: 548. 1972

Ascocarps scattered to clustered in small groups in a common stroma, immersed, subhypodermal, depressed globose, glabrous, 270–300 μm wide, 60–70 μm high. Beak none. Wall in longitudinal section uniform in thickness, 6–8 μm thick, of 2 or 3 layers of 3–4 × 3–4 μm polygonal to rectangular thin-walled yellow cells. Physes numerous, 1.5–2 μm wide, septate at 15- to 25-μm intervals, with thin septa, eguttulate, with slime coating. Asci numerous, from a central base, bitunicate, ovoid, 70–90 × 18–25 μm, with 8 irregularly clumped or tetraseriate ascospores. Ascospores broadly fusiform, 25–34 × 7–11 μm, straight or gently curved, 1- to 3-septate, in sequence 2:1:2, second cell from apex enlarged, central cells no longer than end cells, first septum complete and slightly constricted, supramedian (0.46), often constricted at additional full septa, without ringlike internal thickenings in the wall that simulate septa, hyaline, smooth, finely guttulate, with a conspicuous sharply delimited sheath, 3 μm wide.

HOST: *Sabal adansoni* Guerns.

COLLECTION EXAMINED: UNITED STATES OF AMERICA: ALABAMA: 193370, (Auburn, Lee County), F. S. Earle & Underwood, 4/25, 1896, ex NY, ex Herb. Earle, *Gnomonia sabalicola* Earle, TYPE.

This species is not a *Wettsteinina*. The ascocarps arise from a vertical pallisade of brown mycelioid cells. A locule develops with pseudoparaphyses and numerous asci. The centrum is contained within modified host epidermis and hypodermis on the upper side and heavily colonized layers of subtending parenchyma. The reduced wall is not typical of *Wettsteinina*. The ascospores lack the ringlike thickenings typical of many species of *Wettsteinina*.

Kriegeriella mediterranea (E. Müller) von Arx & Müller, Stud. Mycol. Baarn, 9: 88. 10 Mar. 1975 Figs. 2, 119, 144

≡ *Wettsteinina mediterranea* E. Müller, Sydowia, 18: 91–93. 1965

≡ *Kriegeriella mediterranea* (E. Müller) Barr, Mycotaxon, 2(1): 105. 12 May 1975

≡ *Extrawettsteinina mediterranea* (E. Müller) Barr, Contrib. Univ. Mich. Herb. 9(8): 538. 1972

Ascocarps hypophyllous among leaf hairs, scattered, superficial, conoid, glabrous or tomentose, 120 μm wide, 85 μm high. Beak moderately long, truncate–conical, terete, 50 μm long, 40–45 μm wide, composed of 2 or 3 layers of brown polygonal 4–6 × 4–6 μm cells around a 25–30 μm diameter ostiole, with 12–15 × 1–1.5 μm periphyses, without surface beak setae. Ascocarp wall surface a radially arranged textura prismatica. Wall in longitudinal section uniform in thickness, but thin at flat base, 14–17 μm thick, of 3 or 4 layers of 8–10 × 3–5 μm rectangular thin-walled brown cells. Physes numerous, 1.5–2 μm wide, septate at 20- to 25-μm intervals, with thin septa, eguttulate, with slime coating. Asci few, from a central base, bitunicate, saccate to broadly fusiform, 70–100 × 27–30 μm, with 8 irregularly clumped to tetraseriate ascospores. Ascospores broadly fusiform, 23–29 × 9–11 μm, straight, 1-septate, upper cell enlarged and short, septum complete and slightly constricted, supramedian (0.43), with a blue dot at ends when stained with cotton blue, hyaline, never with cells separated markedly at septum, smooth or rarely rough, finely guttulate, with an inconspicuous sheath,

0.5 μm wide.

HOST: *Quercus ilex* L.

COLLECTION EXAMINED: FRANCE: 193928, Mont Ventoux, Vaucluse, an der Strasse, Nordseite auf ca. 1000 m, E. Müller, 23.5.1962, ex ZT, as *Kriegeriella mediterranea,* TYPUS.

This specimen has only a few fruit bodies remaining. We examined only one. It matched well the ample description and clear illustrations for *W. mediterranea.* In addition, numerous periphyses were seen in a median section of the beak which when viewed superficially, appeared to have an ostiole open to the surface. The wall structure is very characteristic and excludes the species from *Wettsteinina.* The few asci and spores seen were slightly shorter than originally described but not seriously outside the range and were probably slightly less than fully mature.

The slide contained within the packet was broken in transit to Ottawa. We repaired it and placed two of the three cover glasses on a new slide. Water was added to these slides, but we did not find material of the fungus, only the host, but admit that the small fungus might have been missed.

The ascospores were described as thin-walled with a sheath. The wall was said to be sculptured and the sheath to become pigmented. We sought mature 3-septate ascospores to confirm these points but did not find any. The thin sheath is evident on 1-septate ascospores after staining with India ink. Some indications of roughening were seen but may have been from accumulation of India ink on the sheath. Müller illustrated the warted sculpturing as within the wall, not in the sheath. A few sliced spores without cell content were seen and the wall had no detectable roughening, but the spores were not as mature as those observed by Müller.

There is one intact exposed ascoma near the middle of the midvein of the larger leaf. Attention is drawn to it to help future workers in their search for additional ascomata within the hairs on the leaf underside.

Lophiostoma herbarum (Wehmeyer) n.comb.
Figs. 8, 77, 91, 120

≡ *Eriosphaeria herbarum* Wehmeyer, Sydowia, 6: 418–419. 1952

Ascocarps scattered to clustered, immersed becoming superficial, globose, sometimes depressed, densely tomentose mainly on basal part with sinuous thick-walled hyphae up to 100(150) μm long 4–6 μm wide and about 10 μm at base, brown with hyaline tips, 250–380 μm wide, 250–315 μm high. Opening a short slit or laterally compressed beak, 0–75 μm high, 70–100 μm wide, 100–150 μm long, composed of 4 to 8 layers of brown polygonal 3–7 × 3–7 μm cells around a 15–30 μm diameter slit, with 1–1.5 μm wide periphyses, without surface beak setae, with dark areas at base of surface setae and plate structure around slit. Wall structure a textura linearis. Wall in longitudinal section uniform in thickness, 20–32 μm thick, of 6 to 8 layers of 5–15 × 3–7 μm rectangular thick-walled brown cells, thicker walled and darker colored near slit. Physes numerous, 1.5–2 μm wide, septate at 20- to 60-μm intervals, with thin septa, eguttulate, with slime coating. Asci numerous, from broad hymenium, bitunicate, cylindrical, 85–120 × 15–21 μm, with 8 tetraseriate to biseriate ascospores. Ascospores fusiform, 28–35(40) × 7–10 μm, gently curved or straight, 1-septate, upper cell enlarged, septum complete and slightly constricted, submedian (0.52), with blue middle lamella and terminal triangular dots in cotton blue stain, hyaline, later brown when exposed on plant parts, smooth, eguttulate, with a thin conspicuous sheath 1–1.5 μm wide and projecting slightly at ends, sometimes with pores at ends.

HOSTS: (*1*) *Achillea millefolium* var. *alpicola* Garrett, (2) *Pedicularis bracteosa* Benth. as *P. paddoensis* Pennell.

COLLECTIONS EXAMINED: CANADA: B.C.: 193847, on *2,* Sage Pass, 7500′, T. M. C. Taylor 2334, 10 Aug. 1951, ex UBC F4102, as *Massarina* sp. det. M. E. Barr 414. UNITED STATES OF AMERICA: WASHINGTON: 120191, on *1,* Dege Peak Trail, Mt. Rainier National Park, 6900 ft., E. G. Simmons 1934, 12 Aug. 1948, ex Herb. L. E. Wehmeyer, *Eriosphaeria herbarum* Wehm., TYPE; 193341, same information on label, ex Herb. E. G. Simmons with synonymy proposed by Wehmeyer, *Wettsteinina anomala* E. & E. (= *Eriosphaeria macrospora* = *E. herbarum*).

The type specimen differs remarkably from the three other collections cited with the description of *E. herbarum.* It is clear from examination of Wehmeyer's own slides from all four collections that two species were merged. The name *E. herbarum* is retained for the species found on the type. It is a *Lophiostoma.* The other collections are *Wettsteinina duplex. Lophiostoma herbarum* is distinguished by the compressed beak, the short hairs over most of the ascoma body, the 8-spored asci, and the 1-septate ascospores with peculiar apical structure.

The Canadian collection matches well the type of *Lophiostoma herbarum.* Barr (1972, p. 549) had placed the collection in *W. anomala* (Ell. & Ev.) Barr. See the discussion on *L. herbarum* with *W. duplex.*

Lophiostoma sieversiae Peck, New York State Mus. Bull. 167: 44. 1913 Figs. 33, 80, 140, 147

≡ *Wettsteinina sieversiae* (Peck) Barr, Can. J. Bot. 45: 1042. 1967

= *Massaria sieversiae* Clements, Cryptogamae Form. Colorad. 234. (unpublished)

≡ *Leptosphaeria sieversiae* (Clem.) Petrak, Sydowia, 6: 6–7. 1952

= *Wettsteinina andromedae* (Auersw.) Barr. var. *cassiopes* (Dearn. & House ex Barr) Barr, Can. J. Bot. 45: 1041. 1967

≡ *Phaeospora cassiopes* Dearness & House, New York State Mus. Circ. 24: 33. 1940. Validated by Barr, Can. J. Bot. 45: 1041. 1967

Ascocarps scattered, immersed, subepidermal, becoming erumpent, and appearing superficial, globose to ellipsoidal, tomentose above with reddish brown 200–300 × 5–6 μm tapered hairs, 160–200 μm wide, 160–190 μm high, with brown longitudinal hyphae in the host 5–10 μm wide with brown surface droplets and finally a broad brown sheathlike layer about 5–8 μm wide. Beak none, ostiole not seen, no preformed opening detected, perhaps opening by up to 4 radial fissures. Wall in longitudinal section uniform in thickness, 20–27 μm thick, of 3 or 4 layers of 6–8 × 5–6 μm polygonal to rectangular thin-walled brown cells. Physes extremely rare, 2–3 μm wide, septate at 10- to 20-μm intervals, eguttulate, without a slime coating. Asci numerous, from a central base, bitunicate, saccate to broadly fusiform, 150–170 × 50–85 μm, with 8 irregularly clumped to triseriate ascospores. Ascospores broadly fusiform, 50–56 × 20–28 μm, straight or gently curved, 3-septate, in sequence 2:1:2, second cell from apex enlarged, first septum complete and slightly constricted, supramedian (0.48), often constricted at additional full septa, brown, smooth, guttulate, with a conspicuous sharply delimited sheath, 2–3 μm wide.

HOST: (*1*) *Cassiope mertensiana* (Bong.) D. Don. (*2*) *Sieversia turbinata* (Rydb.) Greene.

COLLECTIONS EXAMINED: UNITED STATES OF AMERICA: CALIFORNIA: 192799(*c*), on *1*, Frog Lake, near Mt. Stanford, C. F. Sonne, 25 July 1886, ex Herb. Dearness 5858, as *Phaeospora cassiopes* D. & H. n.s., TYPE; UTAH: 193727, on *2*, Big Cottonwood Canyon, Salt Lake Co., A. O. Garrett 702, 3 July 1913, ex NYS, as *Lophiostoma sieversiae* Peck, TYPE.

