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Introduction

The genus *Leptosphaeria* was established by Cesati and de Notaris (1863) to include 26 species. The original description was superficial by modern standards and relied primarily on ascospore characteristics to delimit the genus. Cesati and de Notaris described ascospores as oblong or fusoid, two- to many-celled, and hyaline becoming yellow to dark brown. Because other structural features were poorly defined, a wide range of ascomycetes has been included in this genus. The 1,689 taxa described in *Leptosphaeria* (Crane and Shearer 1991) represent, according to current concepts of ascomycete classification, a mixture of Hymenoascomycetes and Loculoascomycetes. Crane and Shearer (1991) and Müller (1950) provide good reviews of the historical background of the genus *Leptosphaeria*. Holm (1957) and Shoemaker (1984a) consider a limited number of species.

A large number of intergeneric transfers of *Leptosphaeria* species have been made in the past 50 years. Five genera—*Phaeosphaeria* Miyake, *Paraphaeosphaeria* Eriksson, *Nodulosphaeria* Riess, *Entodesmium* Riess, and *Ophiobolus* Riess—have become accepted repositories for many *Leptosphaeria* species (Holm 1957; Leuchtmann 1984; Shoemaker 1976, 1984a,b). *Paraphaeosphaeria*, *Nodulosphaeria*, and *Entodesmium* are well defined by several morphological features, including ascocarp wall structure and ascospore characteristics (Shoemaker 1984b, Shoemaker and Babcock 1985). *Phaeosphaeria* is separated from *Leptosphaeria* by several morphological characters and host specialization but has itself become a very large and diverse genus (Shoemaker and Babcock 1989b). *Ophiobolus* species intergrade with long-spored species of *Leptosphaeria* (Shoemaker 1976). For a key to genera variously allied with *Leptosphaeria*, see Shoemaker (1984a) or Leuchtmann (1984).

Holm (1957) considered 62 species of *Leptosphaeria* and restricted the genus to those species most similar to the type of the genus, *Leptosphaeria doliolum* (Pers.:Fr.) Ces. & de Not. He emphasized the anatomy of the ascocarp wall and found that in most *Leptosphaeria* species the wall consisted of thick-walled cells termed scleroplectenchyma. He also emphasized the identity of the substrate and the structure of the ascocarp relative to the substrate in relegating a number of *Leptosphaeria* species to other genera. Excluded species were distributed in *Nodulosphaeria*, *Phaeosphaeria*, and *Entodesmium*. He gave considerable weight to the family of host plants in distinguishing these genera. Holm's (1957) scheme was accepted by Shoemaker (1984a) in his treatment of Canadian species of *Leptosphaeria*.

In recent years, *Leptosphaeria* has been included in various orders in the Bitunicatae or the Loculoascomycetes. Luttrell (1973) placed *Leptosphaeria* in the family Pleosporaceae of the Pleosporales. The single order Dothideales was used by von Arx and Müller (1975) for all fungi classified as Loculoascomycetes; they retained *Leptosphaeria* in the Pleosporaceae. Eriksson and Hawksworth (1986) classified the genus in the family Phaeosphaeriaceae of the Dothideales. Barr (1987a) placed *Leptosphaeria* in the family Leptosphaeriaceae of the Pleosporales. Most recently, Eriksson and Hawksworth (1990) accepted the family Leptosphaeriaceae in the order Dothideales. Barr's classification of the Ascomycota (1983, 1987a) is employed in this dissertation because of its relationship to previous classification schemes (Luttrell 1973) and its detailed explanation of the relationship of taxa. Barr's orders and families are based upon combinations of developmental and morphological characteristics that reflect the widespread diversity within the group. Barr's classification provides a key to higher taxa and is practical

for identification and for determining the placement of organisms not yet included in the scheme.

The present research reassesses the taxonomic position of species of *Leptosphaeria* described from plants in the family Rosaceae. In doing so, this work emphasizes a concept of *Leptosphaeria* based on its type species. Because discrete groups of morphologically similar species were found on related hosts (*Nodulosphaeria* on Compositae, *Phaeosphaeria* on Gramineae and *Entodesmium* on Leguminosae), a goal of the study was to determine whether a distinct group of related species could be found on Rosaceous hosts. Also, approaching the taxonomy of this large, complex genus on the basis of host family is a convenient way of dividing the large numbers of *Leptosphaeria* species into smaller, workable groups.

Fifty-five species described from Rosaceous hosts have been included in *Leptosphaeria* (see appendix). Efforts were made to locate and obtain type material for all of the described species. The names of herbaria providing material are abbreviated in this dissertation according to Index Herbariorum (Holmgren et al. 1990). When possible, type specimens were studied, supplemented by other collections, and the species were redescribed and illustrated from the type material. Unfortunately, type material could not be located for all of the species; in such cases, descriptions were based on other material only when the resulting concept of the species was obviously in accordance with the original description. From this work, it became apparent that no discrete group of related species is specialized on the Rosaceae. The species studied were determined to represent a mixture of Loculoascomycetes and Hymenoascomycetes, and non-*Leptosphaeria* species were reassigned to more appropriate genera.

Materials and Methods

Several techniques were employed to assess character states of specimens. Fungi were observed microscopically in water mounts for details of asci, ascospores, hamathecium, centrum, and ascocarp wall surface, using bright-field and Nomarski differential interference contrast. India ink was used as a negative stain to reveal ascospore sheaths. Melzer's reagent (0.5 g iodine, 1.5 g KI, 20.0 g chloral hydrate, 20.0 ml distilled water) was used to observe amyloid reactions in unitunicate asci. Semipermanent mounts were made in lactophenol, and many of the photomicrographs were made from these mounts. Micrographs were made using Kodak T Max 100 and Kodak Technical Pan film 2415 (Eastman Kodak Company, Rochester, New York). For scanning electron microscopy, dry ascocarps and substrate were used direct from the herbarium specimen, without any preparation. Specimens were viewed with an Amray 1830 scanning electron microscope.

The order of septation in ascospores is given following Shoemaker (1984a). The sequence of septation is recorded chronologically, with 1 being the first septum formed. A series of numbers separated by colons indicates the sequence in which the septa form. The first number represents the septum nearest the ascospore apex, and the last number is the septum nearest the base. Unusual or infrequent occurrences are recorded within parentheses (Shoemaker 1984a).

To observe details of ascocarp anatomy, semi-thin sections of the ascocarp were needed for light microscopy. Fixation and embedding techniques for plastic were developed to obtain good, uniform sections from dried fungal material in a relatively short period of time. The techniques for fixation and embedding are given in Huhndorf (1991).

Discussion of Characters

Semi-thin sections of ascocarps were used to assess characteristics of the ascocarp walls. Wall characteristics have proved useful in taxonomic placement of species but may have limitations in the routine identification of specimens. It may be possible to observe this feature with hand sections or frozen microtome sections, as done by Shoemaker (1984a). Ascocarp walls of cells radiating in surface view (textura prismatica) and thick-walled cells (scleroplectenchyma) are good indicators within *Leptosphaeria* of alliance with *L. doliolum*. Wall cells in surface view are seen easily from crush mounts. Semi-thin sections and scanning electron microscopy give a good indication of the relationship of the ascocarp to the substrate. This character has also proved

important in delimiting *Leptosphaeria*; included species have ascocarps that are superficial or that become superficial. Semi-thin sections also show ostiole structure, a characteristic that is important in related genera such as *Nodulosphaeria*.

Ascospore characters, in combination with other characters, are useful for placement of species. *Leptosphaeria* species have more or less fusiform, three- to multi-septate ascospores with some pigmentation. These character states are continuous rather than discrete, and in practice, divisions are made in a somewhat arbitrary manner. Also, ascospore pigmentation varies within a species and may reflect age, environmental influences, and/or substrate. Ascospore wall ornamentation often is difficult to assess, especially when using type material, which frequently is old and in poor condition. In addition, type material is usually of uniform developmental stage and frequently is sparse and depleted by the activities of previous researchers. Ascospore wall ornamentation is difficult to assess with the light microscope because of the limits of resolution, except in cases for which there may be unusually distinctive surface ornamentation. Using the scanning electron microscope to resolve surface features requires sufficient material of an appropriate developmental stage, with the ascospores released from the asci and with surface detail not obscured by sheaths or mucilaginous material. Unfortunately, this situation does not usually exist in type material. In recent collections with different developmental stages it is easier to view ascospore wall ornamentation. Although the taxonomic significance of this character is unclear at this time, largely because of the difficulties involved in studying it, further studies would be useful.

The importance of host specificity or substrate preference in delimiting species or genera needs further clarification. Whether substrate preference does occur and can be used as a taxonomic character can be demonstrated only by extensive collection and comparison of species from a variety of substrates, by comparative study of the morphology of pure cultures of species obtained from a variety of substrates and grown under identical environmental conditions, and by determining experimentally the range of substrates on which isolates of species will grow and reproduce.

The structure of the interascal filaments, part of what Eriksson (1981) termed the hamathecium, plays an important role in distinguishing members of the Melanommatales from those in the Pleosporales according to Barr's (1987a) classification. Only one member of the Melanommatales was found in this group of species, and the diagnostically important trabeculate pseudoparaphyses were difficult to recognize. It was placed in that group because of a combination of other characters. The distinction between cellular pseudoparaphyses (filaments that appear septate at 450x magnification and branch and anastomose) and trabeculate pseudoparaphyses (thin filaments that do not appear septate at 450x magnification and branch and anastomose) seems to be clear only in certain cases; the pseudoparaphyses often appear as continuous, rather than discrete, character states. Trabeculate pseudoparaphyses can be mistaken for cellular ones if septa appear regularly and anastomoses are sparse.

Ascus morphology, emphasized by Eriksson (1981), was not employed in this study because of the difficulty in observing modes of ascus dehiscence and details of ascus wall layers in type and other herbarium specimens. Also, in most cases, the use of stains to enhance ascus wall layers gave virtually no results.

Leptosphaeria Species Referable to the Pleosporales

All of the species in this chapter belong in the Pleosporales (*sensu* Barr 1987a) and share a combination of character states, any one of which may deviate somewhat for a particular taxon. These characters include cellular pseudoparaphyses, asci in a basal layer, a peridium that is usually pseudoparenchymatous, and bipolarly asymmetrical ascospores. The families included within the order are the Leptosphaeriaceae, Phaeosphaeriaceae, and Lophiostomataceae.

Leptosphaeriaceae

The Leptosphaeriaceae as defined by Barr (1987a) include five genera united by the characters of coelomycetous anamorphs, asci that are narrower and thinner-walled than in the Pleosporaceae, and ascocarp walls that consist of relatively large, thick-walled or sclerenchymatous cells. The only genus in the family treated here is *Leptosphaeria*.

Leptosphaeria V. Cesati & G. de Notaris, Commentario della Societa Crittogamologica Italiana, Milan 1:234. 1863. Nomen conservandum.

Lectotype: *Sphaeria doliolum* C.H. Persoon: E.M. Fries.

Ascocarps scattered or clustered, superficial or immersed beneath epidermis, becoming superficial as epidermis is shed, conic globose, subglobose or depressed, glabrous, papillate. **Ascocarp wall** often of radiating textura prismatica in surface view; in longitudinal section usually more than three cells thick, composed of scleroplectenchyma, often with an external crust. **Papilla** central, short, sometimes longer and beaklike, without hyaline periphyses. **Pseudoparaphyses** broad or narrow, septate, anastomosing, with or without guttules, septal thickenings, and gelatinous coating. **Asci** bitunicate, numerous in a broad basal hymenium, cylindrical to clavate, short-stalked, 8-spored in most, with spores often biseriate or overlapping uniseriate. **Ascospores** fusiform, clavate, 3 or more septate, primary septum often median and often constricted, some shade of yellow or brown, appendages or sheath may or may not be present. **Anamorphs** coelomycetous where known (see Crane and Shearer 1991).

The concept of *Leptosphaeria* accepted here is essentially that of Holm (1957), later adopted by Shoemaker (1984a) with some modification. The lectotypification of *L. doliolum* (Shearer et al. 1990) represents a basis for circumscribing the genus. More emphasis is placed on scleroplectenchyma found in the ascocarp walls than is considered important by Shoemaker (1984a). As Shoemaker (1984a) noted, thin sections are essential to show this thick-walled cell structure in which the lumen of the cells is very small. Emphasis is also placed on the wall tissue arrangements in surface view, described using the textura types of Korf (1958). Species having a tissue arrangement similar to that of *L. doliolum*, of cells radiating in surface view (textura prismatica), are regarded as most typical, but species without this character state are not necessarily excluded. The position of the ascocarp relative to the substrate is very important, with included species having either superficial ascocarps or ascocarps immersed beneath the epidermis and becoming superficial as the epidermis is shed. Because only type or herbarium specimens were studied, anamorphs were not considered because cultures could not be made from this dead material.

Examination of 28 purported species of *Leptosphaeria* from the Rosaceae revealed five species that fit the adopted generic concept. The excluded species are treated following these five species.

Key to species of *Leptosphaeria* on the Rosaceae

1a. Ascocarp wall cells radiate 2
1b. Ascocarp wall cells randomly oriented 4
2a. Ascocarp superficial or immersed becoming superficial, ascospores mature inside centrum 3
2b. Ascocarp immersed beneath host cuticle, ascospores mostly maturing on substrate surface ..... *L. umbrosa*
3a. Neck papillate, short conic, ascospores narrowly fusiform, 22–28 x 4–5 µm ..... *L. doliolum*
3b. Neck cylindrical, beaklike, ascospores broadly fusiform, 17–20 x 5–8 µm ..... *L. praetermissa*
4a. Ascocarp immersed-subepidermal, wall pseudoparenchyma, or partly scleroplectenchyma, on leaves of *Cercocarpus* (provisionally retained within *Leptosphaeria*) ..... *L. cercocarpi*
4b. Ascocarp erumpent to superficial, wall scleroplectenchyma, on *Dryas* ..... *L. dryadophila*

•*Leptosphaeria doliolum* (C.H. Persoon:E.M. Fries) V. Cesati & G. de Notaris, Commentario della Societa Crittogamologica Italiana, Milan 1:234–235. 1863. See Figure 1.

≡ *Sphaeria doliolum* C.H. Persoon:E.M. Fries, Icones et Descriptiones Fungorum Minus Cognitorum, p. 39. 1800; E.M. Fries, Systema Mycologicum Sistens Fungorum 2:509. 1823.

= *Leptosphaeria rustica* P.A. Karsten, Fungi Fenniae Exsiccati, Century 10, No. 964. Anno 1870.

≡ *Metasphaeria rustica* (P.A. Karsten) P.A. Saccardo, Sylloge Fungorum Omnium Hucusque Cognitorum Digessit P.A. Saccardo 2:157. 1883.

Ascocarps scattered, sparse, immersed-subcuticular to erumpent, papillate, glabrous to tomentose at base, globose, flattened at base, 300–325 µm diameter, 250–300 µm high. **Ascocarp wall** of textura prismatica in surface view, composed of cells radiating from apex outward; in longitudinal section 45–55 µm thick at sides, 20–27 µm thick at base, composed of 12–15 layers of hyaline, polygonal, isodiametric, scleroplectenchymatic cells (3.6–6.5 µm diameter), outer 2–3 layers somewhat brown-melanized, with an external brown-melanized crust. **Papilla** broadly rounded, not fully formed, 130–135 µm high, 70–75 µm wide; wall 40–50 µm thick, composed of 15–20 layers of small, brown-melanized, thick-walled, polygonal, isodiametric cells (2.5–6.5 µm diameter), outer layers heavily brown-melanized, inner layers hyaline, surrounding a 20–25 µm wide immature circular ostiole formed from small hyaline cells, without periphyses. **Pseudoparaphyses** 1.0–2.0 µm wide, 150–175 µm long (height of the ascocarp cavity), numerous, narrowly cellular, with guttule-like thickenings at septa, without gelatinous coating. **Asci** 90–125 x 5–9 µm, numerous, basal, cylindrical-clavate, with 8 overlapping uniseriate ascospores. **Ascospores** 22–28 x 4–5 µm, narrowly fusiform, with acute end cell shape, second cell slightly enlarged, straight to slightly curved, 3-septate, septa evenly distributed, order of septation 2:1:2, primary septum median and slightly constricted; light brown, guttulate, without appendages, surrounded by gelatinous material.

Lectotype: As *Sphaeria doliolum* Pers., 910.270-650 (L).

Exsiccatae: Finland: Tammela, on *Spireae ulmaria* L. (=*Filipendula ulmaria* Maxim.), Sept., Fungi Fenniae Exsiccati, Century 10, No. 964 (isotype of *L. rustica*, H, FH).

Comments: The collections of *L. rustica*, on stems of *Spiraea ulmaria* L. in both of the exsiccatae sets, were immature. No ascospores were found, and asci were only beginning to form. Karsten (1873) describes the ascospores as elongate-fusoid, subhyaline, uniseptate with several guttules in each cell, and 30–36 x 5–6 µm in size. He probably described immature spores. This information—along with the

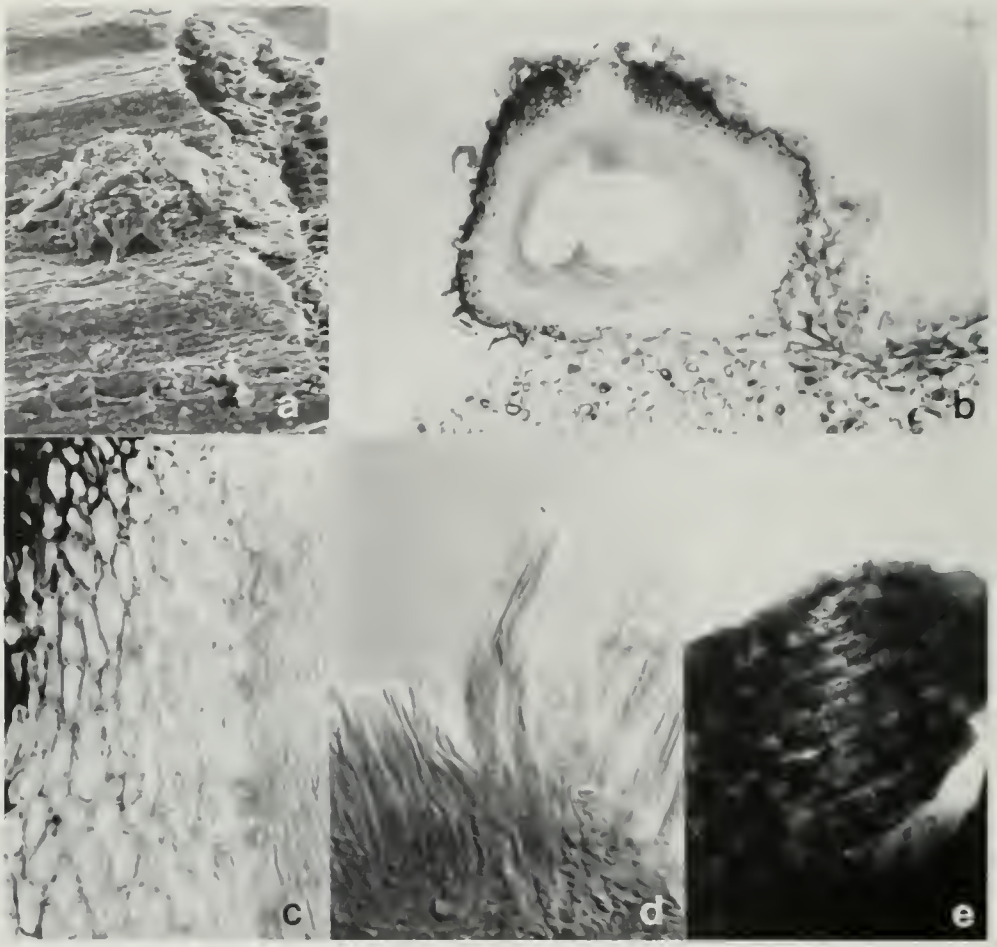

Figure 1. *Leptosphaeria doliolum*. a. SEM of erumpent ascocarp. x125. b. longitudinal median section through ascocarp, x150. c. longitudinal, median section through ascocarp wall. x950. d. ascus, x525. e. ascocarp wall surface with radiating cells, x550. All from isotype of *L. rustica*.

radiating wall cells in surface view, the scleroplectenchymatic wall cells in section, and the location of the ascocarp relative to the substrate—is consistent with the character of *L. doliolum*, the type of the genus. *Leptosphaeria doliolum* is found on many dead herbaceous stems, although not previously described from *Spiraea*.

•*Leptosphaeria dryadophila* S.M. Huhndorf nom. nov. See Figure 2.

Etymology: Gr. philos = having affinity for.

≡ *Melanomma dryadis* C.J. Johanson in Rabenhorst, Fungi europaei no. 3659 (1890). (Basionym).

= *Leptosphaeria dryadis* E. Rostrup, Botanisk Tidsskrift 25:305. 1903.

Ascocarps clustered, erumpent to superficial, papillate, glabrous to slightly tomentose toward base, tomentum of dark brown hyphae, conic-globose, 150–250 µm diameter, 180–275 µm high. **Ascocarp wall** of textura angularis in surface view; in longitudinal section uniformly 12–20 µm thick (up to 27 µm thick near apex), composed of 4–5 layers of polygonal, isodiametric to slightly elongate, scleroplectenchymatic cells, outer 2–3 layers composed of brown-melanized cells (3.5–4.3 x 5.5–6.8 µm), inner 2–3 layers composed of hyaline, compressed cells (2.1–3.5 x 10.0–12.3 µm). **Papilla** conical, 60–65 µm high, 25–50 µm wide at the apex, 90–110 µm wide at the base, composed of 7–9 layers of isodiametric cells (2.8–3.6 µm diameter), wall 10–12 µm thick surrounding a 35–45 µm wide ostiole without

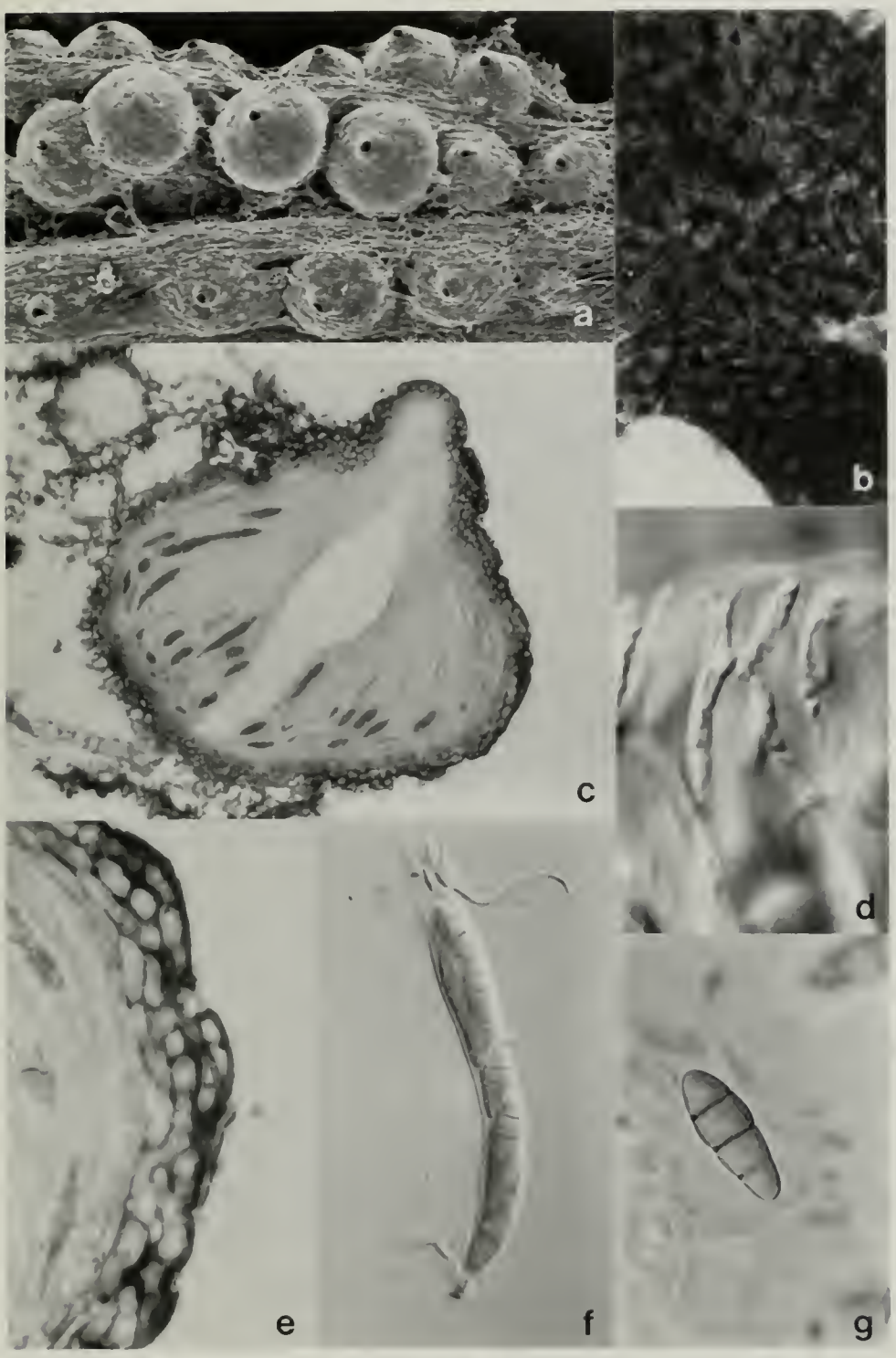

Figure 2. *Leptosphaeria dryadophila*. a. SEM of crumpent ascocarps, x50. b. ascocarp wall surface, x550. c. longitudinal median section through ascocarp, x250. d. cellular pseudoparaphyses, x2,000. e. longitudinal median section through ascocarp wall, x950. f. ascus, x500. g. ascospore, x1,150. a, c, e, and f from holotype of *L. dryadis*; b, d, and g from isotype of *L. dryadophila*.

periphyses. **Pseudoparaphyses** 0.7–3.0 µm wide, 110–175 µm long (height of the ascocarp cavity), numerous, narrowly cellular, with gelatinous coating. **Asci** (72–)90–118 x 10.8–13.6 µm, numerous, basal to slightly lateral, cylindrical, thin-walled but with a thickened rounded apex, short-stalked, with 8 biseriate ascospores. **Ascospores** 20.1–24.5 x 5.7–7.2 µm, fusiform to slightly clavate, with acute end-cell shape, slightly curved; 3(-4-5)-septate, septa evenly distributed, order of septation 2:1:2(:3:4), without constrictions; pale brownish yellow, with ornamented wall, without sheath or appendages.

Isotype: SWEDEN: Jamtland, Renfjallet, c. 900m, in fructibus et calycibus emortuis *Dryadis octopetalae* L. 13, Juli 1884, leg. C.J. Johanson, Rabenhorst, Fungi europaei no. 3659 (1890) (FH, NY).

Exsiccatae: SWEDEN: Jamtland, Renfjallet, 13. Juli 1884, leg. C.J. Johanson, Vgr., Micr. rar. sel. 105 (FH).

Other material examined: ICELAND: Sponsgerdi, on *Dryas octopetala*, Juli 12, 1901, O. Davidson (type of *Leptosphaeria dryadis*, C).

Comments: This fungus was originally described in *Melanomma* and was retained with some reservation in that genus by Holm (1957, 1979), who stated, "The species is hardly a *Melanomma* but its true affinities are doubtful to me." *Melanomma dryadis* differs from the current concept of *Melanomma* (Barr 1987a) in not having asci that arise peripherally within the centrum and not having trabeculate pseudoparaphyses. Barr (1982) erected the genus *Bricookea* for a biologically similar species, *Bricookea sepalorum* (Vleugal) Barr, which is found on the inflorescences of *Juncus* species. *Melanomma dryadis* differs from this fungus in several respects: cells of the ascocarp wall are scleroplectenchymatous, not pseudoparenchymatous; the ascocarp apex opens by a pore, not by a slit; and the ascospores are not hyaline. *Melanomma dryadis*, occurring in and on the dead flowers and fruits of *Dryas octopetala*, is a true *Leptosphaeria*, having the characteristics of an erumpent to superficial ascocarp with a wall of scleroplectenchymatous cells and 3-septate yellow-brown ascospores. It does not, however, show the radiating arrangement of cells of the ascocarp surface characteristic of *L. doliolum*. Because the epithet *dryadis* is pre-empted in *Leptosphaeria* by *L. dryadis* Rostrup, a new name, *Leptosphaeria dryadophila* is proposed for *Melanomma dryadis* Johanson.

•*Leptosphaeria praetermissa* (P.A. Karsten) P.A. Saccardo, Sylloge Fungorum Omnium Hucusque Cognitorum Digessit P.A. Saccardo 2:26. 1883. See Figure 3.

≡ *Sphaeria praetermissa* P.A. Karsten, Fungi Fenniae Exsiccati, Century 9, No. 852. Anno 1869.

Ascocarps clustered, sparse, immersed-subepidermal becoming erumpent, papillate, glabrous to tomentose at base, globose, flattened at base, 350–625 µm diameter, 300–500 µm high. **Ascocarp wall** of textura prismatica in surface view, composed of cells radiating from apex outward; in longitudinal section uniformly 32–58 µm thick at sides and base, composed of 7–8 layers of hyaline, polygonal, isodiametric, scleroplectenchymatic cells (5.7–13.6 x 3.6–7.2 µm), inner 2–3 layers somewhat elongate and compressed, with an external brown-melanized crust. **Papilla** beaklike, cylindrical, erumpent, 120–180 µm high, 75–135 µm wide; wall 25–36 µm thick, composed of 5–6 layers of small, brown-melanized, thick-walled, polygonal, isodiametric cells (4.3–7.2 µm diameter), surrounding a 35–80 µm wide circular ostiole formed from small hyaline cells, without periphyses. **Pseudoparaphyses** 1.0–2.0 µm wide, 180–260 µm long (height of the ascocarp cavity), numerous, narrowly cellular, without gelatinous coating. **Asci** 100–130(–150) x 7–13 µm, numerous, basal, cylindrical, thin-walled, short-stalked, rounded apex with apical chamber present, with 8 biseriate ascospores. **Ascospores** 17–20(–25) x 5.5–8.0 µm, broadly fusiform, end cells acute to rounded, straight to slightly curved; 3-septate, septa evenly distributed, order of septation 2:1:3 or 2:1:2, primary septum median, with constrictions at all septa, second cell occasionally enlarged (wider); brownish-yellow, smooth, without sheath or appendages.

Isotype: FINLAND: In caulibus emortuis *Rubi odorati* et *R. idaei* in par. Tammela sat fre-

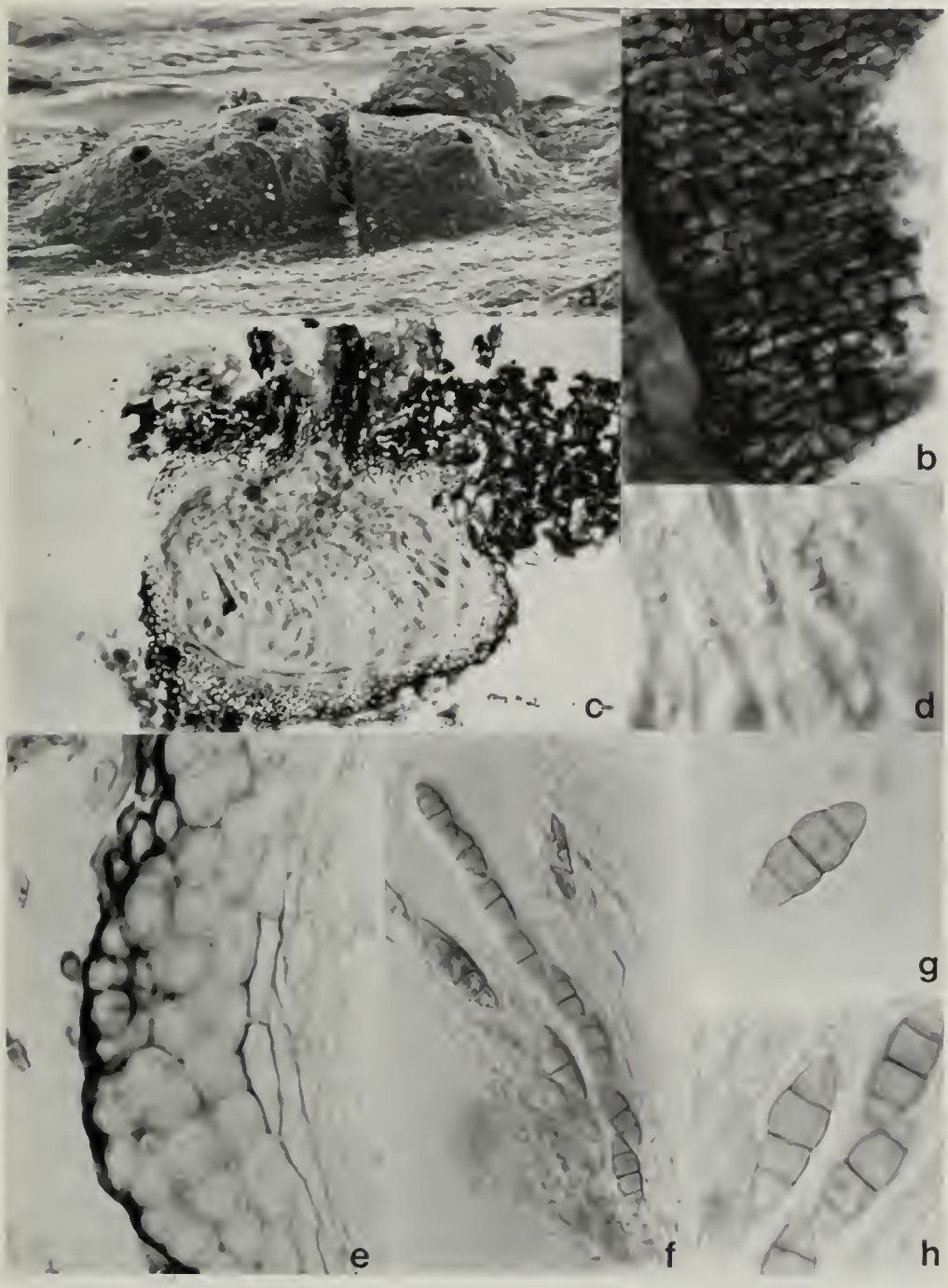

Figure 3. *Leptosphaeria praetermissa*. a. SEM of erumpent ascocarps, x65. b. ascocarp wall surface with radiating cells, x550. c. longitudinal median section through ascocarp, x150. d. cellular pseudoparaphyses, x2,000. e. longitudinal median section through ascocarp wall, x950. f. ascus, x525. g, h. ascospores, x1,150. All from isotype of *L. praetermissa*.

quenter per annum obvia. Fungi Fenniae Exsiccati, Century 9, No. 852 (H, FH).

Other material examined: CANADA: Quebec: Gatineau Provincial Park, Chemin Ridge Road, on *Rubus odoratus*, 20 Jun. 1987, C.T. Rogerson (NY); SWEDEN: Jemtland: Five collections, all on *Rubus ideaus*, Leg. A.G. Eliasson, 20 May 1930, 27 Jun. 1930, 17 Jun. 1931, 19 Jun. 1931, 28 Jul. 1931 (S); Umea, Apr. 1908, J. Vleugel (S).

Comments: *Leptosphaeria praetermissa* warrants inclusion in the genus because of its large erumpent ascocarp with a wall composed of scleroplectenchymatous cells. As in *L. doliolum*, the wall has an external crust, and the cells form a radiating pattern in surface view. It differs from *L. doliolum* in having a rather long, cylindrical neck that grows through the host epidermis before the ascocarp becomes erumpent. This species seems to be found predominantly in Europe but is probably not common there. It was not encountered in any collections of *Rubus* sp. in the United States but was found in one collection from Canada.

•*Leptosphaeria umbrosa* G. Niessl *in* G.L. Rabenhorst, Fungi Europaei Exsiccati, Klotschii Herbarii vivi Mycologici Continuatio, Edition 3 (Edita Nova), Series 2, Century 20, No. 1934. Anno 1875; Just's Botanisch Jahresberichte 3:262. 1887. See Figure 4.