The ascocarps of this species do not have a well-defined opening. As noted by Barr (1967, pp. 1042–1043), there is no indication of a compressed beak as implied by Peck's inclusion of the species in *Lophiostoma*. There is a hint of a small disc-like cap visible in some transverse sections of the apex, but despite close examination of the abundant mature material, the exact opening mechanism is not known. It seemed in several cases that the ascomata opened by a few radial fissures. Physes are extremely rare and the entire small centrum is filled with mature asci. The fungus is as described by Barr, who transferred it to *Wettsteinina*. The dark brown ascospores with three thick septa are unlike the usual spores for *Wettsteinina*. It is necessary to exclude this species. There is a strong resemblance to the spores of *Leptosphaeria hollosiana* Wehmeyer (1963, pp. 319–320) in Himalayan collections Koelz 5551, 5906, and 6918 and B. Singh 5, but these have shorter spores. More importantly, the ascomata lack the characteristic apical hairs and coarse dark brown runner hyphae in the host.

The type of *Wettsteinina andromedae* var. *cassiopes* appeared as follows. Ascocarps scattered, immersed, subepidermal, becoming erumpent, and appearing superficial, globose, glabrous to tomentose, 200–270 μm wide, 200–270 μm high associated with dark brown superficial runner hyphae. Beak not seen. Wall in longitudinal section uniform in thickness, at times perenniating within a similar ascoma, 15–25 μm thick, of 2 to 4 layers of 5–8 × 4–6 μm polygonal to rectangular thin-walled brown cells. Physes not seen. Asci numerous, from a central base, saccate to broadly fusiform, 150–160 × 40–50 μm, with 8 tetraseriate ascospores. Ascospores broadly fusiform, 48–57 × 16–21 μm, straight or gently curved, 3-septate, in sequence 2:1:2, second cell from apex enlarged, first septum complete and slightly constricted, median (0.50), often constricted at additional full septa, dark reddish brown, nearly opaque, smooth, guttulate, with a conspicuous sharply delimited sheath, 2–2.5 μm wide.

Dearness's notes on the packet bear an original and revised set of measurements. The asci were first indicated as 62–120, 93–120 × 30–35 μm. The ascospores were constricted, 3-septate (and guttulate fide drawing), 30–33 × 12–14 μm. In the same shade of ink the ascoma was shown as exposed, hemispherical with hairs 0.25–0.5 mm long. Additions in darker ink extended the ascus measurements to –145–150 × –40–45 μm and the ascospore dimensions to 34–45–49–53 × 15–23 μm. We believe this change is the result of the incorporation of a second species with larger asci and larger ascospores. A handwritten description within the packet incorporates the extremes: asci 93–152 × 31–45, ascospores 30–53 × 13–23 μm. Barr annotated the specimen in 1957 and validated the taxon later (Barr, 1967, p. 1041). The measurements she gave for asci were 85–150 × 30–45 μm and, for ascospores, 34–52 × 12.5–19.5 μm. She observed that the 3-septate spores had "at times a vertical septum in the two middle cells." The published redescription which included one additional collection, Weir 652, gave the ascospores as (25–)28–52 × (10)12–19.5 μm. The drawings, Fig. 1, we believe, includes one spore of each taxon.

In the Dearness packet is one slide he made 29 May 1925. It is of the large-spored species. After consideration of all the evidence on the packet, the handwritten description, the drawings of a spore, an ascus, and one ascoma, as well as the published original description and Barr's validation thereof, we feel the better match is the large-spored species. It matches the drawing because it has constrictions at all three septa and has one large guttule per cell. The small-spored species has ascospores 30–40 × 11–14 μm, constricted only at the first septum and without large guttules. This species with small dictyospores is filed provisionally as *Pleospora* sp. (DAOM 192799(*a*)) (Figs. 32, 93, 130). It resembles *Scleropleella* in some aspects, but the vertical septa in the central cells of some ascospores make this choice unattractive. It is not a good match for *Leptosphaerulina* either. To complete the record of observations on the type specimen, we noted a small-spored (16–18 × 5.5–6 μm) *Scleropleella* sp. (DAOM 192799(*b*)) and a *Didymosphaeria* sp. (192799(*d*)).

Lophiostoma species 1 Figs. 14, 121

Ascocarps scattered, immersed, subepidermal, becoming erumpent to superficial, globose, tomentose, hairs 70–150 × 4–6 μm, 175–275 μm wide, 175–275 μm high. Beak short, a compressed slit, 100–150 μm long, 80–100 μm wide, 50–70 μm high, composed of 10 to 15 layers of brown rectangular 6–10 × 3–5 μm cells around a 15–25 μm diameter ostiole, without periphyses or surface setae. Wall in surface view a textura linearis. Wall in longitudinal section mostly uniform in thickness, wider at base of slit, 25–30 μm thick, of 3 or 4 layers of 8–10 × 4–6 μm polygonal, thick-walled, brown cells, lined with several layers of hyaline compressed rectangular cells. Physes numerous, 1.5–2 μm wide, septate at 30- to 50-μm intervals, with thin septa, eguttulate, with slime coating. Asci numerous, bitunicate, cylindrical, 120–140 × 20–24 μm, with 8 tetraseriate ascospores. Ascospores fusiform, 32–38 × 9–10 μm, straight or gently curved, 3-septate, second cell enlarged, first septum complete and slightly constricted without blue middle lamella and marginal triangular dots in cotton blue, median (0.50), constricted at dentate internal thickenings in the wall that simulate septa, brown, smooth, guttulate or not, with a conspicuous sharply delimited sheath 1.5–2 μm wide and projecting slightly at ends.

HOST: *Gentiana calycosa* Griseb.

COLLECTION EXAMINED: CANADA: B.C.: 193869(*b*), Wall Lake, 6000 ft., T. M. C. Taylor, 8 Aug. 1951, ex UBC 1933, F 4578 (Barr 388), as *Sphaerulina Gentianae* Wehm. with *Venturia atriseda* Rehm.

This collection is not a match for *W. gentianae* (Wehm.) Barr despite its occurrence on *Gentiana* because the ascomata are too small and tomentose. We refer it to *Lophiostoma* species close to, but distinct from, *Lophiostoma herbarum* (Wehm.) n.comb. There are several fungi present on this small collection. Nothing was found with large glabrous ascomata 400–500 μm in diameter to match *W. gentianae*. Barr (1953, p. 816) cited this B.C. collection. It is highly probable that the later record (Barr 1972, p. 550) is based on the same collection which was cited simply Barr 388 (UBC). The number 388 does not appear on the collection, but the same number was given

for *Venturia atriseda* Rehm (Barr 1968, p. 822) which occurs on the same specimen from Wall Lake, UBC 1933 (Barr 1953, p. 819).

Lophiostoma species 2 Fig. 34

= *Wettsteinina niesslii* E. Müller, Sydowia 4: 204. 1950. sensu Müller non Niessl

≡ *Leptosphaeria gigaspora* Niessl in Rabenh. Fungi Eur. 2998. 1882. non *Wettsteinina gigaspora* Höhnel

Ascocarps scattered, immersed, subepidermal, ellipsoidal to globose, glabrous, 250−350 μm wide, 180−220 μm high. Beak none, a simple circular ostiole 50 μm in diameter to an elongated slit, 100 μm long, without periphyses or surface setae. Physes very numerous, 1−1.5 μm wide. Asci numerous, from a broad base, bitunicate, cylindrical, 50−70 × 17−20 μm, with 8 tetraseriate ascospores. Ascospores fusiform, 36−52 × 7−8(9) μm, straight or gently curved, 1-septate, septum complete and not constricted, median (0.50), hyaline, never with cells separated markedly at septa, smooth, guttulate or not, with an inconspicuous thin sheath projecting slightly at ends, but the full extent not observed.

HOST: *Phragmites communis* L.

COLLECTION EXAMINED: SWITZERLAND: 91987, Bodensee (Thurgau), H. Wegelin, 4/5 Oct. 1890, ex ZT and ex Herb. Wehmeyer, as *Wettsteinina niesslii* E. Müller, syn. *Leptosphaeria gigaspora* Niessl.

This specimen is important because it is the only one cited by Müller (1950, pp. 204−206) in addition to the type which was on *Carex acutiformis* Ehrh. (*Carex paludosa* Good.). It is not certain which of the two specimens he used for the illustration. R. A. S. examined the collection in January 1962 and made one slide (91987). The specimen was filed first as *Lophiostoma* by Wegelin, then changed to *Leptosphaeria*. Wegelin noted measurements on the packet and drew three spores. He gave asci 83−121 × 20−21 μm and spores 51−58 × 8−11 μm. The length of the spores including appendages was 80−95 μm. The spore drawings strongly suggest *Lophiostoma* or *Lophiotrema*. The two spores drawn in 1962 are not a good match to Wegelin's drawing, Müller's published illustration, or to Berlese's figure from original material sent to him by Niessl. Wehmeyer examined the specimen in 1958 and recorded the following notes with the slide: "On surface as crowded, elongate fusoid black spots. Ascomata flattened elongate, 400−600 μm long. Ostiole punctate. Asci clavate, thick-walled, 85−95 × 20−22 μm, with numerous pseudoparaphyses. Spores 3-seriate, hyaline, fusoid, 1-septate at first, 35−38 × 5−7 μm, often seen with extra septa in one or both ends, probably immature. This is better in *Metasphaeria*." On the basis of Wehmeyer's and our slides it seems that the fungus is an immature *Lophiostoma*.

Pleospora cytisi Fuckel, Jahrb. Nassau. Ver. Naturk. 23, 24: 132. 1869 (1870) Fig. 20

= *Wettsteinina ambigua* Petrak, Ann. Mycol. 22: 59−60, 1924

Ascocarps scattered, immersed, subepidermal, globose, glabrous, 250−300 μm wide, 250−300 μm high. Beak not seen; only lower part of 4 sliced ascomata seen. Wall in transverse section uniform in thickness, 20−28 μm thick, of 3 or 4 layers of 7−14 × 7−9 μm polygonal thin-walled brown cells. Physes numerous, 2−3 μm wide, septate at 10- to 20-μm intervals, with thin septa, eguttulate, with slime coating. Asci numerous, bitunicate, 140−160 × 18−21 μm, with 8 biseriate ascospores. Ascospores broadly fusiform, 27−42 × 7−14 μm, straight, 1- to 5-septate, in sequence 3:2:1:2:3, third cell from apex enlarged, first septum complete and slightly constricted, submedian (0.53), often constricted at additional full septa, hyaline, smooth, guttulate, with a conspicuous broad sharply delimited sheath, 3−4 μm wide especially on young hyaline spores, later brown with vertical septa and a rough exterior.

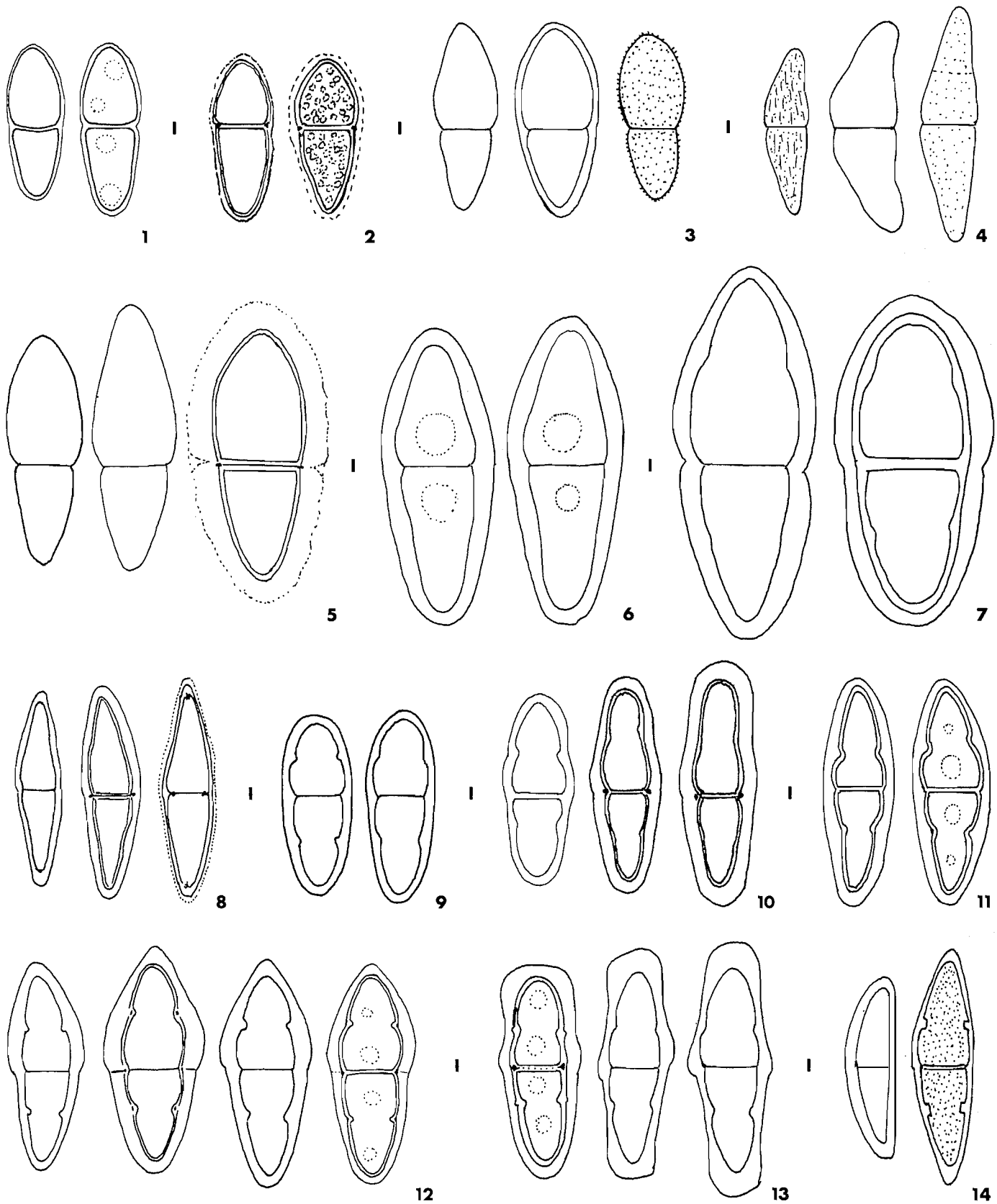
HOST: *Cytisus scoparius* L.

COLLECTIONS EXAMINED: AUSTRIA: 193595(*b*), Hrabuvka, Mahr-Weisskirchen, F. Petrak, 28.IX.1923, ex W 05661, ex Herb. Petrak, Typus, *Wettsteinina ambigua* Petr. n.sp. (transversely sliced ascomata at end of stem previously worked (probably) by Petrak). . . .; Fl. Boh. Mor. exs. 1899, ex W 24562, ex Herb. Petrak 3938, Typus.; . . ., Fl. Boh. Mor. exs. 1899 ex FH; 193578(*b*), Fl. Boh. Mor. exs. 1899 ex Herb. Wehmeyer, ex S.

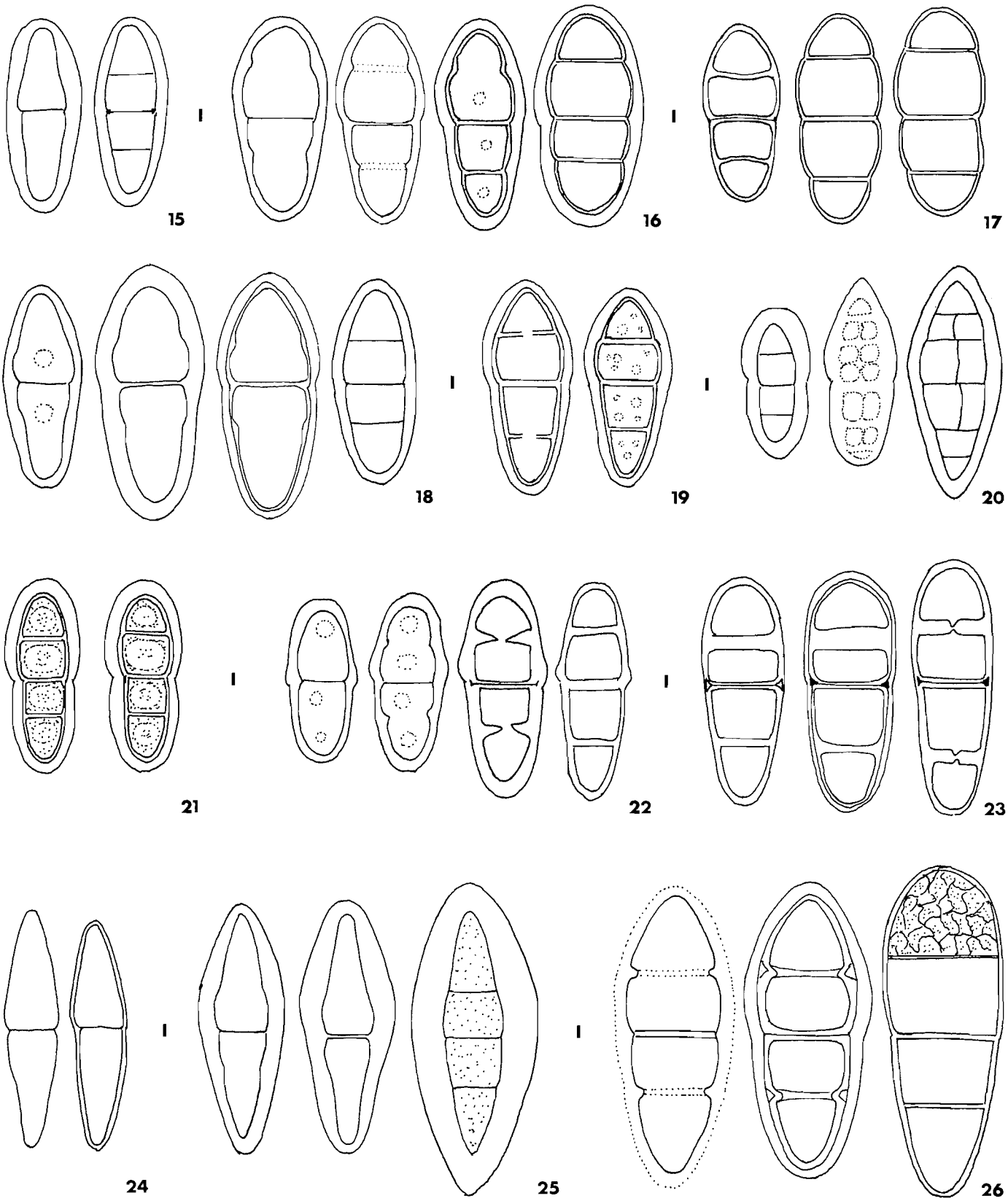
Petrak (1924, pp. 56−60) described *W. ambigua, Mycosphaerella sarothamni* and *Physalospora euganoides* all from *Cytisus scoparius* collected at Hrabuvka, 28.IX.1923. He distributed material labelled *W. ambigua* in Flor. Mor. Boh. Exs. 1899. We have seen this number from FH, W, and a slide made by Wehmeyer from the set at S. All bore abundant *Mycospherella sarothamni* and a *Pleospora*. Nothing that perfectly matched *W. ambigua* was found in number 1899 in these three sets. From W, a specimen marked Typus and bearing handwritten identification as *W. ambigua* was examined in the hope of resolving the problem. A search was made first for areas that had been worked. There were no annotation labels present so it was hoped that the worked areas were those studied by Petrak. One worked area was *Mycosphaerella sarothamni*. The other worked area contained the lower half of 3 transversely sliced ascomata of *Pleospora cytisi* Fuckel. A few additional transverse sections were made from this area. The juvenile hyaline ascospores of *P. cytisi* with 1−5 transverse septa were close to the description given for *W. ambigua* ascospores. Moreover, the further subdivision of young spores resulted in large globular structures that might match the idea of spores "mit . . . grobkornigem Plasma." The *Pleospora* ascomata were 250−300 μm in diameter, about the size given in the diagnosis which included details of immature (and consequently smaller) ascomata. The wall was 20−28 μm thick of 7−14 × 7−9 μm cells compared with Petrak's 25−35 μm thick of 10- to 12-μm cells. Our conclusion is that *W. ambigua* was based on juvenile *Pleospora cytisi* Fuckel to which it is referred. The description above is based on hyaline ascospores.

Mycosphaerella sarothamni Petrak, Ann. Mycol. 22: 57−58. 1924 Figs. 1, 122

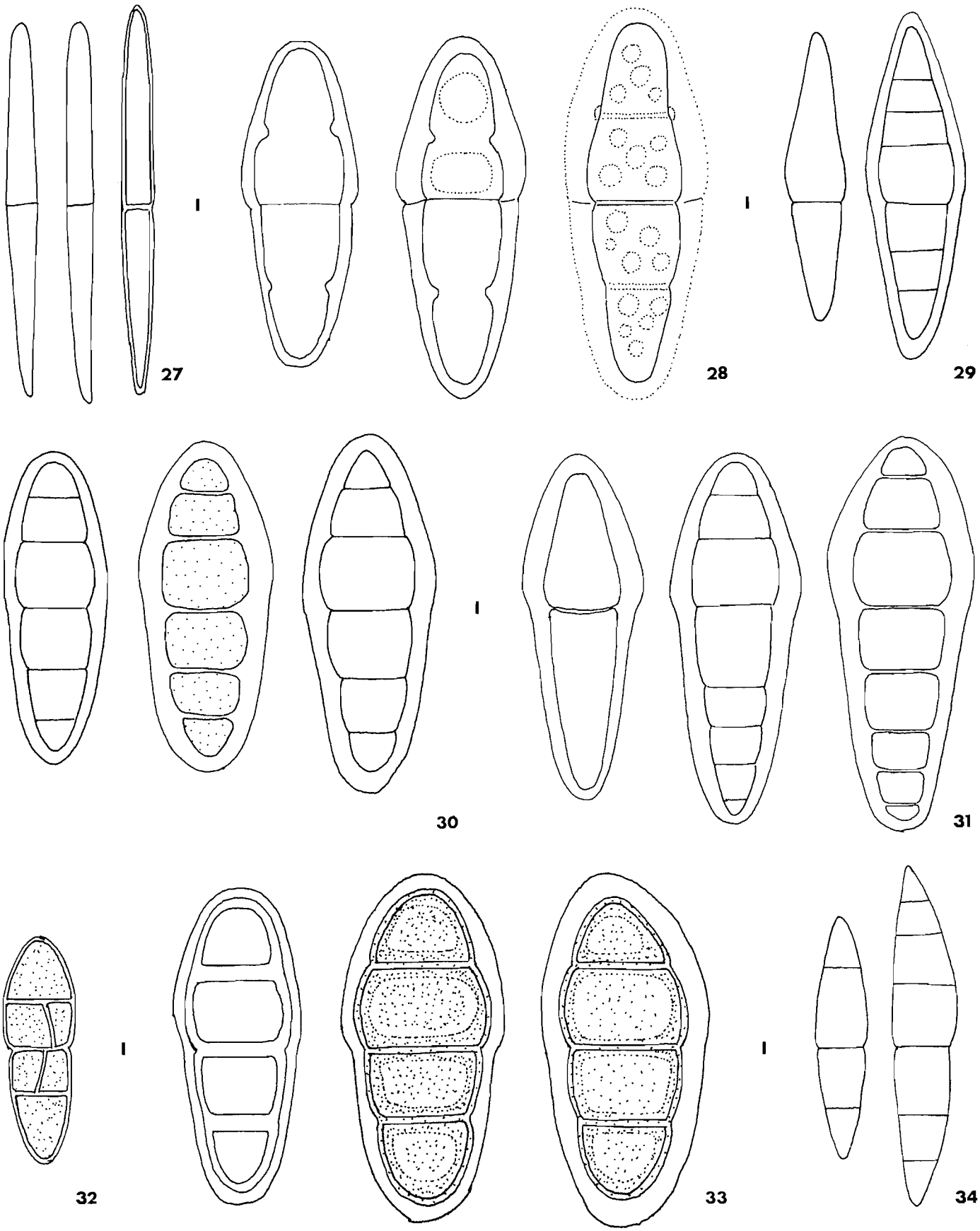
Ascocarps scattered to clustered, immersed within epidermis, subcuticular, globose, glabrous, 140−180 μm wide, 140−180 μm high. Beak short, truncate−conical, terete, 30−50 μm long, 40−50 μm wide, composed of 4 or 5 layers of brown polygonal 4- to 6-μm cells around a 20−25 μm diameter ostiole. Wall in longitudinal section uniform in thickness, 25−30 μm thick, of 3 to 6 layers of 4−12 × 4−7 μm polygonal, thin-walled, brown cells. Physes absent. Asci numerous, from a central base, bitunicate, broadly fusiform to obclavate, 80−100 × 20−24 μm (shorter and broader in sections of ascocarps), with 8 biseriate to tetraseriate below ascospores. Ascospores broadly fusiform, 30−32 × 8−11 μm, straight or gently curved, 1-septate, enlarged above septum, septum complete and slightly constricted, median (0.50), hyaline to greenish, smooth, guttulate or not, with a very thin