≡ *Massaria umbrosa* (G. Niessl) H. Rehm *in* P.A. Saccardo, Sylloge Fungorum Omnium Hucusque Cognitorum Digessit P.A. Saccardo 9:761. 1891.

Ascocarps scattered, immersed-subcuticular, papillate, glabrous, globose, flattened at base, 150–300 µm diameter, 90–200 µm high. **Ascocarp wall** of textura prismatica in surface view, composed of cells radiating from apex outward; in longitudinal section 4–6 µm thick at the base, composed of thin, hyaline, compressed cells, 10.8–22 µm thick at the sides, composed of 5–6 layers of polygonal, scleroplectenchymatic cells, outer 2–3 layers of isodiametric to slightly elongate, brown-melanized cells (3.5 x 7–10 µm) surrounded by a brown-melanized crust, inner 2–3 layers of hyaline, elongate-compressed cells (2–3 x 10–18 µm). **Papilla** bluntly conical, (18–)25–54 µm high, 36–56 µm wide at the apex, 60–70 µm wide at the base, composed of 5–6 layers of small, isodiametric, heavily brown-melanized, thick-walled cells (2–3.6 µm diameter), wall 14.4–22 µm thick surrounding a 25–45 µm wide ostiole without periphyses. **Pseudoparaphyses** 0.7–2.0 µm wide, 80–110 µm long (height of the ascocarp cavity), numerous, narrowly cellular, with guttule-like thickenings at septa, without gelatinous coating. **Asci** (72–)80–100(–117) x 10.8–15.0 µm, numerous, basal, cylindrical-clavate, thick-walled, rounded apex with apical chamber, short-stalked, with 8 tri- to biseriate ascospores, most commonly immature. **Ascospores** 27.3–33.0 x 4.3–7.2 µm, hyaline to subhyaline when immature, 28–37.4 x 5.7–9.3 µm, pale brown when mature, narrowly fusiform, with acute end-cell shape, slightly curved; 4-septate, septa unevenly distributed, order of septation 2:1:2:3, primary septum supramedian and slightly constricted, second cell slightly enlarged at maturity, slightly roughened wall, continuous sheath (0.7–1.5 µm thick) surrounding immature spore, without appendages.

Holotype: AUSTRIA: An *Spiraea Aruncus* [=*Aruncus dioicus* (Walt.) Fern.] bei Voitsberg in Steiermark. Septbr. 1874 (M).

Exsiccatae: AUSTRIA: Voitsberg, Steiermark, Septbr., G. v. Niessl, Rabenhorst, F. europaei exs. 1934 (FH, NY isotypes); Voitsberg, Steiermark, Aug. 1882, G. v. Niessl, Rehm, Ascomyceten 690 (FH, NY authentic material); Voitsberg, Steiermark, G. v. Niessl, Weese, Eumycetes sel. exs. 638 (FH).

Other material examined: GERMANY: Frauenfeld, on Solidago, October (NY).

Comments: *Leptosphaeria umbrosa* is interesting because initially it seems to resemble members of the Phaeosphaeriaceae having small, pseudoparenchymatic-walled, subcuticular ascocarps that lift the host cuticle on maturity. Upon closer examination, it reveals the characteristic features of *Leptosphaeria* such as ascocarp walls composed of scleroplectenchyma surrounded by an external brown crust and wall cells that radiate in surface view. Other distinctive characteristics that may aid in the identification of this species are the wide pseudoparaphyses with prominant thickenings at the septa and mature

Figure 4. *Leptosphaeria umbrosa*. a. SEM of immersed ascocarps, x150. b. ascocarp wall surface with radiating cells, x550. c. longitudinal median section through ascocarp, x200. d. cellular pseudoparaphyses with thickenings at septa, x2,000. e. longitudinal median section through ascocarp wall, x950. f. ascus with immature ascospores, x525. g. ascus with mature ascospores, x525. h. immature ascospore, x1,150. i. mature ascospore from substrate surface, x1,150. All from holotype of *L. umbrosa*.

brown ascospores that are often seen only on the surface of the substrate surrounding the ascocarp. Also diagnostic are the thin ascocarp bases often left behind on the substrate when ascocarps are removed from the substrate surface.

•*Leptosphaeria cercocarpi* H. Sydow & P. Sydow, Annales Mycologici 5:339. 1907. See Figure 5.

Ascocarps clustered, abundant, immersed-subepidermal, with surrounding stroma extending into substrate, papillate, glabrous, globose, 175–240 µm diameter, 175–240 µm high. **Ascocarp wall** of textura angularis-globulosa in surface view; in longitudinal section 22–31 µm thick at sides and base, up to 50 µm thick near apex, composed of 6–8 layers of polygonal, isodiametric-elongate, pseudoparenchymatic cells [3.6–7.2 x 5.4–12.6(–16) µm], outer 2–4 layers of brown-melanized cells at sides and base, inner 4–5 layers of hyaline-compressed cells at base. **Papilla** very short, erumpent, rounded-conical, 31–45 µm high, 62–93 µm wide, wall 25–30 µm thick, composed of 8–10 layers of small, isodiametric, scleroplectenchymatic cells (2.0–7.2 µm diameter), outer 5–6 layers brown-melanized, inner 3–4 layers hyaline, surrounding a 30–40 µm wide circular ostiole without periphyses. **Pseudoparaphyses** 1.0–2.0 µm wide, 125–200 µm long (height of the ascocarp cavity), numerous, narrowly cellular, with gelatinous coating. **Asci** 95–120 x 17–21 µm, numerous, basal, cylindrical-oblong, thick-walled, short-stalked, rounded apex, with 8 biseriate ascospores. **Ascospores** (25–)27–31(–33) x 8.5–11.5 µm, broadly fusiform to slightly clavate, end cells rounded, straight to slightly curved, 3-septate, septa evenly distributed, order of septation 2:1:2, primary septum median, slight constrictions at all septa, brown, ornamented walls, without sheath or appendages.

Holotype: United States: In foliis emortuis *Cercocarpi ledifolii*, Mill Creek Canyon, Salt Lake Co., Utah Americae bor. leg. A.O. Garrett no. 677 (S).

Other material examined: United States: Utah: Box Elder Co., One Mile Creek, north side of Raft River Mts., Aug. 25, 1986; Juab Co., 5.2 mi up Granite Creek Canyon, east side of Deep Creek Mts, Aug. 26, 1986; Rich Co., Sunrise Campground, Cache National Forest, Route 89, west of Garden City, July 13, 1985; Weber Co., Malans Peak, Aug. 11, 1972; Weber Co., south slope of Malans Peak, Wasatch Mts., east of Ogden, July 1, 1976; Weber Co., mouth of Taylor's Canyon, Wasatch Mts., east of Ogden, May 18, 1972, Apr. 29, 1981, May 6, 1982, all on *Cercocarpus ledifolius* Torrey in Torrey & Gray var. *intermontanus* (Brittonia 39:424. 1987), all C.T. Rogerson (all NY).

Comments: *Leptosphaeria cercocarpi* is an easily recognized species on *Cercocarpus ledifolius*. The ascocarps usually entirely cover both surfaces of dead leaves. Retaining this species in *Leptosphaeria* is not totally satisfactory, but placing it elsewhere is also problematic. Certain characteristics resemble those found in the Phaeosphaeriaceae (*sensu* Barr 1987a). The ascocarps are small-medium sized and immersed in the substrate, and there appears to be some kind of hyphal growth or stroma surrounding the ascocarps and extending into the substrate. Other characteristics do not coincide with inclusion in that group. Although the lateral walls of the ascocarp of *L. cercocarpi* consist of pseudoparenchymatous cells, they are not thin and soft as is characteristic of the Phaeosphaeriaceae. In fact, the walls in the upper regions of the ascocarp consist of thick-walled scleroplectenchymatous cells. In Barr's (1987a) key to this family, the only two genera in which this fungus could be placed are *Phaeosphaeria* and *Kalmusia*. The ascocarps are not small and delicate enough for inclusion within *Phaeosphaeria*, and the current concept includes only species on monocots (Shoemaker and Babcock 1989b) (but see also the discussions for *P. pomona* and *P. lucilla* herein). The current concept of *Kalmusia*, which includes *K. clivensis* (see discussion herein), does not adequately accommodate *L. cercocarpi*. Therefore, unlike other leaf-inhabiting species of *Leptosphaeria* belonging elsewhere (i.e., Phaeosphaeriaceae), this species is retained within *Leptosphaeria* because of the larger, robust nature of the ascocarp and wall.

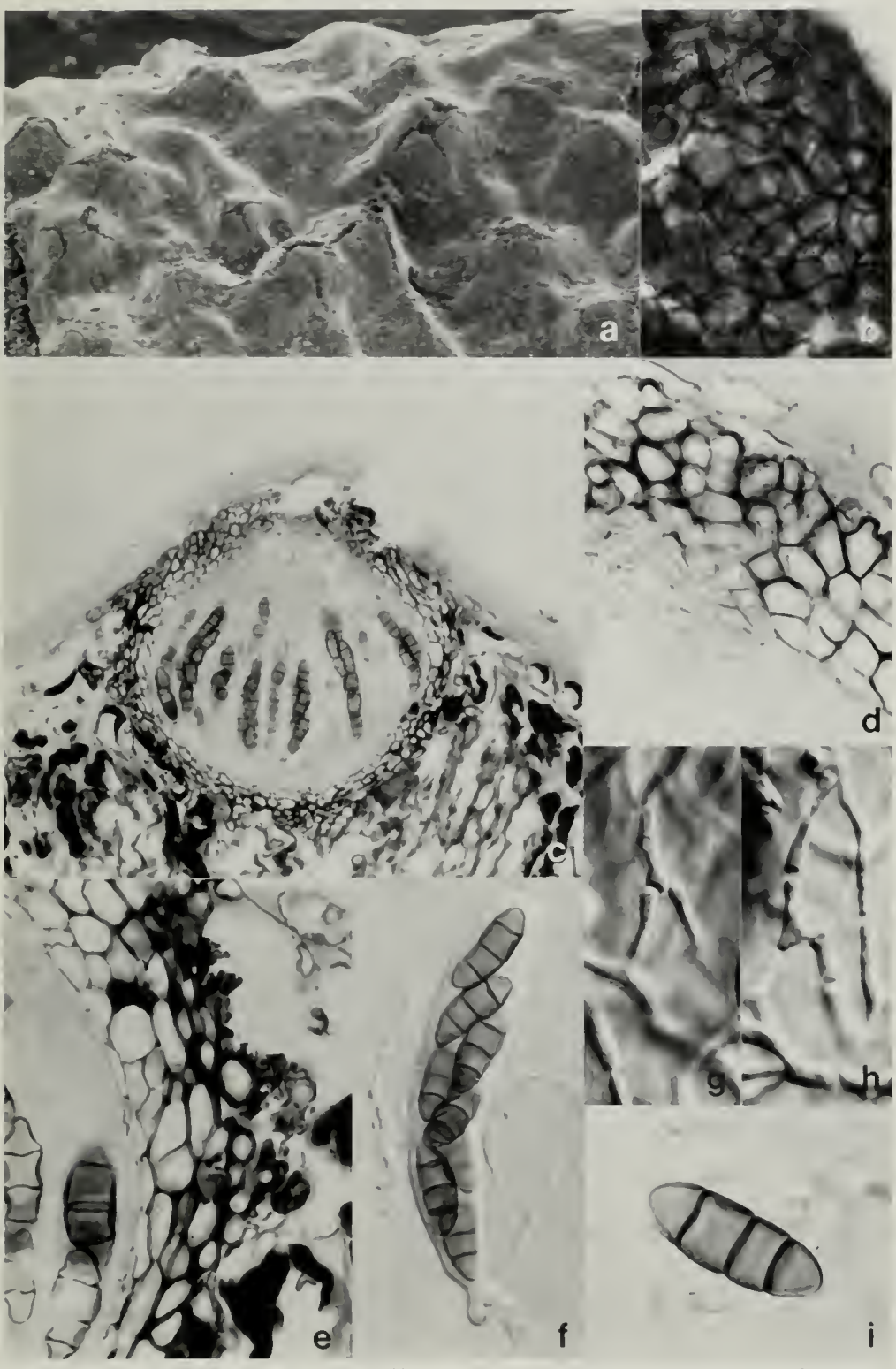

Figure 5. *Leptosphaeria cercocarpi*. a. SEM of immersed ascocarps, x50. b. ascocarp wall surface, x550. c. longitudinal median section through ascocarp, x225. d. section through ascocarp wall neck region, x950. e. longitudinal median section through ascocarp wall, x950. f. ascus, x525. g, h. cellular pseudoparaphyses, x2,000. i. ascospore, x1,150. All from holotype of *L. cercocarpi*.

Phaeosphaeriaceae

The species considered in this section all possess characteristics of the Phaeosphaeriaceae (Barr 1987a). Species in the Phaeosphaeriaceae are distinguished from those in the Leptosphaeriaceae by the smaller ascomatal size, the thin, soft ascocarp wall composed of pseudoparenchymatous cells, and the rather sparse pseudoparaphyses (Barr 1987a). The genera represented within the family are *Paraphaeosphaeria* Eriksson, *Phaeosphaeria* Miyake, and *Kalmusia* Niessl.

•*Paraphaeosphaeria concentrica* (J.B. Ellis & B.M. Everhart) S.M. Huhndorf comb. nov. See Figure. 6.

≡ *Leptosphaeria concentrica* J.B. Ellis & B.M. Everhart, The North American Pyrenomycetes. A Contribution to Mycologic Botany, p. 354. 1892. (Basionym).

Ascocarps scattered, sparse, immersed-subepidermal, globose, papillate, glabrous, 90–100 µm diameter, 100–125 µm high. **Ascocarp wall** of textura angularis in surface view; in longitudinal section 7.2–10.8 µm thick at sides and base, composed of 2–3 layers of elongate-compressed, hyaline, pseudoparenchymatic cells (2.8–3.6 x 12–14.5 µm), wall up to 13 µm thick near apex, composed of 3–4 layers of isodiametric-elongate, slightly brown-melanized cells (3.6–5.6 x 7.2–12.2 µm). **Papilla** very short, erumpent, bluntly conical, 15–20 µm high, 25–30 µm wide, 10–13 µm thick near base of papilla, papilla apex wall cells hyaline, thin-walled surrounding a circular ostiole without periphyses. **Pseudoparaphyses** 1.4–2.0 µm wide, 70–90 µm long (height of the ascocarp cavity), numerous, narrowly cellular, without gelatinous coating. **Asci** (43–)54–66 x 10.8–12.2 µm, numerous, basal, cylindrical-clavate, thick-walled, short-stalked, rounded apex, with apical chamber, with 8 biseriate ascospores. **Ascospores** (14.5–)16.5–18.7 x (3.6–) 4.3–5.7(–6.5) µm, cylindrical, with rounded end cells, end cells longer than central cell, straight; 2-septate, septa unevenly distributed, order of septation 2:1, primary septum submedian and constricted; brown, wall roughened, thin cellular sheath entirely surrounding spore, without appendages.

Holotype: United States: On apple leaves (*Malus* sp.), Columbia, Missouri (H. Dorsett), and Louisiana (Langlois) (NY).

Comments: *Paraphaeosphaeria* species are distinguished by ascocarps that form below or within the host epidermis, an ascocarp wall consisting of a few layers of pseudoparenchyma, and cylindrical, usually echinulate ascospores with the primary septum forming in the lower half of the spore.

Although *Paraphaeosphaeria* species are commonly found on monocotyledonous plants, species on dicot plants have also been placed in the genus (Hedjaroude 1969, Shoemaker and Babcock 1985). Such is the case here with *Paraphaeosphaeria concentrica* described from apple leaves. The description of *P. concentrica* closely resembles the description of the type of the genus, *P. michotii* (Westendorp) Eriksson, with the only difference being the dicotyledonous host plant. *Paraphaeosphaeria michotii* and its synonyms have so far been found exclusively on monocot hosts (Shoemaker and Eriksson 1967, Shoemaker and Babcock 1985). Overlooking substratum preference, *P. concentrica* would be synonymous with *P. michotii*. Because of the historical value placed on this character and the need for experimental evidence to demonstrate the range of substrata on which species will grow and the total lack of collections of *P. michotii* on dicot hosts, *P. concentrica* is retained as a separate species.

•*Phaeosphaeria pomona* (P.A. Saccardo) S.M. Huhndorf comb. nov. See Figure 7.

≡ *Leptosphaeria (Leptosphaerella) pomona* P.A. Saccardo, Nuovo Giornale Botanico Italiano e Bolletino della Società Botanica Italiana 8:176. 1876. (Basionym).