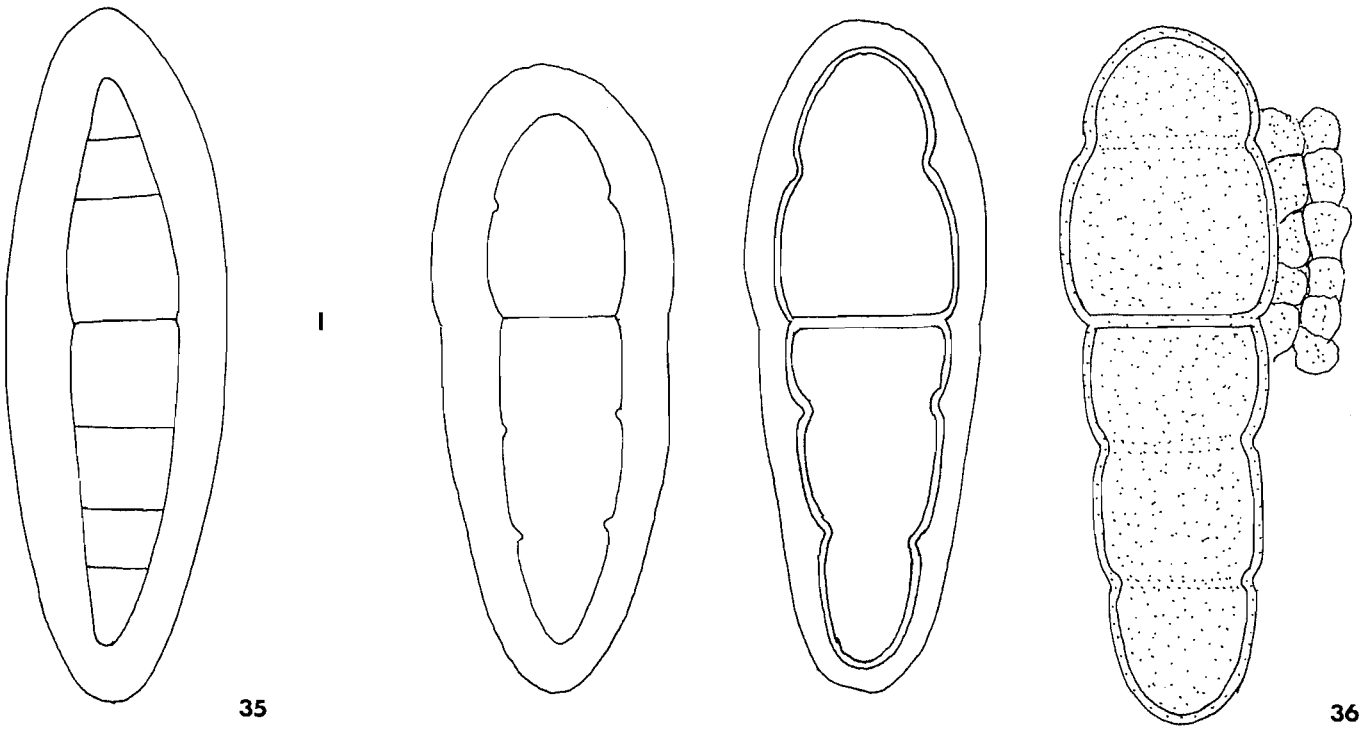
FIGS. 1–14. Ascospores. ×1000. Fig. 1. *Mycosphaerella sarothamni*, 193595(*a*), 193578(*a*). Fig. 2. *Kriegeriella mediterranea*, 193928 (×2) TYPE. Fig. 3. *Wettsteinina arctica*, 70491, 70502 TYPE, 70491 drawn from leaf surface. Fig. 4. *Didymella anomala*, 192846 (×3) TYPE. Fig. 5. *Wettsteinina magnifica*, 88244 (×2), 191260 TYPE. Fig. 6. *Wettsteinina kashmirensis*, 123890 (×2) TYPE. Fig. 7. *Wettsteinina douglasii*, 75177 (×2) TYPE. Fig. 8. *Lophiostoma herbarum*, 193847, 120191 (×2) TYPE. Fig. 9. *Wettsteinina junci*, 70493(*b*) (×2) TYPE. Fig. 10. *Wettsteinina operculata*, 191893 (×3) TYPE. Fig. 11. *Wettsteinina kobresiae*, 123835(*b*) (×2) TYPE. Fig. 12. *Wettsteinina duplex*, 121567(*a*), 120192(*b*) (×3) TYPE. Fig. 13. *Wettsteinina savilei*, 88243 (×3) TYPE. Fig. 14. *Lophiostoma* sp. 1, 193869(*b*) (×2).

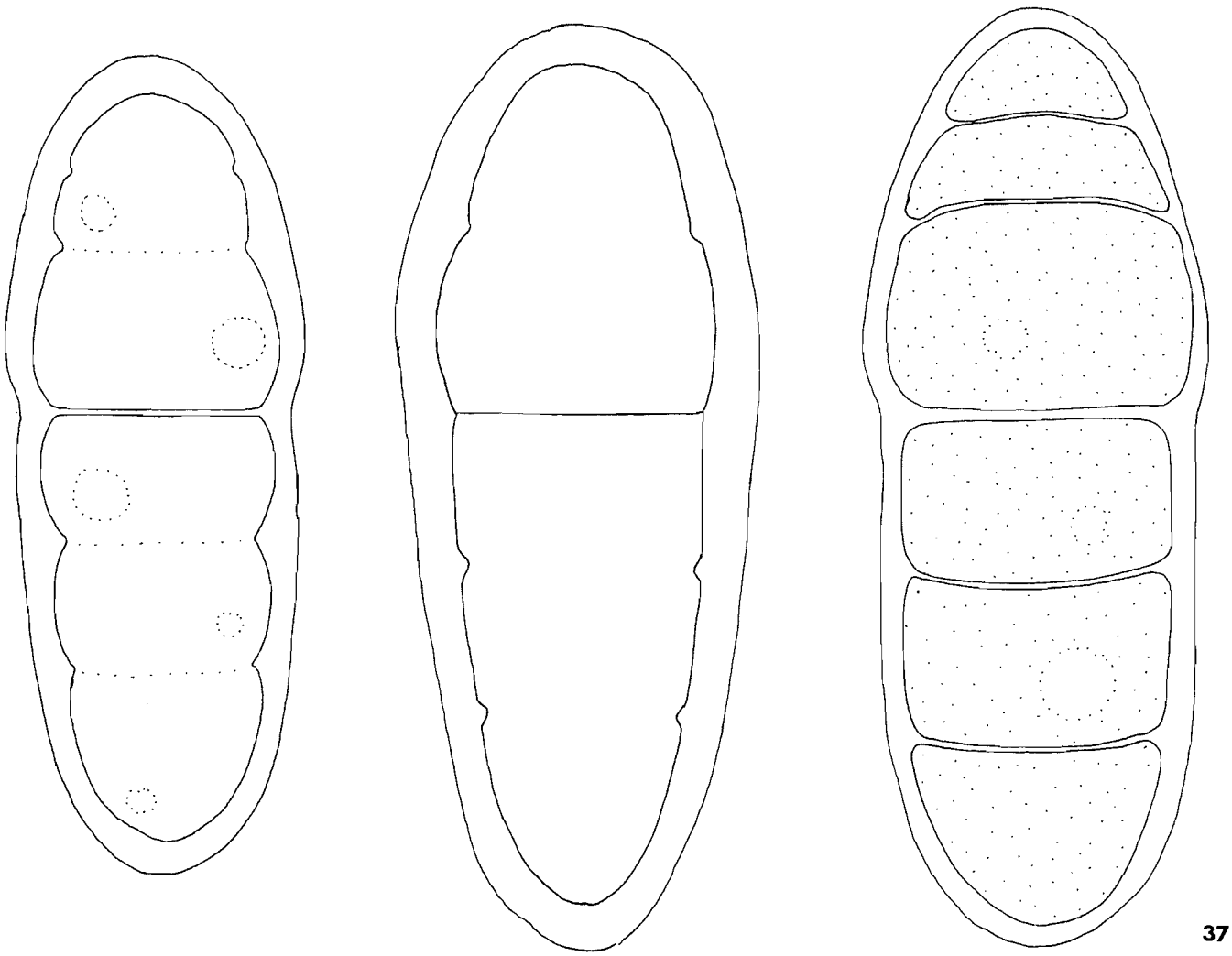


FIGS. 15–26. Ascospores. ×1000. Fig. 15. *Gnomonia sabalicola*, 193370 (×2) TYPE. Fig. 16. *Wettsteinina dryadis*, 193575 TYPE, 63019(*b*), 193868 (×2). Fig. 17. *Wettsteinina andromedae*, 74240(*e*), 70498 (×2). Fig. 18. *Wettsteinina eucarpa*, 83507, 63404(*b*), 193723 TYPE, 83507. Fig. 19. *Wettsteinina luzulae*, 91889 (×2) TYPE. Fig. 20. *Pleospora cytisi*, 193595(*b*) (×3). Fig. 21. *Dothiora ellisii*, 192843 (×2) TYPE. Fig. 22. *Wettsteinina oreophila*, 90910 (×2) TYPE, 123926(*b*), 123806. Fig. 23. *Wettsteinina macrotheca*, 193573 (×2) TYPE, 193574. Fig. 24. *Wettsteinina yuccaegena*, 191957 (×2) TYPE. Fig. 25. *Wettsteinina barrae*, 74329 (×3) TYPE. Fig. 26. *Wettsteinina gentianae*, 120266 (×3) TYPE, last ascospore drawn from leaf surface.



FIGS. 27–34. Ascospores. ×1000. Fig. 27. *Wettsteinina niesslii* sensu Barr, 74328(*b*) (×3). Fig. 28. *Wettsteinina macrospora*, 121583(*a*), 120192(*a*) (×2) TYPE. Fig. 29. *Wettsteinina candida*, 194835 (×2) TYPE. Fig. 30. *Wettsteinina bupleuri*, 91943 (×3) TYPE. Fig. 31. *Wettsteinina pachyasca*, 123649, 123648, 123649. Fig. 32. *Pleospora* sp., 192799(*a*). Fig. 33. *Lophiostoma sieversiae*, 192799(*c*) TYPE of *Phaeospora cassiopes*, 193727 (×2) TYPE. Fig. 34. *Lophiostoma* sp. 2, 91987 (×2).





FIGS. 35–37. Ascospores. ×1000. Fig. 35. *Wettsteinina callista* sensu Höhnel as *Pseudosphaeria callista*, not TYPE ex FH, A. n. 4371. Fig. 36. *Wettsteinina mirabilis*, 193667 part of TYPE of *Massarina gigantospora*, 193689 TYPE of *Sphaerulina callista* var. *vossii*, 193651 drawn from leaf surface. Fig. 37. *Wettsteinina gigaspora*, 91944, 193582 TYPE, sub nominae *Wettsteinina alpina* v. H., 107856 drawn from leaf surface.

sheath, 0.5 μm wide.

HOST: *Cytisus scoparius* L.

COLLECTIONS EXAMINED: AUSTRIA: 193595(*a*), Hrabuvka, Mahr-Weisskirchen, F. Petrak, 28.IX.1923, ex W 05661, ex Herb. Petrak, TYPUS, *Wettsteinina ambigua* Petrak n.sp.; 193578(*a*), same data as previous collection, Fl. Boh. Mor. exs. 1899, ex Herb. Wehmeyer, ex S; same data ex FH.

This specimen is clearly a *Mycosphaerella*. The spores are 1-septate. The dimensions are a good match for those given by Petrak for *Mycosphaerella sarothamni*. The portion used for the description comes from FH under the name *Wettsteinina ambigua* Petrak q.v.

Wehmeyer studied another part of the exsiccatus from S. His notes are as follows. "Perithecia 150−250 μm diam., spheric or somewhat flattened, rather thickly scattered, somewhat pustulate, erumpent just as a minute papillate ostiole, later more widely erumpent. Wall 20−25 μm of coarse black parenchyma, strongly stromatic. Asci saccate at first, then broad oblong−clavate, apical wall much thickened, base claw-like, borne in a rosette without paraphyses, 53−70 × 17−25 μm. Spores biseriate, fusoid, hyaline, 1-septate, straight or somewhat inequilateral, mostly symmetric or slightly more tapered below, slightly constricted at the septum, 24−32 × 5.5−7 μm. Petrak says that 2−3 septa can later be faintly seen in each cell of the spore, but no such septation was seen in this material. It may have been an unequal contraction of the protoplasm. This is a typical *Mycosphaerella*. There is also a *Pleospora* on here with perithecia 400 μm diameter and spores of the yellow−brown media type, 5−7 septate with vertical end septa and 23−27 × 9−11 μm."

Wettsteinina niesslii E. Müller, Sydowia, 4: 204. 1950 sensu Barr non Niessl Figs. 27, 73, 139

≡ *Leptosphaeria gigaspora* Niessl in Rabenh. Fungi Eur. 2998. 1882. non *Wettsteinina gigaspora* Höhnel

Ascocarps scattered, immersed, subepidermal, globose, glabrous, 170−220 μm wide, 155−220 μm high. Beak none. Opening a linear fracture often transverse to the long axis of

FIGS. 38−48. Sections. Fig. 38. *Wettsteinina andromedae*, 70499 (×340). Fig. 39. *Wettsteinina luzulae*, 91889 (×140) TYPE. Fig. 40. *Wettsteinina yuccaegena*, 191957 (×140) TYPE. Fig. 41. *Wettsteinina dryadis*, 70500 (×340). Fig. 42. *Wettsteinina gentianae*, 120266 (×140) TYPE. Fig. 43. *Wettsteinina kobresiae*, 123835(*b*) (×340) TYPE. Fig. 44. *Wettsteinina operculata*, 191893 (×340) TYPE. Fig. 45. *Wettsteinina oreophila*, 123926(*b*) (×340). Fig. 46. *Wettsteinina savilei*, 88243 (×340) TYPE. Fig. 47. *Wettsteinina arctica*, 88241 (×520). Fig. 48. *Wettsteinina gigaspora*, 193582 (×140) TYPE.

FIGS. 49−56. Openings. Fig. 49. *Wettsteinina duplex*, 121567(*a*) (×340). Fig. 50. *Wettsteinina gentianae*, 120266 (×520) TYPE. Fig. 51. *Wettsteinina candida*, 194835 (×520) TYPE. Fig. 52. *Wettsteinina gigaspora*, 193582 (×520) TYPE. Fig. 53. *Wettsteinina macrotheca*, 193818 (×520). Fig. 54. *Wettsteinina magnifica*, 191260 (×340) TYPE. Fig. 55. *Wettsteinina mirabilis*, 193690 (×520). Fig. 56. *Wettsteinina pachyasca*, 123648 (×520).

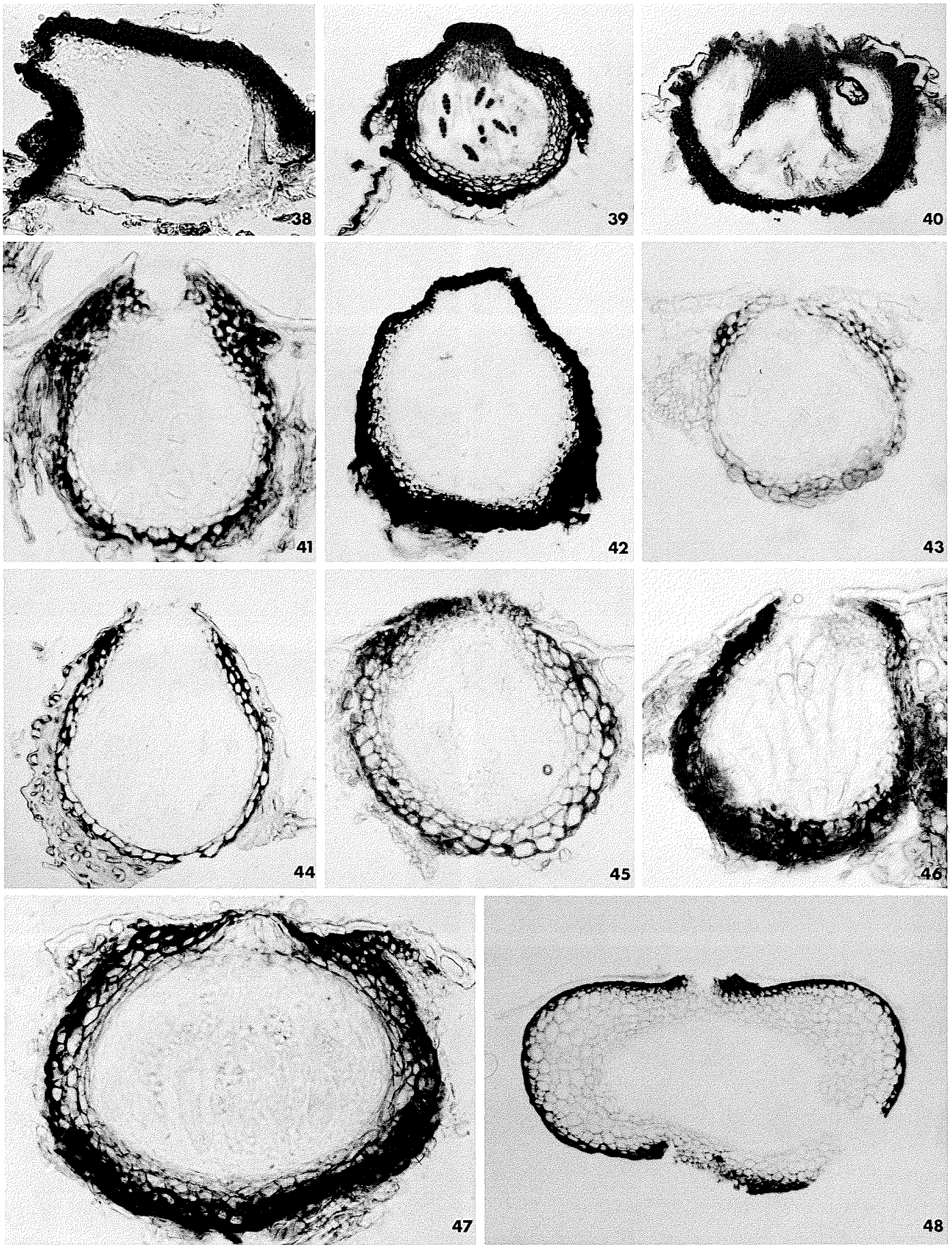
FIGS. 57−83. Wall structure. ×1000. Fig. 57. *Wettsteinina andromedae*, 70499. Fig. 58. *Wettsteinina arctica*, 70491. Fig. 59. *Wettsteinina barrae*, 74329 TYPE. Fig. 60. *Wettsteinina bupleuri*, 91943 TYPE. Fig. 61. *Wettsteinina douglasii*, 75177 TYPE. Fig. 62. *Wettsteinina duplex*, 121538(*b*). Fig. 63. *Wettsteinina eucarpa*, 193723 TYPE. Fig. 64. *Wettsteinina junci*, 70493 TYPE. Fig. 65. *Wettsteinina kobresiae*, 123835(*b*) TYPE. Fig. 66. *Wettsteinina macrospora*, 120192(*a*) TYPE. Fig. 67. *Wettsteinina macrotheca*, 193818. Fig. 68. *Wettsteinina mirabilis*, 193688. Fig. 69. *Wettsteinina operculata*, 191893 TYPE. Fig. 70. *Wettsteinina oreophila*, 123926(*b*). Fig. 71. *Wettsteinina pachyasca*, 123648. Fig. 72. *Wettsteinina savilei*, 88243 TYPE. Fig. 73. *Wettsteinina niesslii* sensu Barr, 74328(*b*). Fig. 74. *Wettsteinina gentianae*, 120266 TYPE. Fig. 75. *Wettsteinina gigaspora*, 193582 TYPE, rind and part of wall. Fig. 76. *Dothiora ellisii*, 192843 TYPE. Fig. 77. *Lophiostoma herbarum*, 193341. Fig. 78. *Wettsteinina luzulae*, 91889 TYPE. Fig. 79. *Wettsteinina magnifica*, 191260 TYPE. Fig. 80. *Lophiostoma sieversiae*, 192799(*c*). Fig. 81. *Wettsteinina candida*, 194835 TYPE. Fig. 82. *Didymella anomala*, 192846 TYPE. Fig. 83. *Wettsteinina yuccaegena*, 191957 TYPE.