Ascocarps scattered, sparse, immersed-subcuticular, globose, papillate, glabrous to slightly tomentose near base, with loose, dark hyphal growth on host cuticle surrounding ascocarps, (55–)90–125 µm diameter, 75–115 µm high. **Ascocarp wall** of textura angularis-globulosa in surface view; in longitudinal section uniformly 6.1–7.7 µm thick, composed of 2–3 layers of brown-melanized, compressed, isodiametric-to-elongate pseudoparenchymatous cells (1.5–2.0 x 8–12 µm). **Papilla** very short, erumpent, bluntly conical, 15–21 µm

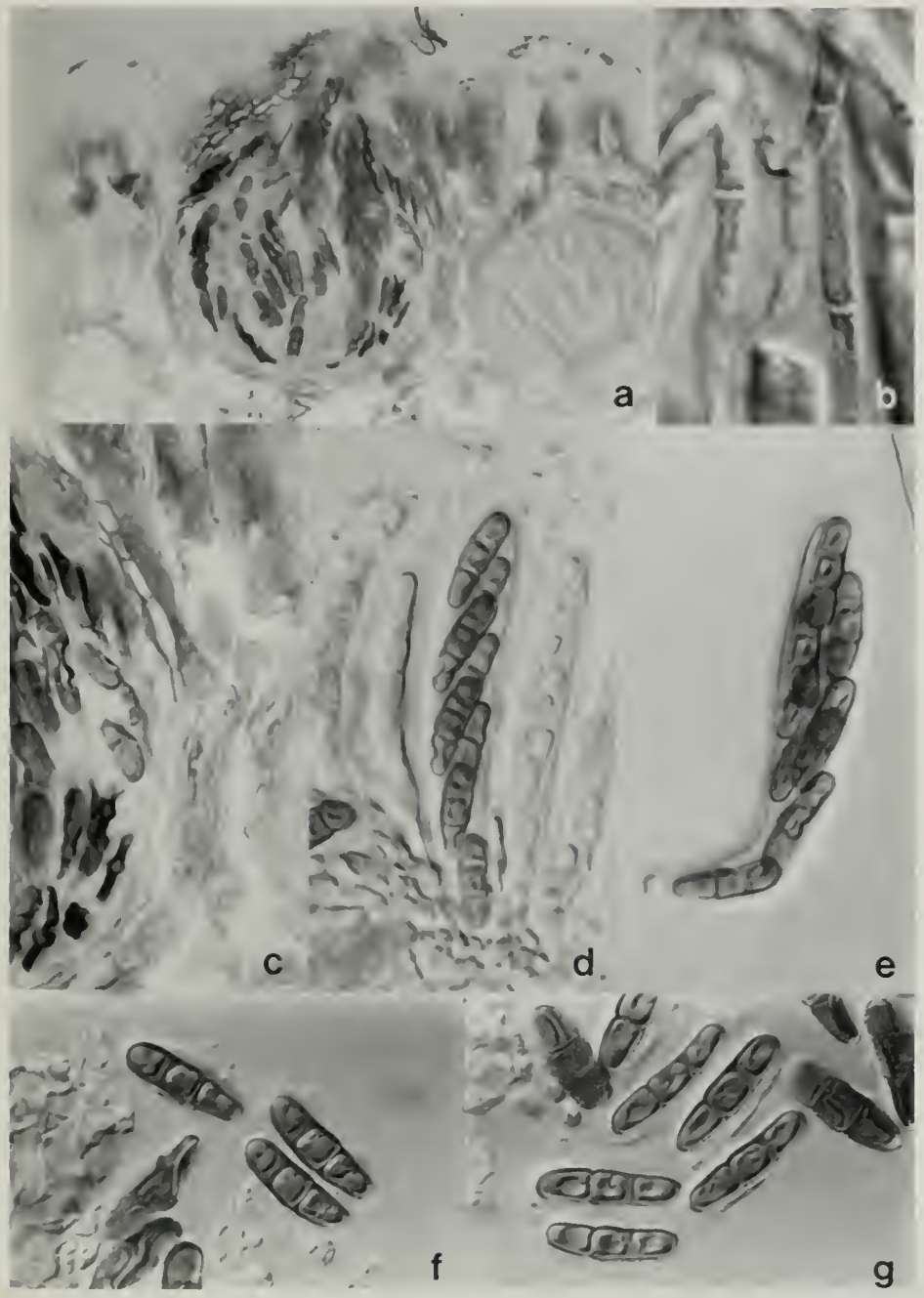

Figure 6. *Paraphaeosphaeria concentrica*. a. longitudinal median section through ascocarp, x375. b. cellular pseudoparaphyses, x2,000. c. longitudinal median section through ascocarp wall, x950. d, e. asci, x1,050. f, g. ascospores, x1,150. All from holotype of *P. concentrica*.

high, 31–37 µm wide, composed of 3–4 layers of small, brown-melanized, isodiametric cells (2.6–4.6 µm diameter), (9–)12–17 µm thick near base of papilla, apex of papilla wall cells hyaline, thin-walled surrounding a circular ostiole without periphyses. **Pseudoparaphyses** 1.0–1.5 µm wide, (46–)77–93 µm long (height of the ascocarp cavity), numerous, narrowly cellular, with guttule-like thickenings at septa, without gelatinous coating. **Asci** 55.5–65 x

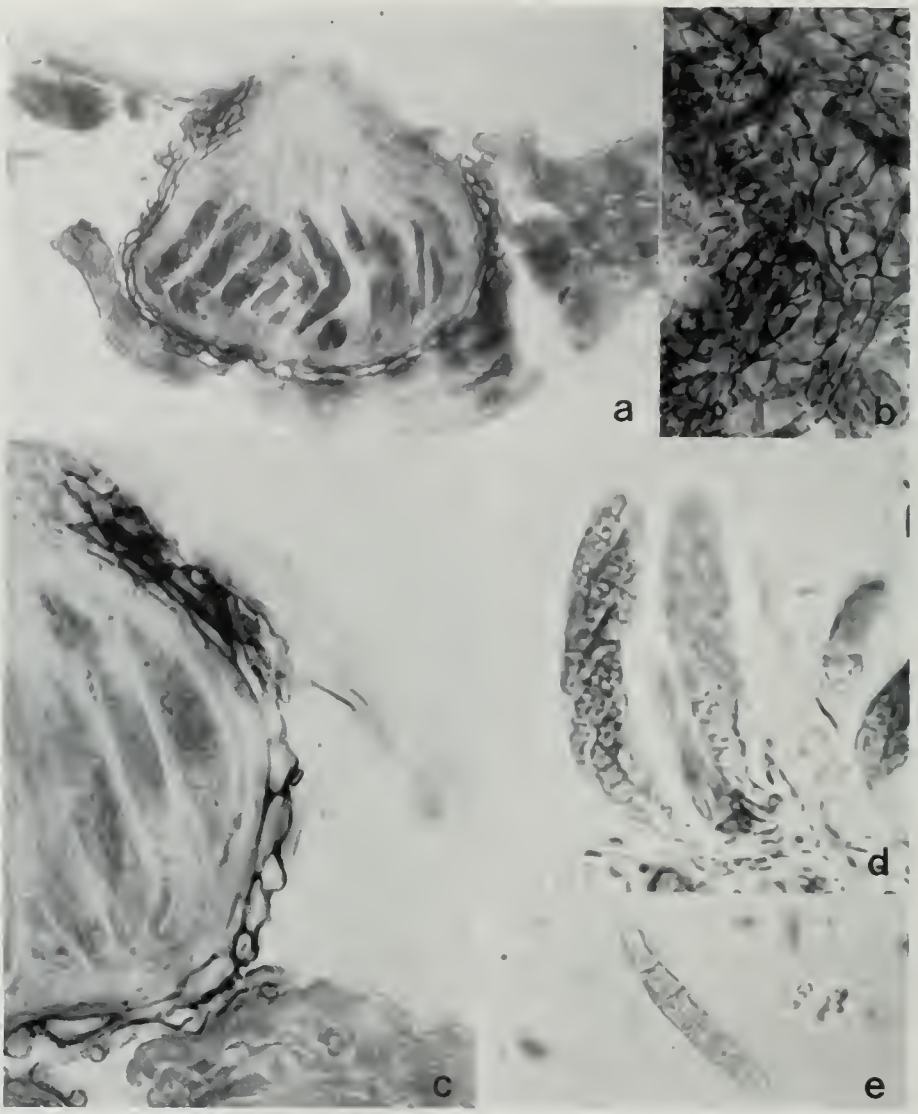

Figure 7. *Phaeosphaeria pomona*. a. longitudinal median section through ascocarp, x375. b. ascocarp wall surface, x550. c. longitudinal median section through ascocarp wall, x950. d. ascus, x1,050. e. ascospore, x1,150. All from holotype of *P. pomona*.

8.3–11.5 µm, numerous, basal, cylindrical, thick-walled, short-stalked, rounded apex, with apical chamber, with 8 biseriate ascospores. Ascospores 20.1–26.5 x (2.8–)3.6–5.0 µm, narrowly fusiform, with acute end cells, second cell from the top occasionally enlarged, straight; 5-septate, septa unevenly distributed, without constrictions, order of septation unknown, pale brownish yellow, guttules present in ascospore cells, smooth, thin cellular sheath entirely surrounding spore (0.7–2.0 µm thick).

Holotype: ITALY: In pag. super. folior. *Pyri Mali*, socia *Vermicularia Pomona*, a selva (Treviso), Sept. 1875, raro (PAD).

Comments: See under *Phaeosphaeria lucilla*.

•*Phaeosphaeria lucilla* (P.A. Saccardo) S.M. Huhndorf comb. nov. See Figure 8.

≡ *Leptosphaeria lucilla* P.A. Saccardo, Nuovo Giornale Botanico Italiano e Bolletino della Società Botanica Italiana 7:310-311, 1875. (Basionym).

Figure 8. *Phaeosphaeria lucilla*. a. longitudinal median section through ascocarp, x375. b. cellular pseudoparaphyses, x2,000. c. longitudinal median section through ascocarp wall, x950. d. asci, x1,050. e. ascocarp wall surface, x550. f, g. ascospores, x1,150. All from holotype of *P. lucilla*.

Ascocarps scattered, sparse, immersed-subcuticular, papillate, glabrous, depressed-globose, 110–130 µm diameter, 90–115 µm high. **Ascocarp wall** of textura angularis in surface view; in longitudinal section uniformly 6.0–7.7 µm thick, composed of 3–4 layers of brown-melanized, compressed, isodiametric-to-elongate, pseudoparenchymatous cells (2.3–3.8 x 6.9–10.0 µm). **Papilla** very short, erumpent, conical, 20–25 µm high, 30–40 µm wide, composed of 4–5 layers of brown-melanized, isodiametric cells (3.0–4.6 µm diameter), 10.7–

13.0 µm thick near base of papilla, apex of papilla wall cells hyaline, thin-walled surrounding a circular ostiole without periphyses. **Pseudoparaphyses** 1.5–2.0 µm wide, 62–71 µm long (height of the ascocarp cavity), numerous, narrowly cellular, without gelatinous coating. **Asci** 40–51(–56) x 8.4–10(–11.5) µm, numerous, basal, in a broad hymenium, cylindrical, thin-walled, sessile, rounded apex, with 8 bi- to triseriate ascospores. **Ascospores** 15.3–18.4(–20) x 3.0–4.6 µm, fusiform, with acute end cells, second cell from apex slightly enlarged, straight to slightly curved; 3-septate, septa evenly distributed, order of septation 2:1:2, primary septum median and slightly constricted; pale yellowish brown, wall smooth, without sheath or appendages.

Holotype: ITALY: In foliis languidis *Pyri communis* in agro Tarvisino et Patavino (PAD).

Comments: Fungi in the genus *Phaeosphaeria* are characterized by immersed ascocarps with thin walls of pseudoparenchyma, fusiform 3- to multiseptate ascospores and monocotyledonous hosts. Nonetheless, Leuchtmann's (1984) treatment of *Phaeosphaeria* includes a group of species found on the leaves and stems of plants in the dicot family Caryophyllaceae. The placement of dicotyledonous *Leptosphaeria* species, morphologically similar to *Phaeosphaeria*, into the genus *Phaeosphaeria* is contrary to Shoemaker and Babcock's (1989b) concept of the genus. These authors do not, however, suggest an alternative genus for these species. They do place certain species on dicots in *Leptosphaeria*, citing the presence of thick-walled cells in the ascocarp wall. *Phaeosphaeria pomona* and *P. lucilla* are morphologically similar to species of *Phaeosphaeria* found on monocot hosts. They do not have the ascocarp and wall characteristics of *Leptosphaeria*.

When *P. pomona* and *P. lucilla* were described, Saccardo (1875, 1876) placed them in *Leptosphaeria* subgenus *Leptosphaerella* Sacc., which included fungi from leaves of dicotyledonous plants. *Leptosphaeria* subgenus *Leptosphaerella* was subsequently placed in synonymy with *Phaeosphaeria* (Leuchtmann 1984). At this time, there is no other genus suitable for the placement of these "dicot *Phaeosphaeria*" species. Erecting a new genus for these species based solely on substrate preference, with no morphological differences from *Phaeosphaeria* seems unwise. With proof of strict substrate preference requiring experimental evidence, there seems to be some justification for their placement within *Phaeosphaeria* until such work is done.

•*Phaeosphaeria thomasiana* (P.A. Saccardo & C. Roumeguère) S.M. Huhndorf comb. nov. See Figure 9.

≡ *Leptosphaeria thomasiana* P.A. Saccardo & C. Roumeguère, Revue Mycologique 5:236. 1883. (Basionym).

Ascocarps scattered, numerous, immersed-subcuticular, globose, flattened at base, papillate, glabrous, 150–175 µm diameter, 110–125 µm high. **Ascocarp wall** of textura angularis-globulosa in surface view; in longitudinal section uniformly 9.3–12.2 µm thick, composed of 4–5 layers of polygonal, pseudoparenchymatous cells, outer 2–3 layers of polygonal-to-elongate, brown-melanized cells (2.2–5.0 x 6.5–8.6 µm), inner 1–2 layers of elongate-compressed, hyaline cells (0.7–1.5 x 8.0–10.8 µm). **Papilla** very short, erumpent, bluntly conical, 12–30 µm high, 10–36 µm wide, composed of 7–8 layers of small, brown-melanized, isodiametric cells (2.6–4.6 µm diameter), 14–18 µm thick near base of papilla, apex of papilla wall cells hyaline, thin-walled surrounding a 12–18 µm wide circular ostiole without periphyses. **Pseudoparaphyses** 1.0–1.5 µm wide, 80–85 µm long (height of the ascocarp cavity), numerous, narrowly cellular, without gelatinous coating. **Asci** 55.5–65.5 x 8.0–10.8 µm, numerous, basal, cylindrical-clavate, thick-walled, short-stalked, rounded apex, with apical chamber, with 8 biseriate ascospores. **Ascospores** 15.0–18 x 3.6–4.5 µm, fusiform, with acute end cells, straight or slightly curved; 3-septate, septa evenly distributed, order of septation 2:1:2, primary septum median, without constrictions; subhyaline to pale brownish yellow, guttules absent in ascospore cells, smooth, without sheath or appendages.

Holotype: FRANCE: In sarmentis *Rubi* emortuis (305-Reliquiae Libertianae) n.v.

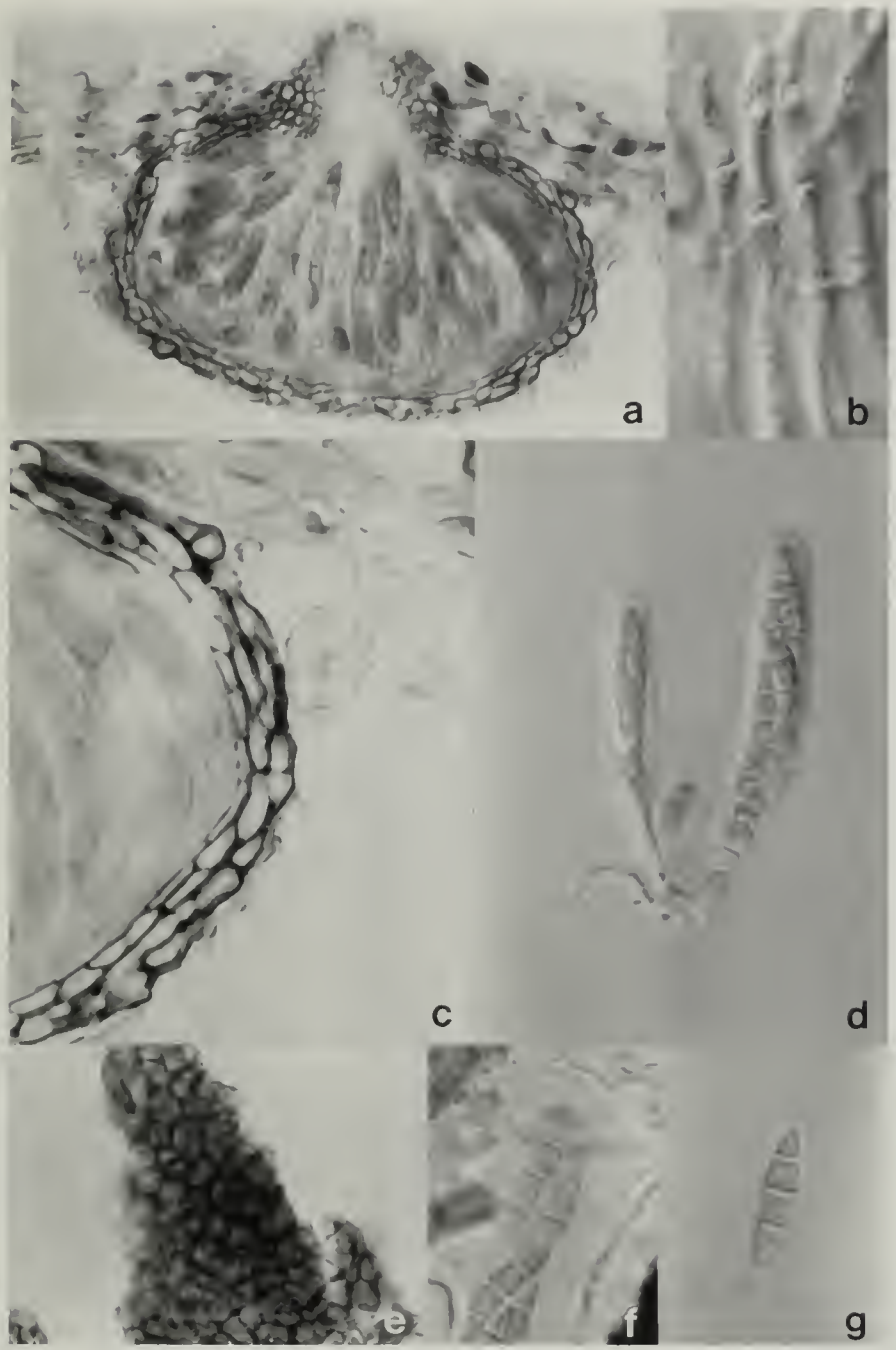

Figure 9. *Phaeosphaeria thomasiana.* a. longitudinal median section through ascocarp, x375. b. cellular pseudoparaphyses, x2,000. c. longitudinal median section through ascocarp wall, x950. d. asci, x1,050. e. ascocarp wall surface, x550. f, g. ascospores, x1,150. All from Roum. F. sel exs. 6039.

Exsiccatae: France: Bois des Roches (Noidan), May 1891, F. Fautrey, Roumeguère, F. sel exs. 6039 (NY).

Other material examined: United States: Oregon: Corvallis, on loganberry (*Rubus loganobaccus* Bailey), Mar. 12, 1930, S.M. Zeller; on loganberry, Mar. 15, 1916, A. Frank (all NY).

Comments: *Leptosphaeria thomasiana* is placed in *Phaeosphaeria* because of its small ascocarps immersed beneath the host cuticle and its ascocarp wall of pseudoparenchymatous cells. I was unable to see the type specimen, which is number 305 in the exsiccatae set Reliquiae Libertianae. This is not a regular exsiccatae set (Pfister 1985), and the set at FH did not contain this specimen. The description and plate herein were prepared from Roumeguère, F. sel exs. 6039 specimen from NY, which included few ascocarps. I did not find any ascocarps of *P. thomasiana* in the collections from Oregon, but the canes did have large gray patches on them as Zeller (1927) described. He also mentions that a cane blight or "Loganberry gray bark disease" has been ascribed to this organism in western Washington. I have seen no reports from other regions of this organism as a pathogen of *Rubus*.

•*Kalmusia clivensis* (M.J. Berkeley & C.E. Broome) M.E. Barr, Mycotaxon. An International Journal Designed to Expedite Publication of Research on Taxonomy & Nomenclature of Fungi & Lichens 29:504. 1987. See Figure 10.

≡ *Sphaeria (Caulicolae) clivensis* M.J. Berkeley & C.E. Broome, Annals and Magazine of Natural History, Series 2, 9:379. 1852.

≡ *Leptosphaeria clivensis* (M.J. Berkeley & C.E. Broome) P.A. Saccardo, Sylloge Fungorum Omnium Hucusque Cognitorum Digessit P.A. Saccardo 2:16. 1883.

≡ *Diapleella clivensis* (M.J. Berkeley & C.E. Broome) A. Munk, Dansk Botanisk Arkiv 15(2):75. 1953.

= *Leptosphaeria galiorum* P.A. Saccardo var. *lapsanae* P.A. Saccardo & P.A. Briard, Revue Mycologique 7:209. 1885.

= *Leptosphaeria steironematis* J.B. Ellis & B.M. Everhart, Proceedings of the Academy of Natural Sciences of Philadelphia 1890: 237. (1890) 1891.

= *Leptosphaeria arunci* S.M. Zeller, Mycologia 19:134–135. 1927.

= *Leptosphaeria longipedicellata* J.H. Miller & G. Burton, Mycologia 34:2–3. 1942.

Ascocarps scattered, sparse, immersed-subepidermal, papilla erumpent, at times with a surrounding clypeus, glabrous, depressed-globose, 275–400 µm diameter, 175–375 µm high. **Ascocarp wall** of textura prismatica in surface view; in longitudinal section uniformly 15–20 µm thick, composed of 5–6 layers of parallel, elongate, prismatic, scleroplecten-chymatic cells (0.7–1.5 x 15–20 µm), outer 3–4 cell layers slightly brown-melanized, inner 2–3 layers hyaline; at the base cells are compressed, flattened, hyaline. **Papilla** conical, short-intermediate, (50–)90–100(–130) µm high, 40–80 µm wide at the apex, 50–100 µm wide at the base, composed of 6–8 layers of small, light-brown pigmented, isodiametric cells with no external, melanized crust (2–5 µm diameter), 10–13 µm thick, surrounding a circular ostiole 18–20 µm wide, composed of thin-walled, hyaline, compressed cells, without periphyses. **Pseudoparaphyses** 0.5–1.5 µm wide, 200–225 µm long (height of the ascocarp cavity), numerous, narrowly cellular, without gelatinous coating. **Asci** 95–110(–150) x 11–15(–21) µm, numerous, basal, clavate, thin-walled, long-stalked (27–39 µm long), rounded apex, with 8 biseriate ascospores. **Ascospores** 19–25(–32) x 5–8.5(–11) µm, fusiform, with rounded to acute end cells slightly longer than central cells, straight to slightly curved; 3-septate, septa slightly unevenly distributed, order of septation 2:1:2, with slight constrictions at all septa; dark brown, smooth, without sheath or appendages.

Holotype: Great Britain: King's Cliffe, on dead stems of *Pastinaca sativa*, Jul 1850, Herb. Berk. 1879 (K).

Exsiccatae: Canada: London, on *Steironema ciliatum*, as *Leptosphaeria steironematis*, May 1890, Ell. & Ev., North American Fungi 2615 (NY); Sphaer. Brit. Ill 60, (FH).

Other material examined: Canada: London, on *Steironema ciliatum*, May 1890, with 1640, Dearness (Holotype of *Leptosphaeria steironematis*, NY); 1640, London, as *Leptosphaeria steironematis*, 19 Apr., 1890

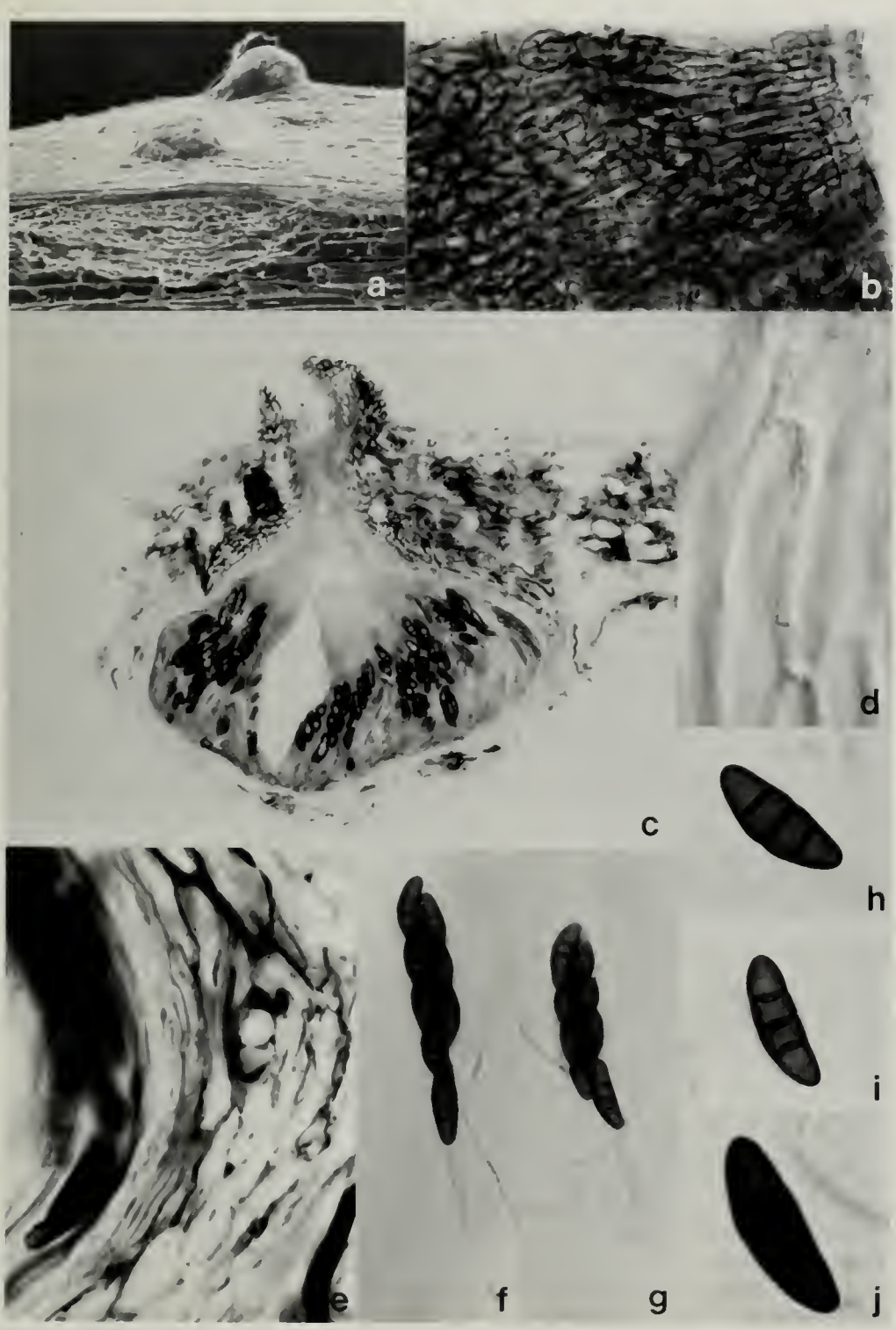

Figure 10. *Kalmusia clivensis*. a. SEM of immersed ascocarps with erumpent papilla, x100. b. ascocarp wall surface, x550. c. longitudinal median section through ascocarp, x125. d. cellular pseudoparaphyses, x2,000. e. longitudinal median section through ascocarp wall, x950. f, g. asci, x525. h–j. ascospores, x1,150. a, c, d, e, f, and h from holotype of *Leptosphaeria arunci*; b, g, and i from holotype of *K. clivensis*; j from lectotype of *L. longipedicellata*.

(NY). Great Britain: England, Chute Meadow, Lambriggan, W. Cornwall, on *Centaurea nigra*, May 9, 1942, F. Rilstone (NY-MEBB coll); Scotland, Wester Ross, Rassal N.N. Reserve, on ? *Senecio jacoboea*, June 2, 1982, P.F. Cannon (NY). Italy: Briard no. 8, on *Lapsana communis*, June 12, 1885 (holotype of *Leptosphaeria galiorum* var. *lapsanae*, PAD). United States: Colorado: Larimer Co., 3 mi W. Redfeather Lakes, 8100' Roosevelt National Forest, on *Rosa* sp., Aug. 4, 1984, MEBB # 7008 (NY); Georgia: 7684, Clarke Co., Athens, South Campus, University of Georgia, on *Daucus carota*, Sept. 11, 1939, J.H. Miller (Lectotype of *Leptosphaeria longipedicellata*, GAM); Michigan: Emmet Co., Gill and Elder Roads, Carp Lake, on ? *Acer*, Sept. 11, 1969, MEBB #5527 (NY): Oregon: Multnomah Falls, April, on dead stems of *Aruncus silvester* (holotype of *Leptosphaeria arunci* in Zeller Herb. 6811, NY).

Comments: Four of the putative *Leptosphaeria* species that were examined are synonymous with *Kalmusia clivensis*; one was found on a Rosaceous host (*L. arunci* on *Aruncus*). The most distinctive feature of this species is the presence of long-stipitate asci with prominent dark brown, 3-septate ascospores. The long stipe, as well as the thin ascus wall, has led previous workers to treat it as a unitunicate fungus in the monotypic genus *Diapleella* (Munk 1957, Dennis 1978). Shoemaker (1984a) retained the genus *Diapleella* but treated it as bitunicate. Barr (1987b) transferred *D. clivensis* to the genus *Kalmusia* Niessl without much explanation. The original description of *Kalmusia* (Niessl 1871) and the illustration of the genus in Berlese (1890) show a fungus with long-stipitate asci and dark brown, 3-septate ascospores. *Kalmusia clivensis* appears to be well-placed within this genus.

Shoemaker (1984a) looked at one collection of *Leptosphaeria longipedicellata* on *Solidago caesia* L., which is cited in the original description of the species. He mentions that "the original description of *L. longipedicellata* is strongly suggestive of *Diapleella clivensis*." This collection was in fact *L. macrospora* (Fuckel) Thümen, and Shoemaker did not resolve the placement of *L. longipedicellata*. The collection on *Daucus carota* L., cited in the description and marked as type on the herbarium packet, matches the original description exactly and is the same as *Kalmusia clivensis* except that the ascospores and asci are slightly larger than those in the type collection of *K. clivensis*. The ascocarp and wall in section appear exactly the same. I believe the size differences are probably due to environmental differences or other individual variation and that *L. longipedicellata* is synonymous with *K. clivensis*. Collection 7684, Clarke Co., Athens, South Campus, University of Georgia, on *Daucus carota*, Sept. 11, 1939, J.H. Miller (GAM) is chosen as the lectotype of *Leptosphaeria longipedicellata*.

•*Kalmusia coniothyrium* (L. Fuckel) S.M. Huhndorf comb. nov. See Figure 11.

≡ *Sphaeria coniothyrium* L. Fuckel, Symbolae Mycologicae, p. 115. 1870. (Basionym).

≡ *Leptosphaeria coniothyrium* (L. Fuckel) P.A. Saccardo, Nuovo Giornale Botanico Italiano e Bolletino della Società Botanica Italiana 7:317. 1875.

≡ *Melanomma coniothyrium* (L. Fuckel) L. Holm, Symbolae Botanicae Upsalienses 14(3):56–57. 1957.

≡ *Diapleella coniothyrium* (L. Fuckel) M.E. Barr *in* M.E. Barr, C.T. Rogerson, S.J. Smith, and J.H. Haines, Bulletin of the New York State Museum 459:30. 1986.

= *Sphaeria (Obtectae) hendersonia* J.B. Ellis *in* M.C. Cooke and J.B. Ellis, Grevillea 6:14–15. 1877.

≡ *Clypeosphaeria hendersoniae* (J.B. Ellis) P.A. Saccardo, Sylloge Fungorum Omnium Hucusque Cognitorum Digessit P.A. Saccardo 2:91. 1883.

≡ *Leptosphaeria (Clypeosphaeria) hendersoniae* (J.B. Ellis) M.C. Cooke, Grevillea 17:91. 1889.

Ascocarps clustered, numerous, immersed-subepidermal, depressed, globose, flattened at top and base, sometimes beneath blackened clypei, papillate, glabrous, 175–300 µm diameter, 175–200 µm high. **Ascocarp wall** of textura angularis-globulosa in surface view; in longitudinal section 15–25 µm thick at the sides, 13–18 µm at the base, composed of 8–12 layers of polygonal, pseudoparenchymatous cells, outer 3–5 layers of isodiametric-to-slightly-elongate, light brown cells (5.0–9.5 x

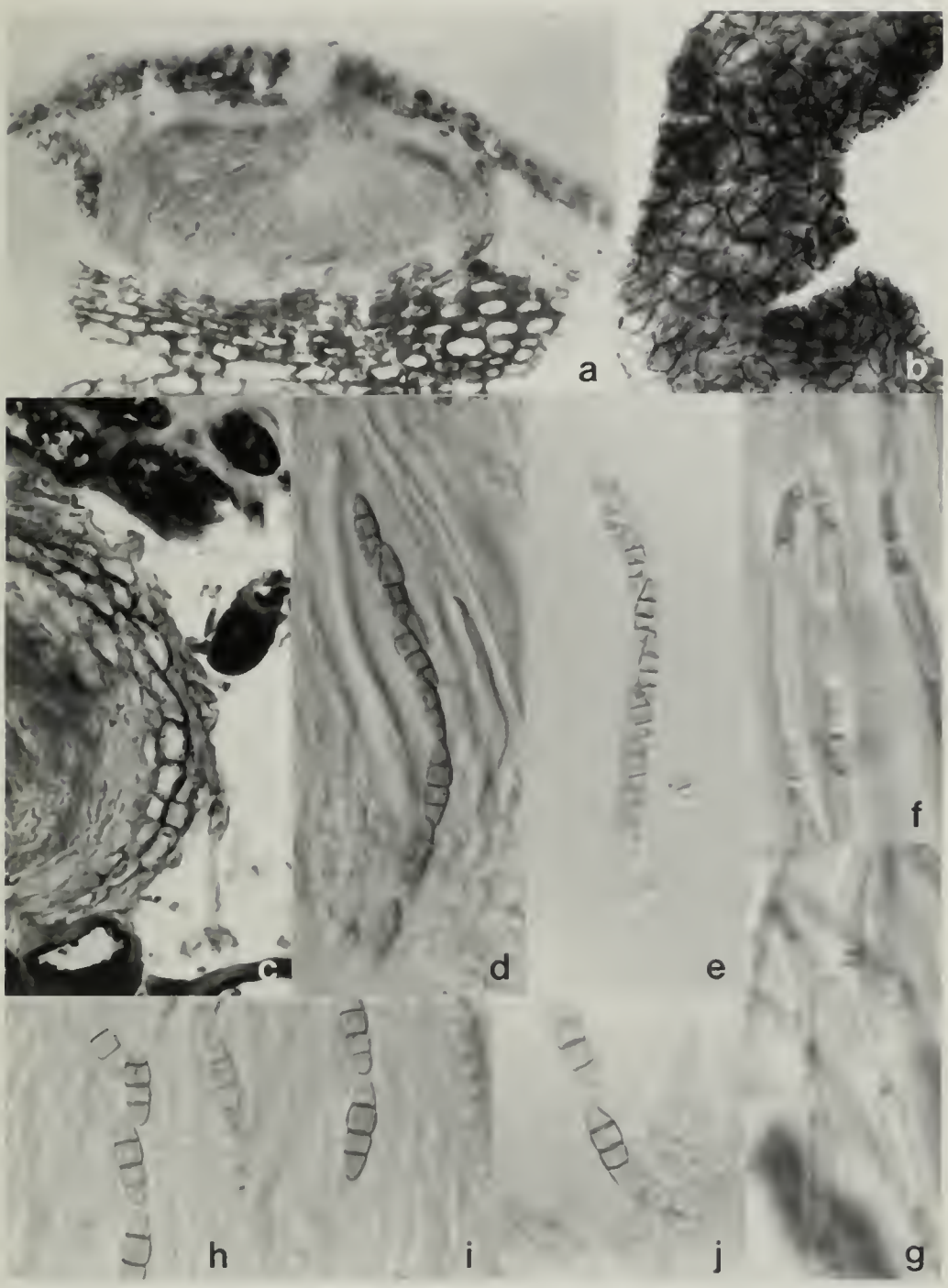

Figure 11. *Kalmusia coniothyrium*. a. longitudinal median section through ascocarp, x250. b. ascocarp wall surface, x550. c. longitudinal median section through ascocarp wall, x950. d, e. asci, x1,050. f, g. cellular pseudoparaphyses, x2,000. h–j. ascospores, x1,150. a–d, f–i from holotype of *K. coniothyrium*; e, j from neotype of *Sphaeria hendersonia*.