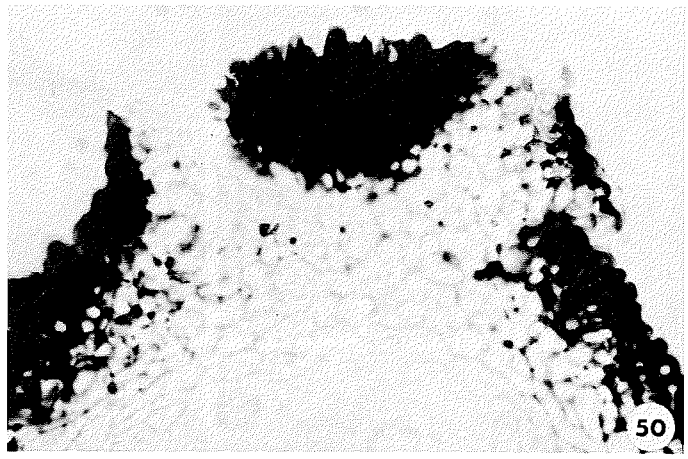
FIGS. 84−98. Asci. ×520. Fig. 84. *Wettsteinina andromedae*, 70498. Fig. 85. *Wettsteinina arctica*, 70491. Fig. 86. *Wettsteinina eucarpa*, 63404. Fig. 87. *Wettsteinina kobresiae*, 123835(*b*) TYPE. Fig. 88. *Wettsteinina yuccaegena*, 191957 TYPE. Fig. 89. *Wettsteinina barrae*, 74329 TYPE. Fig. 90. *Wettsteinina dryadis*, 63019(*b*). Fig. 91. *Lophiostoma herbarum*, 193847. Fig. 92. *Dothiora ellisii*, 192843 TYPE. Fig. 93. *Pleospora* sp., 192799(*a*). Fig. 94. *Wettsteinina duplex*, 121538(*b*). Fig. 95. *Wettsteinina luzulae*, 91889 TYPE. Fig. 96. *Wettsteinina macrotheca*, 193573 TYPE. Fig. 97. *Wettsteinina operculata*, 191893 TYPE. Fig. 98. *Wettsteinina oreophila*, 123926(*b*).

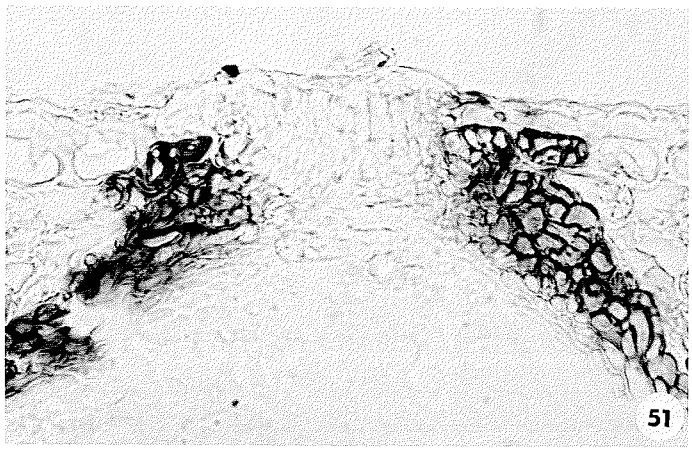
FIGS. 99−106. Asci. ×520 unless otherwise noted. Fig. 99. *Wettsteinina junci*, 70493(*b*) TYPE. Fig. 100. *Wettsteinina gentianae*, 120266 (×340) TYPE. Fig. 101. *Wettsteinina bupleuri*, 91943 TYPE. Fig. 102. *Wettsteinina pachyasca*, 123649. Fig. 103. *Wettsteinina candida*, 194835 TYPE. Fig. 104. *Wettsteinina magnifica*, 191260 TYPE. Fig. 105. *Wettsteinina macrospora*, 121538(*a*). Fig. 106. *Wettsteinina mirabilis*, 123579.

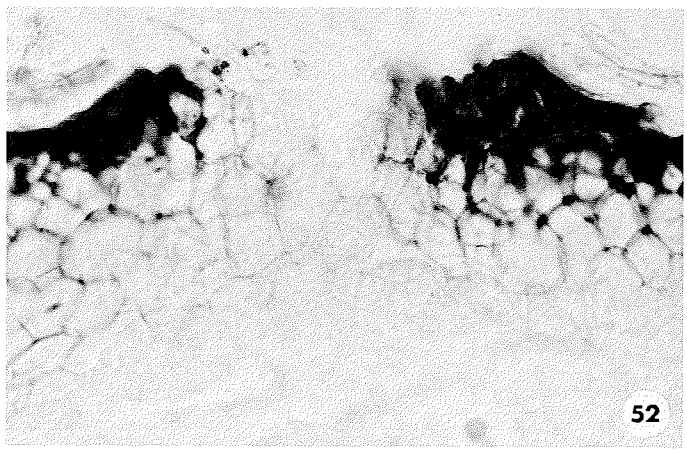
FIGS. 107−134. Ascospores. ×1000. Fig. 107. *Wettsteinina andromedae*, 70498. Fig. 108. *Wettsteinina arctica*, 88241. Fig. 109. *Wettsteinina dryadis*, 193575 TYPE. Fig. 110. *Wettsteinina duplex*, 121538(*b*). Fig. 111. *Wettsteinina eucarpa*, 193723 TYPE. Fig. 112. *Wettsteinina junci*, 70493(*b*) TYPE. Fig. 113. *Wettsteinina kobresiae*, 123835(*b*) TYPE. Fig. 114. *Wettsteinina luzulae*, 91889 TYPE. Fig. 115. *Wettsteinina operculata*, 191893 TYPE. Fig. 116. *Wettsteinina savilei*, 88243 TYPE. Fig. 117. *Wettsteinina yuccaegena*, 191957 TYPE. Fig. 118. *Didymella anomala*, 192846 TYPE. Fig. 119. *Kriegeriella mediterranea*, 193928 TYPE. Fig. 120. *Lophiostoma herbarum*, 120191. Fig. 121. *Lophiostoma* sp. 1, 193869(*b*). Fig. 122. *Mycosphaerella sarothamni*, 193595(*a*). Fig. 123. *Wettsteinina barrae*, 74329 TYPE. Fig. 124. *Wettsteinina barrae*, 74329 TYPE, spore from leaf surface. Fig. 125. *Wettsteinina kashmirensis*, 123890 TYPE. Fig. 126. *Wettsteinina magnifica*, 191260 TYPE. Fig. 127. *Wettsteinina oreophila*, 123806. Fig. 128. *Dothiora ellisii*, 192843 TYPE. Fig. 129. *Gnomonia sabalicola*, 193370 TYPE. Fig. 130. *Pleospora* sp., 192799(*a*). Figs. 131, 132. *Wettsteinina gentianae*, 120266 TYPE. Fig. 133. *Wettsteinina macrospora*, 121538(*a*). Fig. 134. *Wettsteinina macrotheca*, 193573 TYPE.

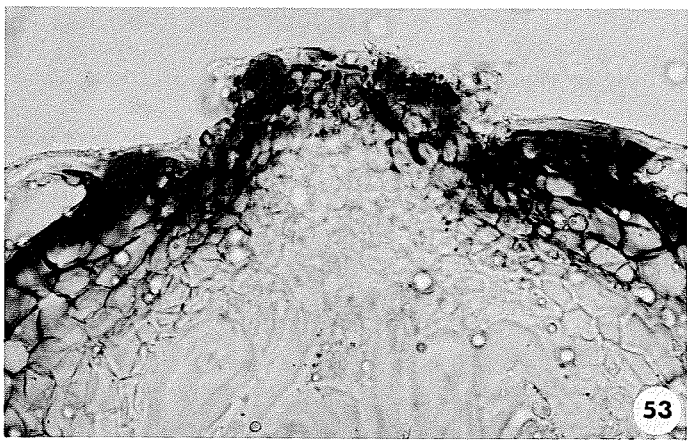
FIGS. 135−150. Ascospores. Fig. 135. *Wettsteinina candida*, 194835 (×1000) TYPE. Fig. 136. *Wettsteinina bupleuri*, 91943 (×1000) TYPE. Fig. 137. *Wettsteinina pachyasca*, 123572 (×1000). Fig. 138. *Wettsteinina mirabilis*, 193651 (×1000). Fig. 139. *Wettsteinina niesslii* sensu Barr, 74328(*b*) (×1000). Fig. 140. *Lophiostoma sieversiae*, 193727 (×430) TYPE. Fig. 141. *Wettsteinina douglasii*, 75177 (×1000) TYPE. Fig. 142. *Wettsteinina gigaspora*, 121289 (×430). Fig. 143. *Wettsteinina gentianae* 120266 (×1000) TYPE. Fig. 144. *Kriegeriella mediterranea*, 193928 (×1000) TYPE. Fig. 145. *Gnomonia sabalicola*, 193370 (×280) TYPE. Fig. 146. *Wettsteinina andromedae*, 70498 (×1000). Fig. 147. *Lophiostoma sieversiae*, 193727 (×1000) TYPE. Fig. 148. *Wettsteinina pachyasca*, 123648 (×280). Fig. 149. *Wettsteinina arctica*, 70502 (×430) TYPE. Fig. 150. *Wettsteinina magnifica*, 88244 (×280).