3.6–5.0 µm), inner 5–7 layers of small, isodiametric-elongate, compressed, hyaline cells (3.6–4.3 x 2.0–3.6 µm). **Papilla** short, erumpent, bluntly conical, 45–55 µm high, 25–35 µm wide, 16–18 µm thick, composed of 5–10 layers of small, hyaline, isodiametric cells (1.4–2.8 µm diameter), surrounding a 10–20 µm wide, circular ostiole without periphyses. **Pseudoparaphyses** 1.0–1.5 µm wide, 75–100 µm long (height of the ascocarp cavity), numerous, narrowly cellular, with guttule-like thickenings at septa, with gelatinous coating. **Asci** 60–75 x 5.5–7.5 µm, numerous, basal in a broad hymenium, cylindrical, thin-walled, short-stalked, rounded apex, with apical chamber, with 8 overlapping, uniseriate ascospores. **Ascospores** 11.5–14.4(–15.8) x 3.6–4.5 µm, fusiform to ellipsoidal, with acute end cells, second cell somewhat enlarged, straight or slightly curved; 3-septate, septa slightly unevenly distributed, order of septation 2:1:2, primary septum median and constricted; brownish yellow, guttules lacking, smooth, without sheath or appendages.

Holotype: AUSTRIA: Auf durren Ranken von *Rubus fruticosus*, selten, im Fruhling. An der Heimbach bei Oestrich (G).

Exsiccatae: Rehm, Asc. 388, on *Rubus fruticosus* (NY); Krieger, Fungi saxon. 18, 1120, 1121 (NY); Petrak Kryptogamae exsic. 2318 (NY); Sacc, Mycotheca Veneta 72, as *Sphaeria fuscella* f. *Ampelopsidis hederaceae*, (FH); Petrak, Fl. Boh. et Mor. exsic. II no. 4, as *Clypeosphaeria notarisii* (FH); Ellis N. American Fungi 581 as *Sphaeria Hendersonia*, Mar. 1878 (ILL, FH, NY).

Other material examined: CANADA: Ottawa, on Sambucus racemosa, Mar. 10, 1897 (NY); London, as *Clypeosphaeria Hendersonia*, 1883, 3 May 1892 (NY). ITALY: 198 as *Sphaeria clypeata*, de Notaris (RO). UNITED STATES: DELAWARE: Faulkland, as *Sphaeria Hendersonia*, Mar. 20, 1887 (NY); NEW JERSEY: Newfield, on *Rubus strigosus*, J.B. Ellis 101, May 29, 1880 (neotype of *Sphaeria Hendersonia*, NY); on *Rubus occidentalis*, as *Sphaeria Hendersonia*, Aug. 4 1879, Apr. 1880, J.B. Ellis (FH); as *Clypeosphaeria Hendersonia*, Aug. 15, 1894, J.B. Ellis 773 (NY); MASSACHUSETTS: Andover, as *Sphaeria Hendersonia*, Rev. J. Blake No. 79 (NY); NORTH DAKOTA: Kulm, on Rubus strigosus, Mar. 12, 1916, Brenkle, Fungi Dakotenses 384 (NY); OREGON: Troutdale, Feb. 10, 1929, M.J. O'Connell (NY); Gresham, Apr. 30, 1934, S.M. Zeller (NY); PENNSYLVANIA: Avestrud Co., on *Rubus* sp., July 10, 1944 (NY); WISCONSIN: Sauk Co., Aldo Leopold Reserve, on *Rubus* sp., 9 Apr. 1988, 30 Sept. 1988, S.M. Huhndorf (ILLS).

Comments: This fungus is placed in *Kalmusia* because of its immersed, clypeate ascocarps with pseudoparenchymatous walls composed of compressed cells. *Kalmusia coniothyrium* lacks the characters distinctive of *Leptosphaeria*, including erumpent to superficial ascocarps with a wall of scleroplectenchymatous cells. Holm (1957) placed the species in *Melanomma*, but the fungus does not fit the current concept of that genus (Barr 1987a) because it lacks erumpent ascocarps with walls composed of small thick-walled cells, asci formed peripherally within the centrum, and trabeculate pseudoparaphyses. However, the ascospores of this fungus do strongly resemble those of some *Melanomma* species. The ascus shape of *K. coniothyrium* differs from that of *K. clivensis* in being cylindrical and short-stalked, and the ascospores are brownish yellow rather than dark reddish brown. But in *Kalmusia ebuli* Niessl, the type of the genus, these characters are variable; asci are clavate to cylindrical, short- or long-stalked, and ascospores are lighter brown than those of *K. clivensis*. There appears to be sufficient range within the genus to accommodate *K. coniothyrium*.

Sphaeria hendersonia is synonymous with *K. coniothyrium*. The description for the holotype specimen is at NY, but the actual specimen is missing. Because no other specimen is cited in the published description and it is uncertain what was available to Ellis when he described the organism, a neotype was chosen from the Ellis collection at NY which matches the description and is in good condition. The neotype of *Sphaeria hendersonia* is J.B. Ellis 101, Newfield, New Jersey, on *Rubus strigosus*, May 29, 1880.

Lophiostomataceae

The following species possesses characteristics of the Lophiostomataceae in the order Pleosporales (Barr 1987a). Lophiostomataceae *sensu* Holm and Holm (1988) is considered a heterogeneous group whose overall common characters, the flattened neck and slotlike ostiole, are highly adaptive and unstable. Consequently, the family in this sense may be completely dissociated (Holm and Holm 1988). Lophiostomataceae *sensu* Barr (1987a) contains genera that are united by wall characteristics, pseudoparaphysis structure and ascospore morphology. The compressed apical papilla is considered to be of generic or specific importance. Taxa in the Lophiostomataceae may have this type of papilla or may have a conspicuous, rounded apical papilla, or a short papilla with or without grouped setae, or the apex may open by a pore or slit.

•*Lophiostoma subcutanea* (M.C. Cooke & J.B. Ellis) S.M. Huhndorf comb. nov. See Figure 12.

≡ *Sphaeria (subtectae) subcutanea* M.C. Cooke & J.B. Ellis, Grevillea 7:41. 1878. (Basionym).

≡ *Leptosphaeria subcutanea* (M.C. Cooke & J.B. Ellis) J.B. Ellis *in* N.L. Britton, Catalogue of Plants Found in New Jersey. Geological Survey of New Jersey, Final Report of the State Geologist, 2(1):525. 1889.

≡ *Metasphaeria subcutanea* (M.C. Cooke & J.B. Ellis) P.A. Saccardo, Sylloge Fungorum Omnium Hucusque Cognitorum Digessit P.A. Saccardo 2:167. 1883.

Ascocarps clustered, sparse, superficial, papillate, glabrous, conic, 150–170 µm diameter, 180–225 µm high. **Ascocarp wall** of textura angularis-prismatica in surface view; in longitudinal section (15–)20–23 µm thick at sides and base, composed of 6–7 layers of polygonal, isodiametric-to-elongate, pseudoparenchymatic cells (2.0–3.6 x 5–7 µm), outer 3–4 layers of brown-melanized cells at the sides, inner 1–3 layers of hyaline, compressed cells; basal wall composed only of hyaline, elongate-compressed cells. **Papilla** elongate-conical, longitudinally compressed, 75–85 µm high, 55–75 µm wide at the apex, 100–125 µm wide at the base, composed of 6-7 layers of brown-melanized, thickened, isodiametric cells (2.5–4.0 µm diameter); at apex, cells coalescing to form a thickened dark brown mass; wall 25–27 µm thick, surrounding a 40–50 µm wide slotlike ostiole lined with periphyses. **Pseudoparaphyses** 0.5–1.5 µm wide, 108–124 µm long (height of the ascocarp cavity), numerous, narrowly cellular, without gelatinous coating. **Asci** 77–84(–92) x 5.3–7.6 µm, numerous, basal, cylindrical, thin-walled, short-stalked, rounded apex, with 8 biseriate ascospores. **Ascospores** (20–)25–29 x 3.0–3.5 µm, narrowly fusiform, with acuminate end cells, second cell slightly enlarged, straight to slightly curved; 4-6(-8)-septate, septa unevenly distributed, order of septation unknown, with slight constrictions at all septa; hyaline to subhyaline, guttules present in ascospore cells, wall smooth, possibly with thin cellular sheath surrounding entire spore, without appendages.

Holotype: United States: On decorticated limbs of *Pyrus communis* L (NY, K).

Comments: Holm and Holm (1988) considered the Swedish species of the Lophiostomataceae and emphasized ascocarp shape and peridial anatomy in distinguishing the genera *Lophiostoma* Ces. & de Not. and *Lophiotrema* Sacc. emend. L. Holm & K. Holm. The presence of a flattened papilla or neck and a slotlike ostiole have been used to distinguish the Lophiostomataceae from other groups. Although these features are highly variable in some species, they are still useful for placing this species in the Lophiostomataceae. However, generic placement within the family is problematic. The conic or pyriform ascocarp shape with a distinct flattened neck and the fusiform ascospores that are multiseptate within the ascus suggest *Lophiostoma*. The cylindric asci suggest *Lophiotrema*. The ascocarp wall anatomy in section resembles that of *Lophiotrema*, with uniformly thick walls of polygonal globose or angular cells. But in surface view, the cells seem to form a textura prismatica suggesting the long, parallel cells of *Lophiostoma*. The fungus is placed in *Lophiostoma* with some reservation because, at this time, there is no other suitable place for it.

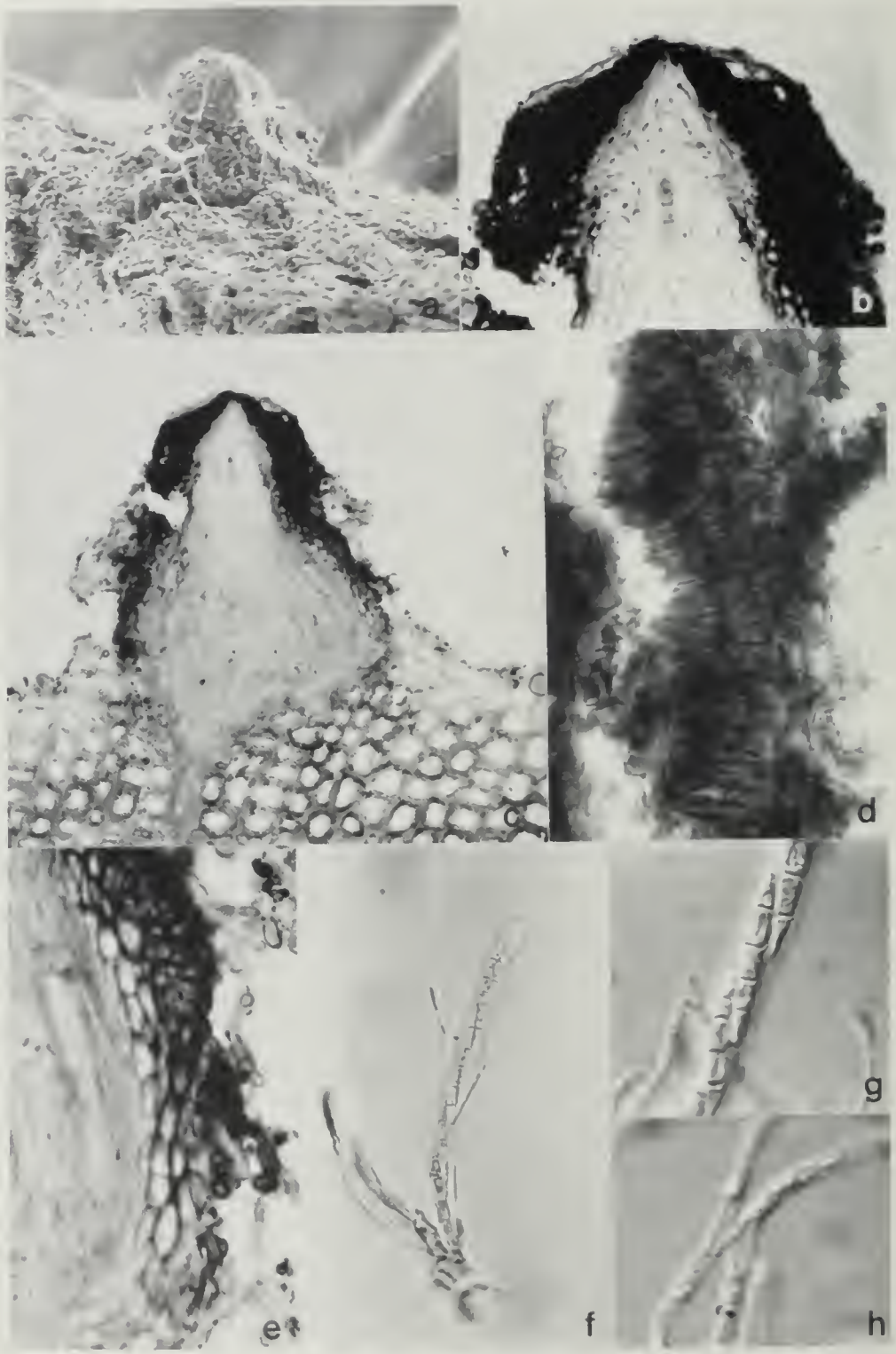

Figure 12. *Lophiostoma subcutanea*. a. SEM of ascocarp with apical crest, x175. b. longitudinal section of ascocarp neck with periphyses, x525. c. longitudinal median section through ascocarp, x325. d. ascocarp wall surface, x550. e. longitudinal median section through ascocarp wall, x950. f. ascus, x525. g. ascospores within an ascus, x1,150. h. cellular pseudoparaphyses, x2,000. All from holotype of *L. subcutanea*.

Leptosphaeria Species Referable to the Melanommatales

One species investigated had characteristics of the Melanommataceae in the order Melanommatales (Barr 1987a). The order Melanommatales is distinguished from the Pleosporales by trabeculate pseudoparaphyses, asci arranged peripherally within the centrum, an ascocarp wall composed of small or compressed cells, and ascospores with bipolar symmetry. Any one of these features may deviate in a particular taxon. Fungi in the Melanommataceae are distinguished by gregarious, erumpent ascocarps with a wall of small, thick-walled cells.

•*Melanomma pulvis-pyrius* (C.H. Persoon:E.M. Fries) L. Fuckel, Symbolae Mycologicae p. 159, 1870. See Figure 13.

≡ *Sphaeria pulvis-pyrius* C.H. Persoon, Synopsis Methodica Fungorum p. 86, 1801; E.M. Fries, Systema Mycologicum Sistens Fungorum 2:458. 1823.

= *Cladosphaeria rimicola* G.H. Otth, Mitteilungen der Naturforschenden Gesellschaft in Bern 1870:106. 1871. Nom inval. Art. 43.1. [The genus *Cladosphaeria* was validated in 1894.]

≡ *Leptosphaeria rimicola* (G.H. Otth) P.A. Saccardo, Hedwigia, Dresden 35:XXIX. 1896; Sylloge Fungorum Omnium Hucusque Cognitorum Digessit P.A. Saccardo 11:XXIX. 1896.

Ascocarps clustered, sparse, superficial, papillate, glabrous with tomentum of thick-walled brown hyphae surrounding and between ascocarps, conic-subglobose to irregular, 425–550 µm diameter, 475–600 µm high. **Ascocarp wall** of textura angularis-epidermoidea in surface view; in longitudinal section 55–75 µm thick at sides, 80–100 µm thick at base, composed of 21–35 layers of cells, outer 5–6 layers of polygonal, isodiametric, brown-melanized, scleroplectenchymatic cells (3.6–4.3 x 7–8 µm) giving rise to the thick-walled hyphae of the tomentum, middle 6–9 layers composed of hyaline, polygonal-elongate, scleroplectenchymatic cells (5–7 x 10–12 µm), inner 10–20 layers of small, polygonal, thick-walled, hyaline cells (2.0–5.7 µm diameter), which become compressed and obscured toward the interior of the cavity. **Papilla** broadly rounded to dome-shaped, 110–160 µm high, 160–250 µm wide at the apex, 220–300 µm wide at the base; wall 36–54 µm thick, composed of 12–15 layers of cells, outer layers of brown-melanized, thickened, isodiametric cells (3.6–5.7 µm diameter), inner layers hyaline, compressed, surrounding a 75–150 µm wide circular ostiole lined with periphyses. **Pseudoparaphyses** 0.5–1.5 µm wide, 250–375 µm long (height of the ascocarp cavity), numerous, trabeculate with sparse branching, with guttule-like thickenings at septa, without gelatinous coating. **Asci** (95–)120–150 x 8.5–12 µm, numerous, basal and lateral, partially lining the peripheral wall of the centrum, cylindrical, thin-walled, short-stalked, rounded apex, with 8 overlapping uniseriate ascospores. **Ascospores** 17.2–22.3 x 5.7–8.0 µm, fusiform, with acute end cells, straight to slightly curved; 3-septate, septa evenly distributed, order of septation 2:1:2, primary septum median and slightly constricted, bipolarly asymmetrical with a wider anterior and a narrower posterior part, second cell slightly enlarged; pale brown occasionally with slightly lighter colored end cells, wall smooth, without sheath or appendages.

Exsiccatae: Czechoslovakia: Betschwa-Ufer, Dec. 27, 1911, M. Weisskirchen, Petrak, Fl. Boh et Mor. exsic. Lfg. 4 Nr. 196 (FH); Finland: Bjork, Dec. 9, 1865, Karsten, Fungi Fenniae 992 (FH); Finland: on *Sambucus racemosa*, Jan. 1866, Karsten, Fungi Fenniae 995 (FH).

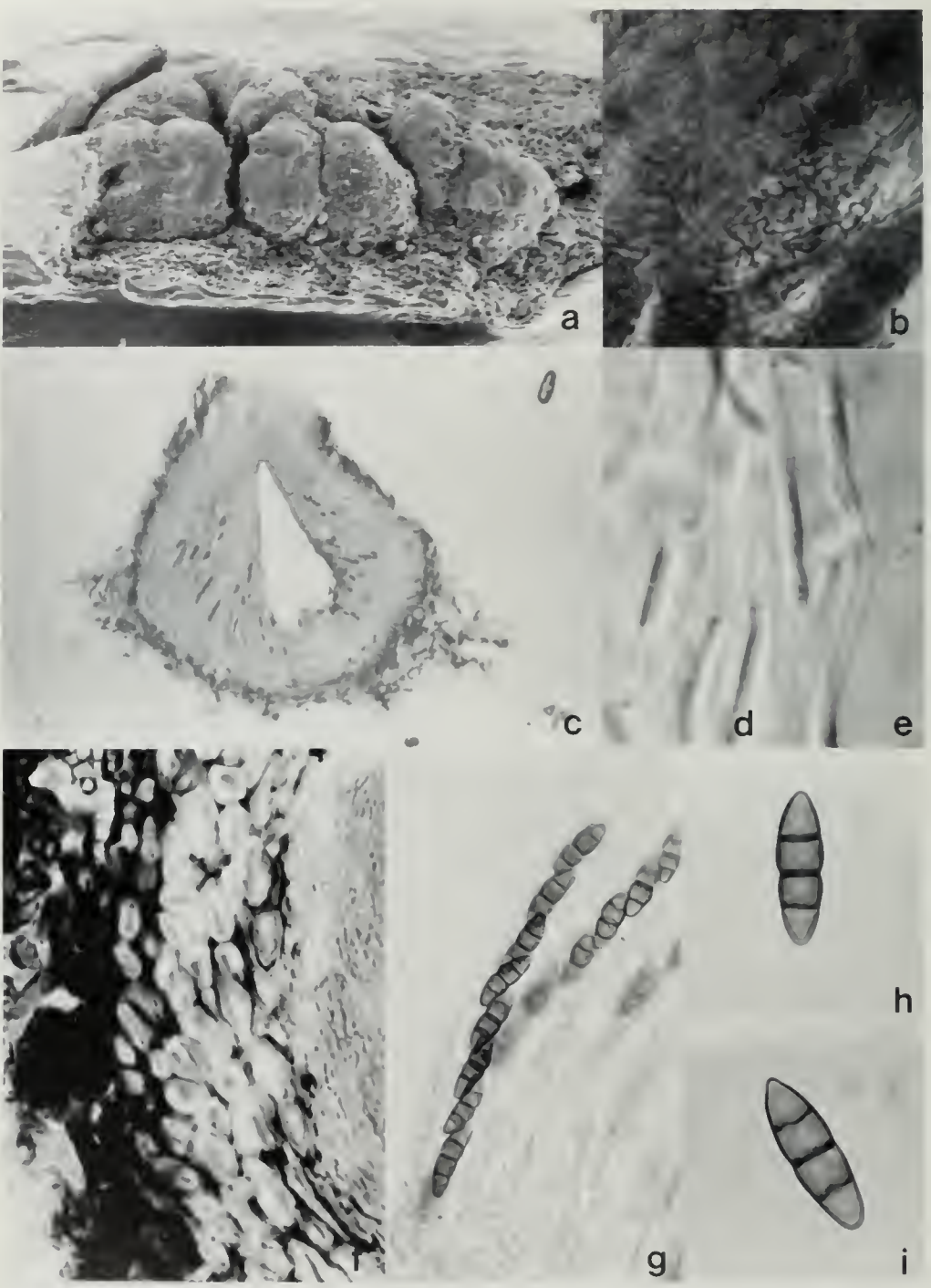

Figure 13. *Melanomma pulvis-pyrius*. a. SEM of erumpent ascocarps, x35. b. ascocarp wall surface, x550. c. longitudinal median section through ascocarp, x75. d, e. trabeculate pseudoparaphyses, x2,000. f. longitudinal median section through ascocarp wall, x950. g. ascus, x525. h, i ascospores, x1,150. All from holotype of *Cladosphaeria rimicola*.

Other material examined: SWITZERLAND: Bremengartenwald, on Prunus avium L. (holotype of *Cladosphaeria rimicola*, BERN). UNITED STATES: CALIFORNIA: Spruce Cove Heads, Trinidad, Humbolt Co., on *Rubus parviflorus*, 30 Jan. 1941, H.E. Parks 6513 (FH).

Comments: *Leptosphaeria rimicola*, described from the fallen branches of *Prunus avium* L., is synonymous with *Melanomma pulvis-pyrius*. *Leptosphaeria rimicola* has the overall appearance of *M. pulvis-pyrius*, with large, gregarious, superficial ascocarps and ascospores with the characteristic *Melanomma* shape: 3-septate with the primary median septum dividing the spore into a wider anterior and a narrower posterior part. The measurements of the ascospores of *L. rimicola* are somewhat larger than were found by Chesters (1938) for *M. pulvis-pyrius*, but they are not beyond the range for *M. pulvis-pyrius* given by Saccardo (1878). The asci peripherally lining the centrum about halfway up the wall and the ascocarp wall composed of small thickened cells correspond to Barr's (1987a) concept of the genus *Melanomma*. The pseudoparaphyses are thin and flexuous, but the branchings and anastomoses are infrequent and the septa often show thickenings, making them difficult to accurately identify as trabeculate.

Leptosphaeria Species Referable to the Dothideales

The species in this chapter all belong in the Dothideales (*sensu* Barr 1987a). Barr's concept of this order differs considerably from the all-inclusive concept of von Arx and Müller (1975) or the broad concept of Eriksson and Hawksworth (1985, 1986). The Dothideales (Barr 1987a) are characterized by ascocarps without a hamathecium (although interthecial cells are often present) and by asci that tend to be ovoid to saccate, arranged in a basal fascicle or a basal layer. The families represented are the Dothioraceae and the Pseudosphaeriaceae.

Dothioraceae

•*Saccothecium sepincola* (E.M. Fries:E.M. Fries) E.M. Fries, Summa Vegetabilium Scandinaviae, p. 398. 1849. See Figure 14.

≡ *Sphaeria sepincola* E.M. Fries, Observationes Mycologicae. 1:181. 1815; Systema Mycologicum Sistens Fungorum 2:498. 1823. [As *saepincola*.]

≡ *Metasphaeria sepincola* (E.M. Fries: E.M. Fries) P.A. Saccardo, Sylloge Fungorum Omnium Hucusque Cognitorum Digessit P.A. Saccardo 2:164. 1883. [As Fr? Fuckel.]

≡ *Leptosphaeria sepincola* (E.M. Fries:E.M. Fries) H.G. Winter, Dr. L. Rabenhorst's Kryptogaman-Flora von Deutschland, Oesterreich und der Schweiz, Second edition, 1(2):473. 1885.

≡ *Sphaerulina sepincola* (E.M. Fries: E.M. Fries) K. Starbäck, Botaniska Notiser 1890:117. 1890; Botanisches Zentralblatt, 46:261. 1891.

≡ *Pringsheimia sepincola* (E.M. Fries: E.M. Fries) F. v. Höhnel, Annales Mycologici 18:97. 1920.

≡ *Pleosphaerulina sepincola* (E.M. Fries: E.M. Fries) H. Rehm *in* F. v. Höhnel, Annales Mycologici 18:96. 1920.

≡ *Sclerodothis sepincola* (E.M. Fries: E.M. Fries) F. Petrak, Annales Mycologici 19:41. 1921.

For other synonyms see Barr (1972).

Ascocarps thickly scattered, immersed-subepidermal, globose, glabrous, 180–200 µm diameter, 170–180 µm high. **Ascocarp wall** of textura angularis in surface view; in longitudinal section 25–36 µm thick at sides and base, up to 45 µm thick at apex, composed of 7–8 layers of pseudoparenchymatic, polygonal cells (5–6 x 6–12 µm), outer 2–3 layers of isodiametric-to-elongate, brown-melanized cells, inner 4–5 layers of hyaline-subhyaline, thin-walled, elongate-compressed cells, at the base giving rise to a central column (18–23 µm high, 27–36 µm wide) of hyaline, isodiametric cells (3–4 µm diameter, but cell boundaries becoming obscured in mass) on which the asci are borne. **Papilla** broadly rounded, bluntly conical, 45–55 µm high, 55–70 µm wide. **Asci** 40–60 x (13–)15–25 µm, numerous, fasciculate, borne on a basal column, oblong-ovate to clavate, thick-walled, short-stalked, apex rounded and thickened, with 8 bi- to triseriate ascospores. **Ascospores** (17–)18.5–20.5(–22.5) x 5.0–7.2 µm, obovate, with acute end cells, broad above and tapering to a narrower base, straight to slightly curved; 4-5(-6)-septate, septa unevenly distributed, septation order 3:2:1:2:4 or 4:2:1:3:5, primary septum submedian, vertical septum occasionally present in second or third cell from the top; hyaline, wall smooth, without sheath or appendages.

Lectotype: SWEDEN: Ad ramos emortuos Rosae aliorumque fruticum (UPS).

Exsiccatae: AUSTRIA: Nassau, on *Rosa canina*, as *Metasphaeria sepincola*, 1894, Fuckel, Herbier Barbey-Boissier 385 (FH); Nassau, on *Rubus fruticosus*, as *Sphaerulina intermixta* (Berk & Br) Sacc, 1894, Fuckel, Herbier

Figure 14. *Saccothecium sepincola*. a. SEM of immersed ascocarps, x125. b. longitudinal median section through ascocarp wall, x950. c. longitudinal median section through ascocarp, x225. d. asci, x1,050. e. ascocarp wall surface, x550. f. ascospores, x1,150. All from lectotype of *S. sepincola*.

Barbey-Boissier 501 (FH); Czechoslovakia: Weisskirchen, Ohrensdorf, as *Sphaerulina intermixta*, 25 Jan. 1912, Petrak, Fl. Boh. et Mor. exsic. Lfg. 4 Nr. 174. (FH); Germany: Leihterfeld bei Berlin, on *Philadelphus* sp., 1890, Sydow, Myc. March. 2934 (FH); Italy: Selva, as *Sphaerulina intermixta*, Sept. 1878, Saccardo, Myc. Ven. 1367 (FH).

•*Saccothecium sepincola* var. *abbreviata* (M.C. Cooke) S.M. Huhndorf comb. nov. See Figure 15.

≡ *Sphaeria abbreviata* M.C. Cooke, Handbook of British Fungi, p. 893. 1871. (Basionym).

≡ *Leptosphaeria abbreviata* (M.C. Cooke) P.A. Saccardo, Sylloge Fungorum Omnium Hucusque Cognitorum Digessit P.A. Saccardo 2:26. 1883.

Ascocarps 117–144 µm diameter, 81–99 µm high; wall 14–21 µm thick at the sides and apex, up to 27 µm thick at the base, composed of 7–8 layers of pseudoparenchymatic, polygonal cells (5–6 x 6–12 µm). **Papilla** broadly rounded. **Asci** (32–)41–61 x (13–)16.5–24.5 µm. **Ascospores** (12–)13.7–16.6 x 3.6–5.7 µm, 4-5(-6)-septate.

Holotype: Great Britain: On dead stems of bramble. Jan.–April (K).

Comments: *Saccothecium sepincola* is not uncommon, but it has been confused by mycologists over the years as exemplified by the number of name changes based on the fungus. Wehmeyer (1957) gave an account of the history and nomenclatural confusion surrounding this species, including its relationships with other organisms and its relationship to the later genus *Pringsheimia* Schulzer von Müggenburg. He also included a lectotypification of *Saccothecium* Fr. Barr (1972) lists the taxonomic synonyms of *Saccothecium sepincola*. In some treatments, *Pringsheimia sepincola* is still used as the name for this species (Froidevaux 1973, von Arx and Müller 1975, Sivanesan 1984). Holm (1975) argued for the lectotypification of *Saccothecium* Fr. 1835 by *S. sepincola* (Fr.) Fr. 1849, which, as mentioned above, apparently was already done by Wehmeyer (1957) (see Dennis 1978). Holm (1975) does not mention the lectotypification by Wehmeyer, so it is unknown if this lectotypification was not accepted or if Holm overlooked Wehmeyer's work. In any case, with lectotypification, *Saccothecium* is the correct name and *Pringsheimia* becomes a synonym.

Saccothecium sepincola is placed in the family Dothioraceae by Barr (1987a) and is characterized by sphaeroid ascomata with walls of pseudoparenchymatous cells and oblong to clavate asci with a thickened apex which arise from a central basal column or mound of hypothecial cells. The septate, hyaline, obovate ascospores usually have a vertical septum present in one or more of the central cells. These characters suggest a similarity to some *Dothiora* species with raised basal areas (Barr 1972).

Leptosphaeria abbreviata is regarded as a variety of *Saccothecium sepincola* because ascospore sizes differ. The ascospores of *S. sepincola* are 17–22 x 5–7 µm, whereas the spores of *S. sepincola* var. *abbreviata* are 12–16 x 3–6 µm. The ascospores appear to be mature in specimens of both species. The ascocarps also differ in size between the two species in the specimens seen.

Some discrepancy exists between Cooke's (1871) description of *Sphaeria abbreviata* and the fungus that was present on the type specimen. Cooke's (1871) description includes "perithecia minute, in short parallel lines" and "asci very short and broad, elliptical, pyriform or obovate," which matches the fungus in the type. But then he describes spores that are "triseptate, slightly torulose and pale brown," which does not match this fungus, although occasionally the spores when mature may appear slightly pale brown. It is unclear whether his description was simply inaccurate or whether he was looking at two different fungi. Only one fungus is present on the type specimen and it was similar to *S. sepincola*.

Pseudosphaeriaceae

•*Leptosphaerulina pulchra* (H.G. Winter) M.E. Barr, Contributions de l'Institut Botanique de L'Université de Montréal 73:7. 1959. See Figure 16.

≡ *Sphaerella pulchra* H.G. Winter, Hedwigia 11:145–146. 1872.

≡ *Leptosphaeria pulchra* (H.G. Winter) P.A. Saccardo, Sylloge Fungorum Omnium Hucusque Cognitorum Digessit P.A. Saccardo 2:53–54. 1883.

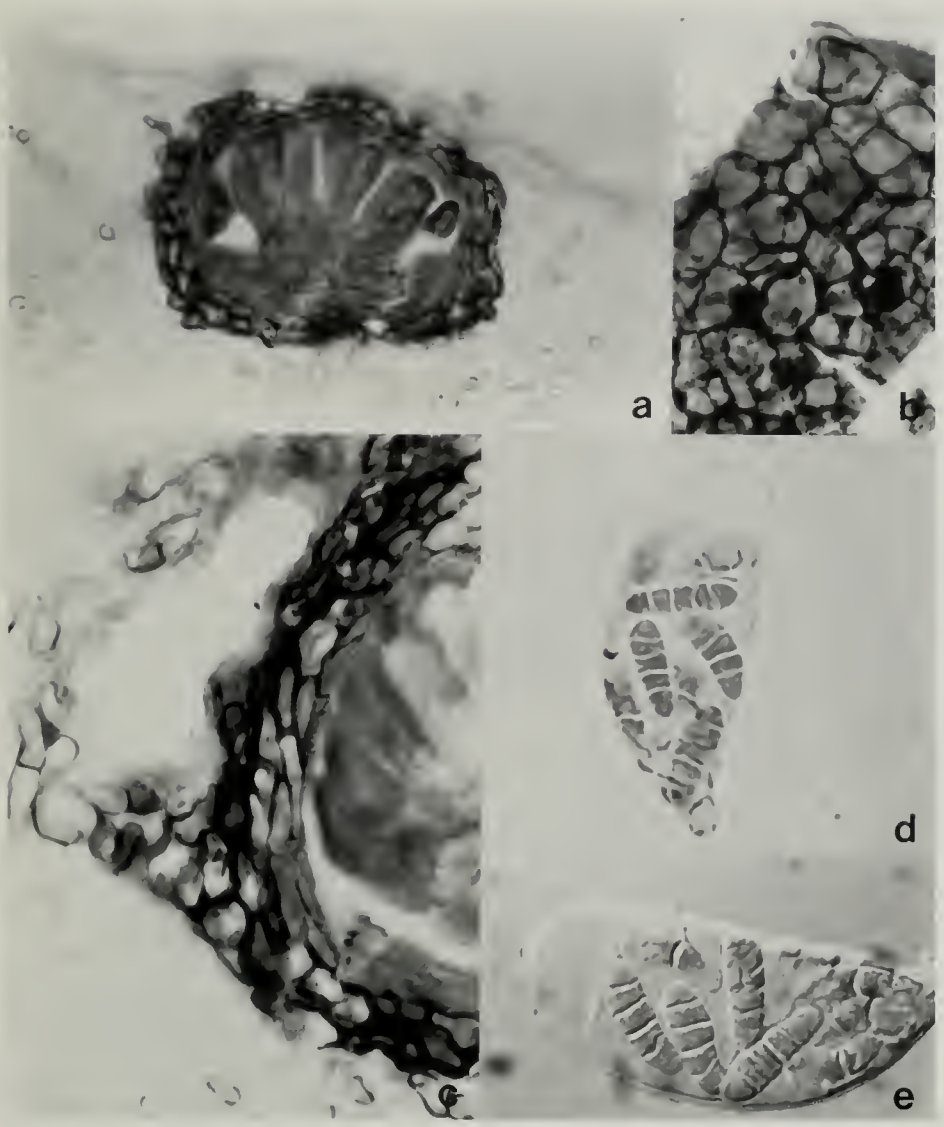

Figure 15. *Saccothecium sepincola* var. *abbreviata*. a. longitudinal median section through ascocarp, x375. b. ascocarp wall surface, x550. c. longitudinal median section through ascocarp wall, x950. d. ascus, x1,050. e. ascospores within an ascus, x1,150. All from holotype of *S. sepincola* var. *abbreviata*.

≡ *Mycotodea pulchra* (H.G. Winter) W. Kirschstein, Annales Mycologici 34:201. 1936; Kryptogamenflora de Mark Brandenburg und Angrenzender Gebiete herausgegeben von den Botanischen Verein der Provinz Brandenburg 7(3):433. 1938.

= *Leptosphaeria oligotheca* F. Petrak & H. Sydow, Annales Mycologici 22:359. 1924. [Described from type material of *Laestadia potentillae* E. Rostrup, Botanisk Tidsskrift 25:300. 1903.]

For other synonyms see Barr (1959).