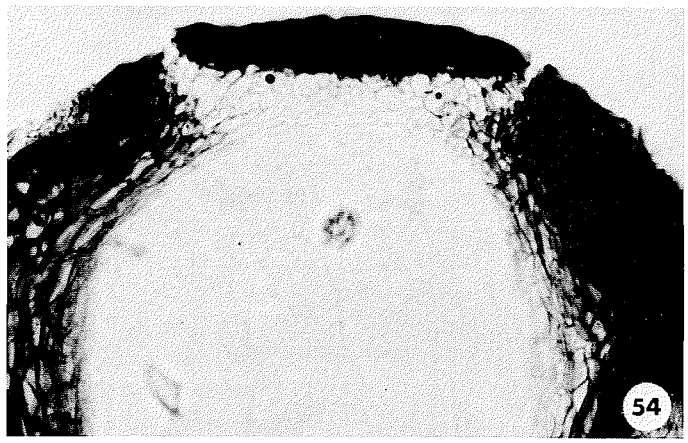


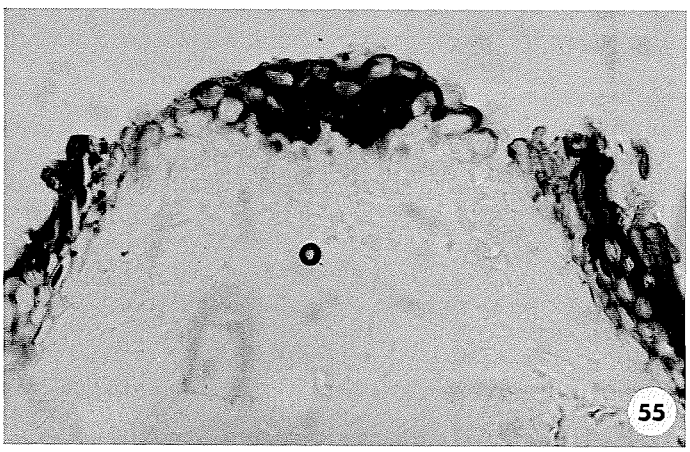


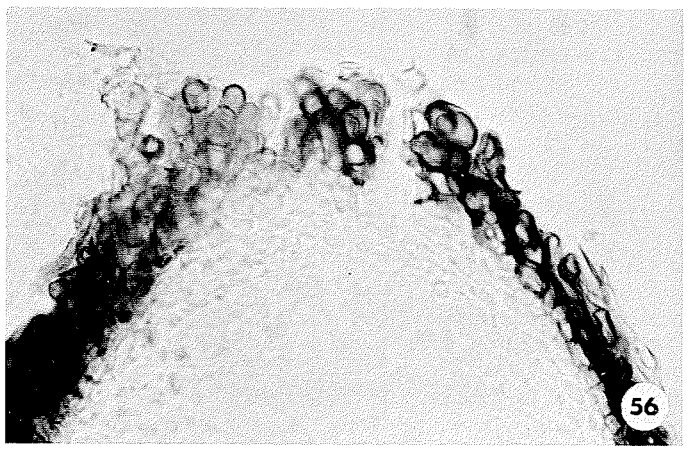


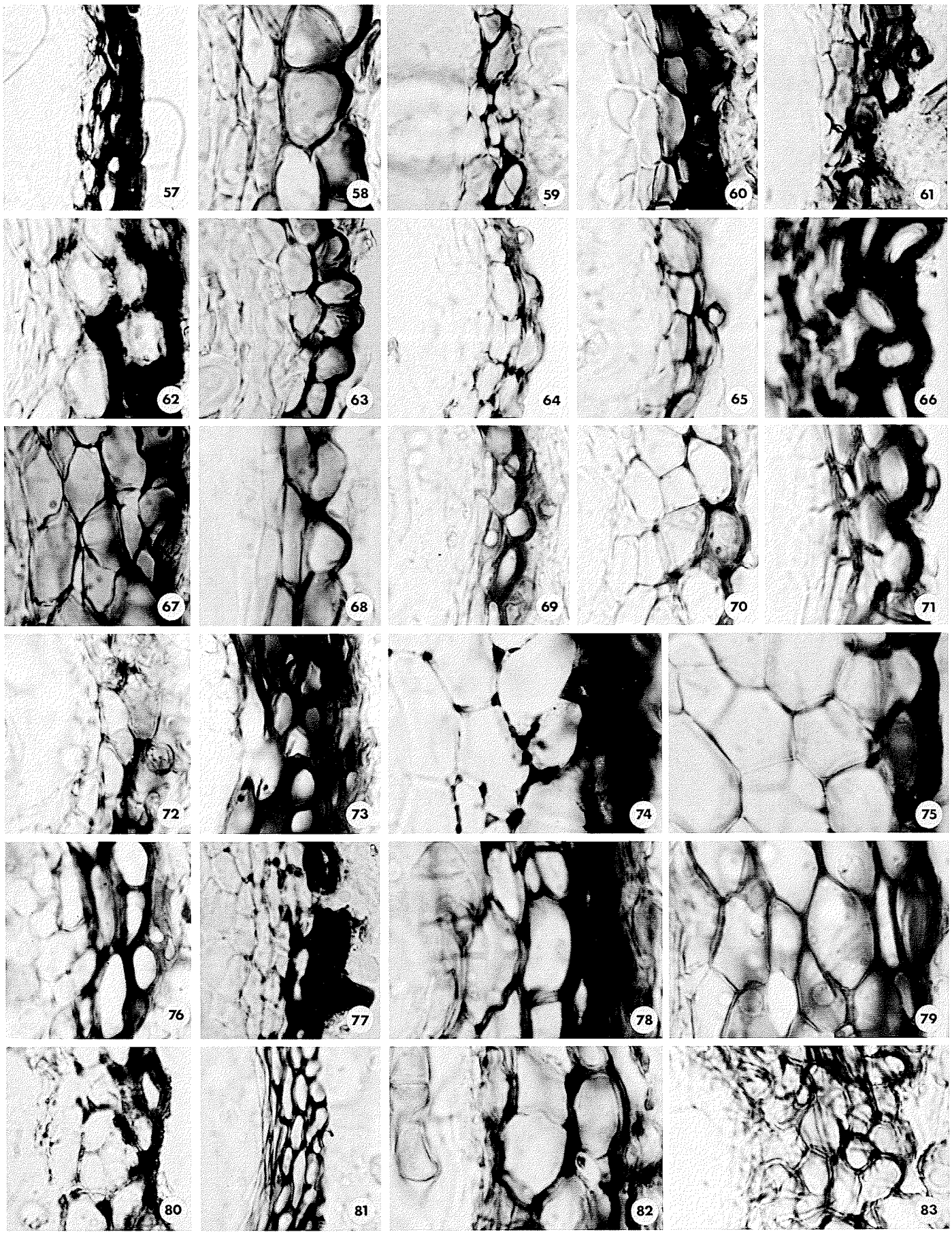


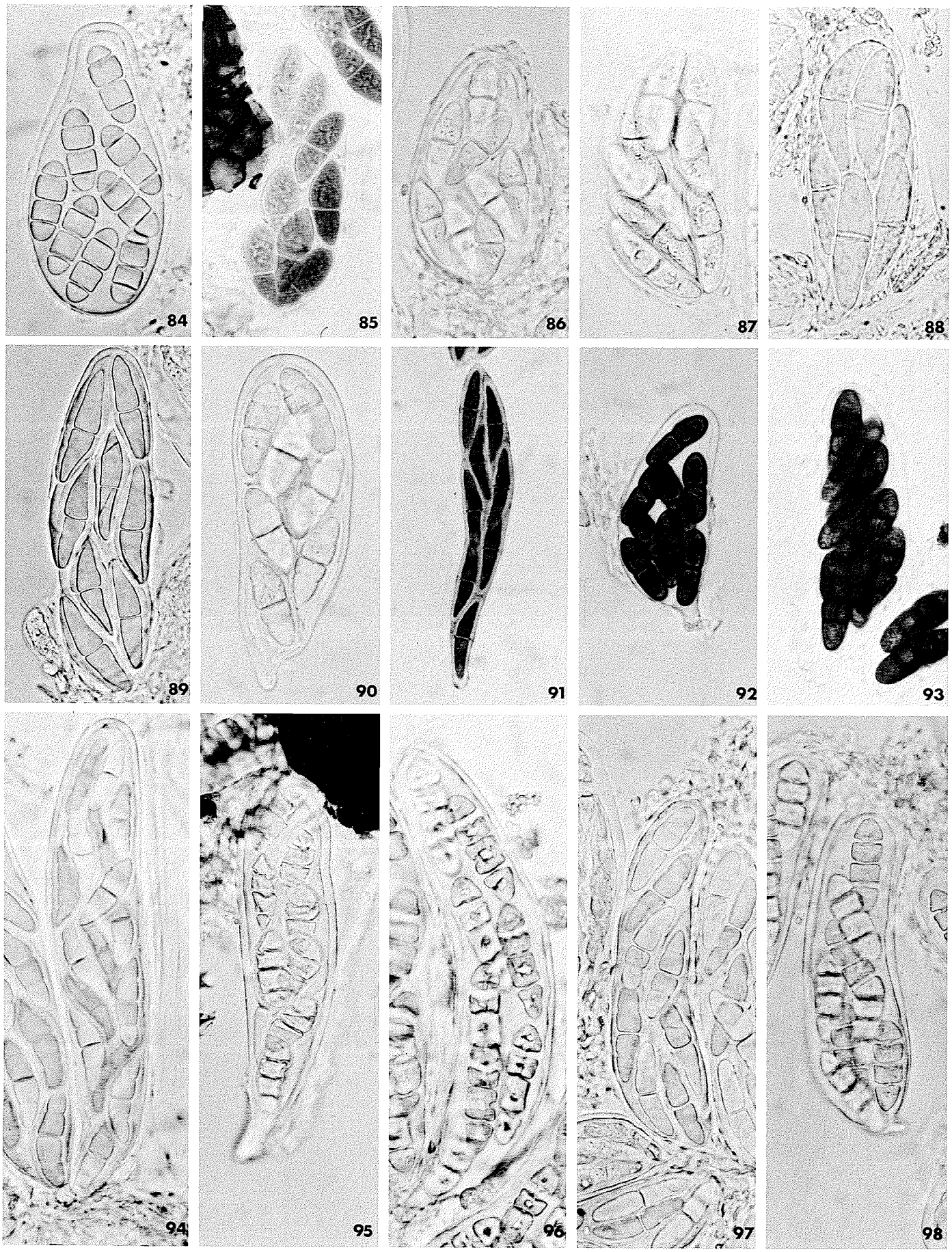


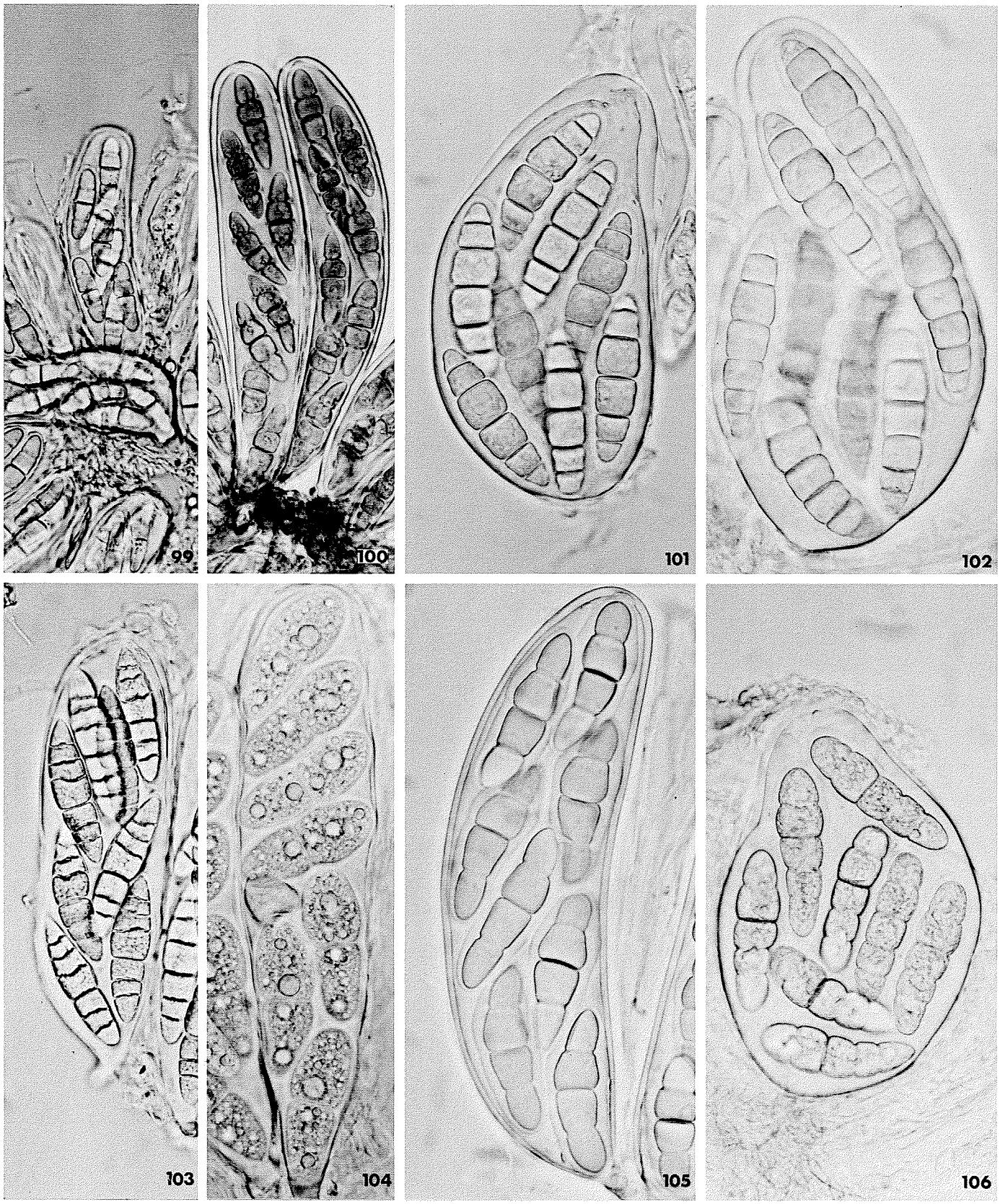


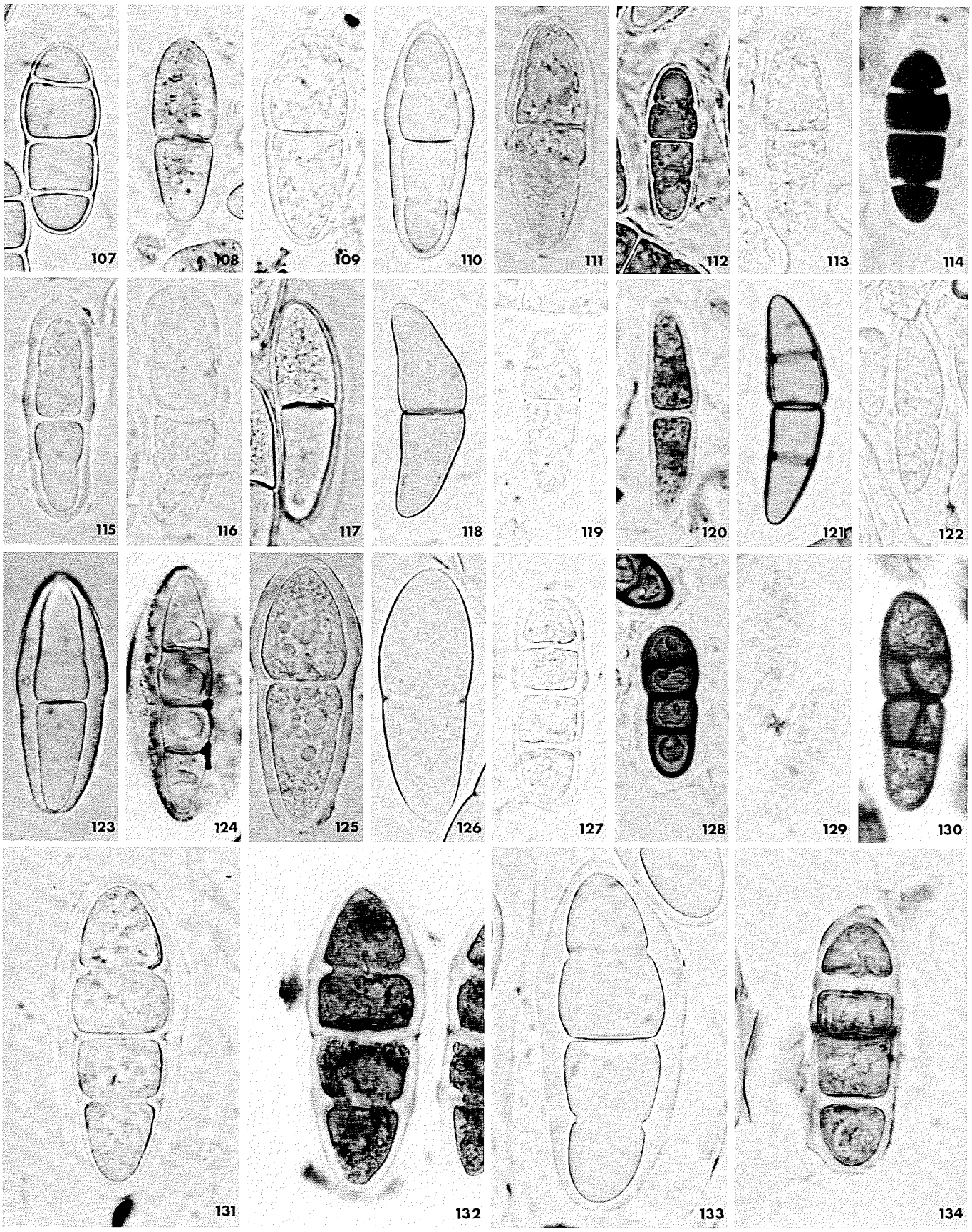


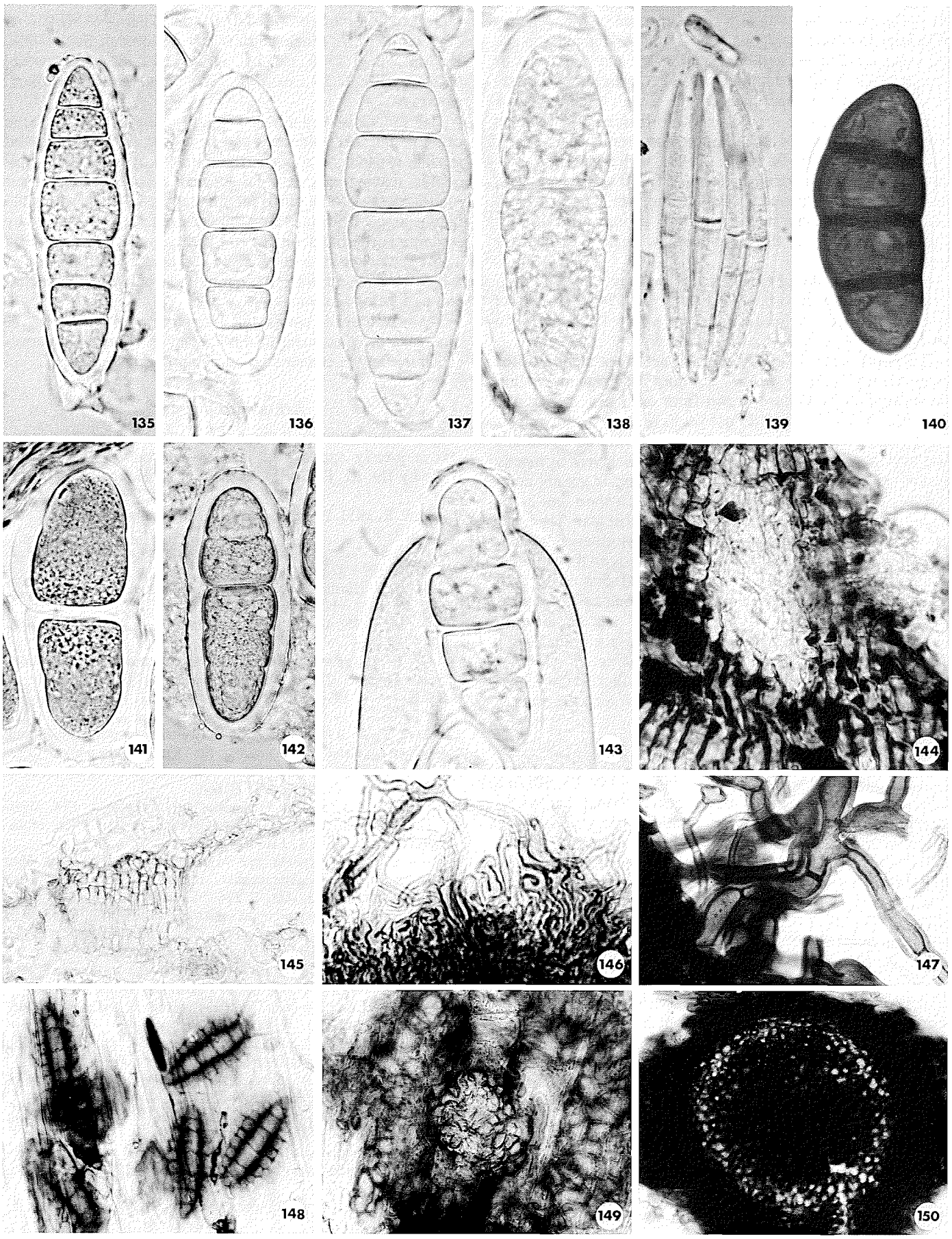












the host leaf through a circular subepidermal disclike cap 20–25 μm high, 60–80 μm wide, composed of 3 or 4 layers of hyaline to orange polygonal 8–12 × 4–6 μm cells, in age becoming compressed and dark brown, without periphyses or surface setae. Wall in longitudinal section uniform in thickness, but thinner at upper margin, 20–27 μm thick, of 4 to 6 layers of 8–2 × 4–6 μm polygonal to prismatic thin-walled brown cells. Physes none. Asci numerous, from a central base, broadly fusiform, 80–90 × 20–24 μm, with 8 fascicled ascospores. Ascospores long fusiform, 55–70 × 4.5–6 μm, straight or gently curved, 1-septate, septum complete with refractive dot at end, not constricted, supramedian (0.48), hyaline, smooth, guttulate or not, without a sheath or appendages.

HOST: *Eriophorum angustifolium* Honcheny.

COLLECTION EXAMINED: CANADA: QUE.: 74328(*b*), top of Mt. Albert, H. E. & M. E. Bigelow, 8 July 1957, ex Herb. M. E. Barr 1956, as *Wettsteinina niesslii.*

This collection is in good condition but is not a good match to the description of *W. niesslii* nor does it correspond well to the illustration by Berlese drawn from original material. We think it is undescribed but do not yet have a satisfactory genus for it. The opening is peculiar. There is a thin subepidermal disc that in young stages consists of several layers of mostly hyaline cells. When asci are mature, the disc is greatly compressed. The opening most often appears as a short tear in the epidermis transverse to the long axis of the host leaf. There is a short tear in the disc from which the ascus tips emerge. No evidence was seen that the entire disc erupts though the structure is reminiscent of a weak cap of the kind that is so well developed in *W. magnifica*. Probably the strong host epidermis prevents eruption of the disc. It is peculiar that the host epidermis is not colonized to any extent and that the entire disc is subepidermal and not even partly intraepidermal.

This species deserves a new genus. The collection on *Carex* that Barr (1961, p. 308) referred to *W. niesslii* is described as *W. candida*.

Wettsteinina yuccaegena Barr, Contrib. Univ. Mich. Herb. 9(8): 547–548. 1972 Figs. 24, 40, 83, 88, 117

Ascocarps scattered, immersed, subepidermal but partly intraepidermal, flattened above, globose below, glabrous, 300–600 μm wide, 200–400 μm high compound with 1 central walled fruit body and 6–8 peripheral locules. Central beak short, terete, 30–35 μm long, 30–35 wide, composed of 1 or 2 layers of brown rectangular 7–12 × 3–5 μm cells around a 15–20 μm diameter ostiole, not projecting beyond the upper wall but differentiated from the wall cells, without periphyses or surface setae. Wall in longitudinal section not uniform in thickness, central upper wall exposed, of vertically aligned cells, peripheral upper wall extended into large epidermal cells, lateral wall 27–33 μm thick, of 6 to 8 layers of 5–7 × 5–7 μm polygonal thin-walled brown cells. Physes few to numerous, 3–5 μm wide, septate at 8- to 12-μm intervals, with thin septa, rarely guttulate, without slime coating. Asci numerous, from a central base from each part of the compound ascoma, clavate, 90–110 μm, with 8 tetraseriate ascospores. Ascospores fusiform, straight or gently curved, 1-septate, apical cell enlarged, septum complete and slightly constricted, median (0.50), hyaline to pale yellow, later brown when exposed on plant parts, smooth or rarely rough, guttulate or not, finely granular, with a thin irregular sheath, 1–1.5 μm wide.

HOST: *Yucca glauca* Nutt.

COLLECTION EXAMINED: UNITED STATES OF AMERICA: KANSAS: 191957, Manhattan, W. A. Kellerman, Sept. 1884, N. Am. Fungi 1366, ex DAOM, as and with *Coniothyrium herbarum* Ell. & Ev., ex NY, *Wettsteinina yuccaegena* Barr, PARATYPE.

This fungus is very distinctive. It develops within the large cells of the host epidermis and below it. As the compound ascoma expands, it splits a large circular opening in the epidermis, leaving an area of fungus wall exposed. In the center of the area the ostiole of the central ascoma develops within the fungus tissue. The outer third of the large flat top is covered by epidermal cells filled with brown vertically aligned hyphae. In a ring under the area covered by the epidermis a number of ascocarps develop with a common wall between the central and peripheral ascomata.

The nature of the compound ascoma and several other featurs make the placement of this species in *Wettsteinina* unacceptable, but we cannot suggest an appropriate genus.

Acknowledgments

The help of curators at the various herbaria mentioned in the text is greatly appreciated, as are the constructive reviews made by Dr. M. P. Corlett and Dr. S. J. Hughes.

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