Ascocarps thickly scattered, immersed-subcuticular, globose, papillate, glabrous, 50–75 µm diameter, 55–75 µm high. **Ascocarp wall** of textura globulosa in surface view; in longitudinal section uniformly 7.2–10.8(–12.7) µm thick, composed of 2–3 layers of pseudoparenchymatic, polygonal cells, outer 1–2 layers of brown-melanized cells (3.6–5.6 x 5.6–10.1 µm) covered by a brown-pigmented crust, inner 1–2 layers of hyaline, elongate-compressed cells (2.1–3.6 x 8.6–10.1 µm). **Papilla** short, erumpent, bluntly conical, 10–20 µm high, 10–21 µm wide at apex, 21–29 µm

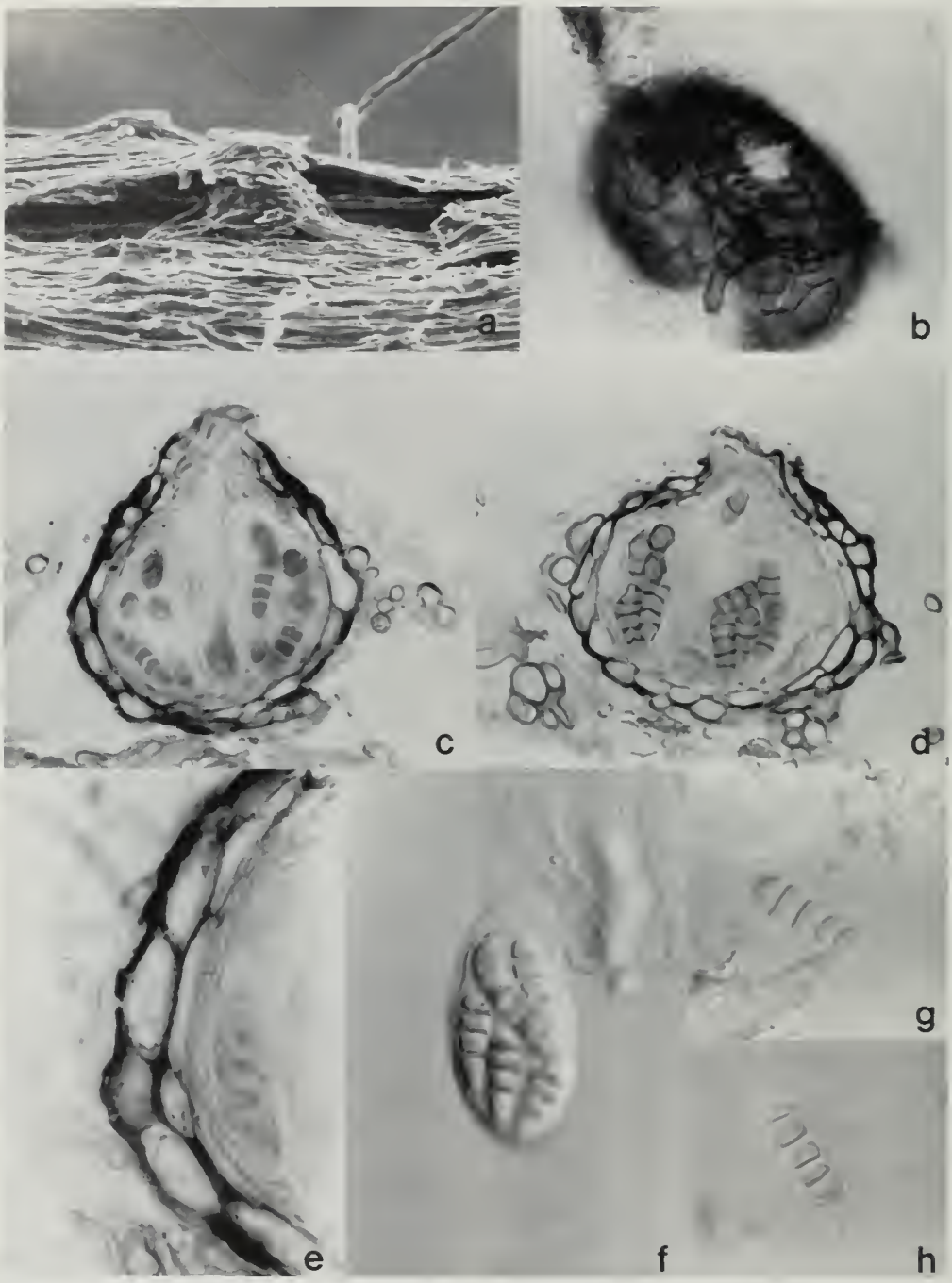

Figure 16. *Leptosphaerulina pulchra*. a. SEM of ascocarp, x250. b. ascocarp wall surface, x550. c, d. longitudinal median section through ascocarps, x650. e. longitudinal median sections through ascocarp wall, x950. f. ascus, x1,050. g, h. ascospores, x1,150. a, b, d, and f from holotype of *Leptosphaeria oligotheca*; c, e, g, and h from neotype of *Leptosphaerulina pulchra*.

wide at base, neck wall 3.6–8.6 µm thick, composed of 2–3 layers of isodiametric-elongate cells (3.6–4.3 x 3.6–6.5 µm) surrounding a circular ostiole (9–12 µm wide) without periphyses. Remnants of interthecial tissue remain between and above the asci. **Asci** 32–45 x 15–20 µm, few, basal, fasciculate, ovoid-saccate, thick-walled, sessile, rounded apex, without apical chamber, with 8 tri- to tetraseriate ascospores. **Ascospores** 17.2–20.8 x 5.7–7.2 µm, clavate to obovoid, bipolarly asymmetrical with broadly rounded apical end cell and acutely rounded basal end cell, straight; 4(-5)-septate, septa unevenly distributed, order of septation 3:1:2:4, primary septum supramedian and constricted, a single vertical septum occasionally present in the central cells; subhyaline to pale brownish yellow, wall smooth, without sheath or appendages.

Holotype: AUSTRIA: Ad caules foliaque aridos *Potentillae caulescentis*, "am Martinstein bei Seis in Tyrol" 1870 von v. Hausmann gesammelt (B), (n.v.), presumed destroyed.

Neotype: UNITED STATES: MAINE: Basin Pond, Baxter St. Park, July 5, 1962, MEBB # 3316 (NY).

Other material examined: CANADA: Labrador, Newfoundland, Blanc Sablon, July 19, 1957, R.T. Wilce #161 (NY). ICELAND: on *Potentilla maculata*, type material of *Laestadia potentillae* Rostrup, July 14, 1884 (Holotype of *Leptosphaeria oligotheca*, C). UNITED STATES: MAINE: Mt. Katahdin, Baxter St. Park, Tablelands from Saddle Trail, ca. 4200', Aug. 3, 1962, MEBB # 3546 (NY); NEW HAMPSHIRE: Mt. Washington, on *Potentilla tridentata*, June 9, 1894 (FH as *Sphaerulina potentillae*); Mt. Monadnock, near Dublin, June 27, 1961, MEBB # 2927 (NY).

Comments: *Leptosphaerulina pulchra* is placed in the family Pseudosphaeriaceae because of the minute, sphaeroid-globose ascocarps with a very thin wall composed of pseudoparenchymatous cells and the interthecial tissues. The species is recognized readily on the basis of its saccate asci, ascospore shape, and septation. Barr (1959) mentions the presence of a vertical septum in the central cells, but in most of the collections seen, vertical septa were lacking. Still, the obovate, asymmetrical ascospore shape is distinctive.

The holotype of *Leptosphaerulina pulchra* at B, not located, is presumed to have been destroyed with the rest of the ascomycete collection during World War II. Also unsuccessful were attempts to locate authentic material of Winter or of the collector, von Hausmann. Because of this, a neotype for *L. pulchra* was chosen (MAINE: Basin Pond, Baxter St. Park, July 5, 1962, MEBB # 3316) from the M.E. Barr collection now at NY. The neotype reflects both the original description and the current, well-established concept of this species.

Leptosphaeria oligotheca is synonymous with *Leptosphaerulina pulchra*. When Petrak and Sydow (1924) originally described *Leptosphaeria oligotheca* from material on the type of *Laestadia potentillae*, on stems of *Potentilla maculata*, they did not segregate any of the material as the holotype for *L. oligotheca* and none could be found with their herbarium specimens at W or S. The type specimen of *Laestadia potentillae* at C contained abundant material matching the description of *Leptosphaeria oligotheca*, so a portion was segregated as the holotype of that fungus.

Barr (1959) mentions several other species whose descriptions suggest they may be synonymous with *Leptosphaerulina pulchra*. One of these was *Sphaeria minima* Duby *in* C. Roumeguère, Fungi Selecti Gallici Exsiccati, Century 7, No. 694. Anno 1880. Examining specimens from the exsiccatae sets at G, FH, NY, and ILL showed that they included many ascocarps, but none contained asci or ascospores. Therefore, it was impossible to resolve the placement of this species.

•*Diadema obtusa* R.A. Shoemaker & C.E. Babcock, Canadian Journal of Botany 67: 1353–1354. 1989. See Figure 17.

Ascocarps thickly scattered, immersed-subcuticular becoming erumpent, globose, glabrous to slightly tomentose, with smooth brown hairs, 100–150 µm diameter, 120–150 µm high. **Ascocarp wall** of textura angularis in surface view; in longitudinal section (7.5–) 10–18 µm thick at sides and base, composed of 2–3 layers of brown-melanized, polygonal, pseudoparenchymatic cells (1.8–4.3 x 7–11

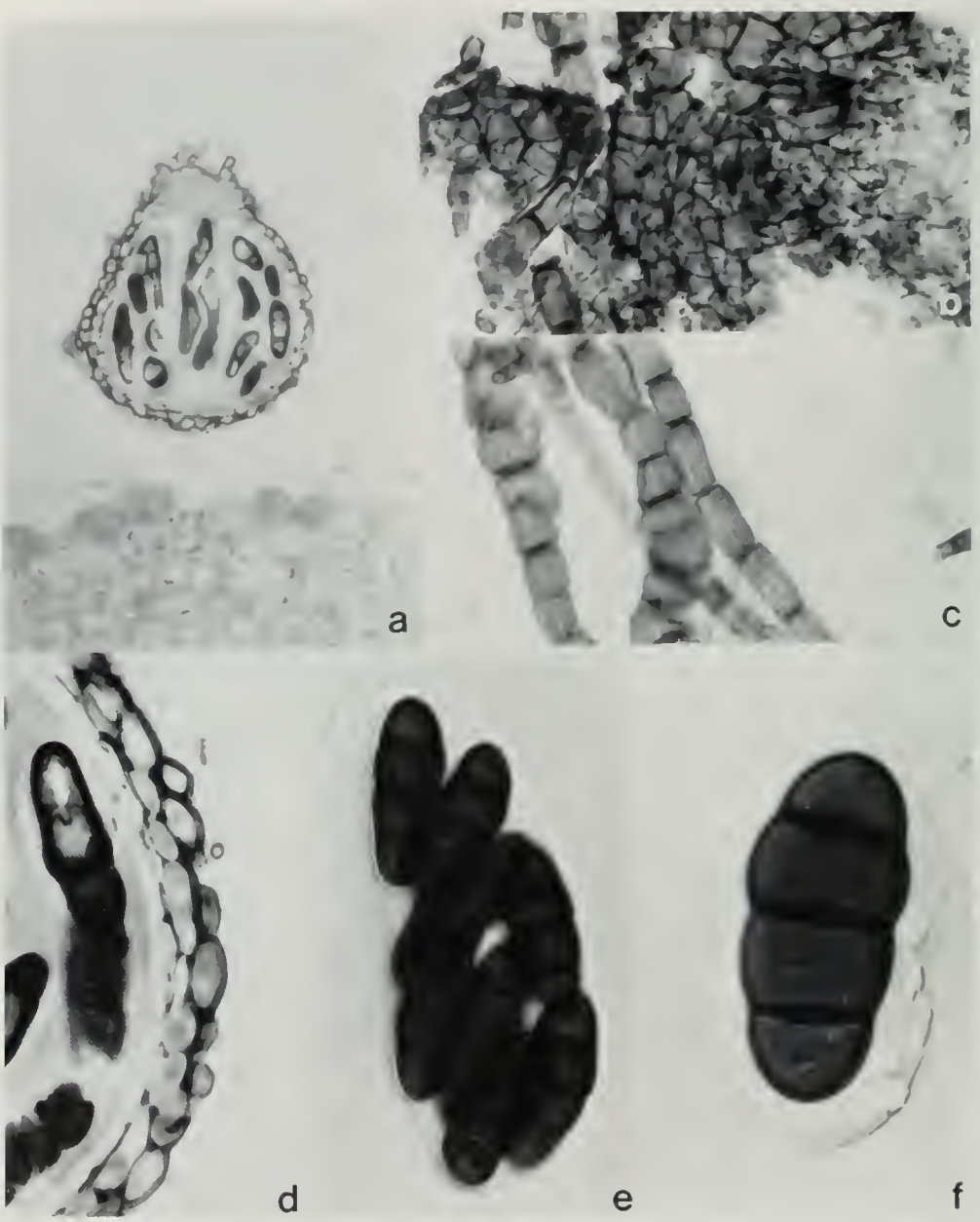

Figure 17. *Diadema obtusa*. a. longitudinal median section through ascocarp, x250. b. ascocarp wall surface, x550. c. hyphae on substrate surface, x550. d. longitudinal median section through ascocarp wall, x950. e. ascus, x525. f. ascospore, x1,050. All from collection 123871, on *Potentilla agrophylla*.

µm). **Apex** broadly rounded, 18–27 µm thick, 45–65 µm diameter, composed of 2–3 outer layers of brown-melanized, isodiametric cells (3.6–5.4 µm diameter) with 6–8 layers of hyaline pseudoparenchyma below center, opening area not seen, possibly discoid, caplike opening lacking, ostiole not seen. Interthecial tissues present. **Asci** (100–)120–145 x (30–) 50–70 µm, few, basal, fasciculate, ovoid-saccate to clavate, thick-walled, short-stalked, rounded apex, with apical chamber, with 8 tri- to tetraseriate ascospores. **Ascospores** (41.5–) 45–50(–55) x (15–17–)19–23 µm, broadly fusiform, acutely rounded end cells, second cell

enlarged, straight to slightly curved, occasionally flattened in one plane; 3-septate, septa slightly unevenly distributed, order of septation 2:1:2, primary septum median and constricted, slightly constricted at other septa; brown, wall smooth, sharply delimited sheath entirely surrounding spore (5–7.5 µm thick), without appendages.

Holotype: India: Kashmir: 123831(b), on *Trisetum spicatum*, Pensi La, Zaskar, 16,500 ft. W. Koelz (5906), 23 July 1933, TYPE, ex Herb. Wehmeyer, as *Leptosphaeria hollosiana* nom. nov. (DAOM).

Other material examined: India: 123871, on *Potentilla agrophylla* Wall., Spiti Valley, Bara Lacha Pass, 16,500 ft, Bhagwan Singh (5), 8 July 1932, ex Herb. Wehmeyer, as *Leptosphaeria hollosiana* nom. nov. (DAOM).

Comments: Shoemaker and Babcock (1989a) established the new genus *Diadema* for a group of alpine fungi with relatively large, very dark brown ascospores. They did not place the genus within a family or order. Eriksson and Hawksworth (1990) placed it in the Dothideales but did not designate a family. In the present report I treat it under the Pseudosphaeriaceae because it resembles *Wettsteinina* Höhnel; for example, some species have a peculiar disclike opening of the ascocarp and have interthecial tissue in the centrum. *Diadema* is characterized by globose, subcuticular ascocarps with a thin wall of brown polygonal cells and broadly fusiform ascospores that are dark brown and have a prominent sheath.

Wehmeyer (1963) published the name *Leptosphaeria hollosiana* for *Leptosphaeria maritima* L. Hollós because the latter binomial was predated by *L. maritima* (Cke. & Plowr.) Sacc. He applied the new name to several collections from India and Pakistan, including two collections on *Potentilla*. Shoemaker and Babcock (1989a) described two new species of *Diadema* from these collections, including the type of the genus, *D. acuta*, on *Trisetum spicatum* (L.) Richt., and *D. obtusa*, also on that host. The collections on *Potentilla* were also determined to be *D. obtusa*. The collection on *Potentilla* served as the basis for this description and plate because of the Rosaceous host and because it had numerous ascocarps. The other collections of *D. obtusa* were sparse.

As Shoemaker and Babcock (1989a) noted, the ascocarp opening mechanism in this species is not clearly understood. It is not distinctly caplike but in vertical section becomes almost papillate (Figure 17a). The entire upper section of the wall is subtended by hyaline pseudoparenchyma. Interthecial pseudoparenchymatic threads occurred between the asci. Also, coarse, brown hyphae were seen on the host surrounding several of the ascocarps, and some of the ascocarps were not glabrous but had tapered hairs at the top. I did not see the ascospores flattened in one plane, as did Shoemaker and Babcock (1989a). Shoemaker and Babcock (1989a) suggested that the generic placement of this species is not ideal because several characters were not identical to those of the type species. The overall aspect of this species, however, suggests an affinity with the type species, and that it is adequately placed in this genus. It appears that certain characters, such as the ascocarp cap and interthecial tissues, are variable among collections and may depend on the maturity of the specimen, as was also noted by Shoemaker and Babcock (1989a). Species of *Wettsteinina* are similarly variable, either showing a disclike cap or an ostiolar opening to the ascocarp; species with either character state are adequately retained within the genus because of overall resemblances (Shoemaker and Babcock 1987). Thus, such variation does not appear sufficient to exclude species from these genera.

•*Diadema sieversiae* (C.H. Peck) S.M. Huhndorf comb. nov. See Figure 18.

≡ *Lophiostoma sieversiae* C.H. Peck, New York State Museum Bulletin 167:44. 1913. (Basionym).

≡ *Wettsteinina sieversiae* (C.H. Peck) M.E. Barr, Canadian Journal of Botany 45:1042. 1967.

= *Massaria sieversiae* F.E. Clements, Cryptogamae Formationum Coloradensium, Century III, No. 234. Anno 1906. Nom. nud. Art. 36.1.

≡ *Leptosphaeria sieversiae* (F.E. Clements) F. Petrak, Sydowia. Annales Mycologici 6(1-4):6. 1952. [Combination is not valid because the basionym is an invalidly published species.]

Ascocarps thickly scattered, immersed-subcuticular becoming erumpent, globose,

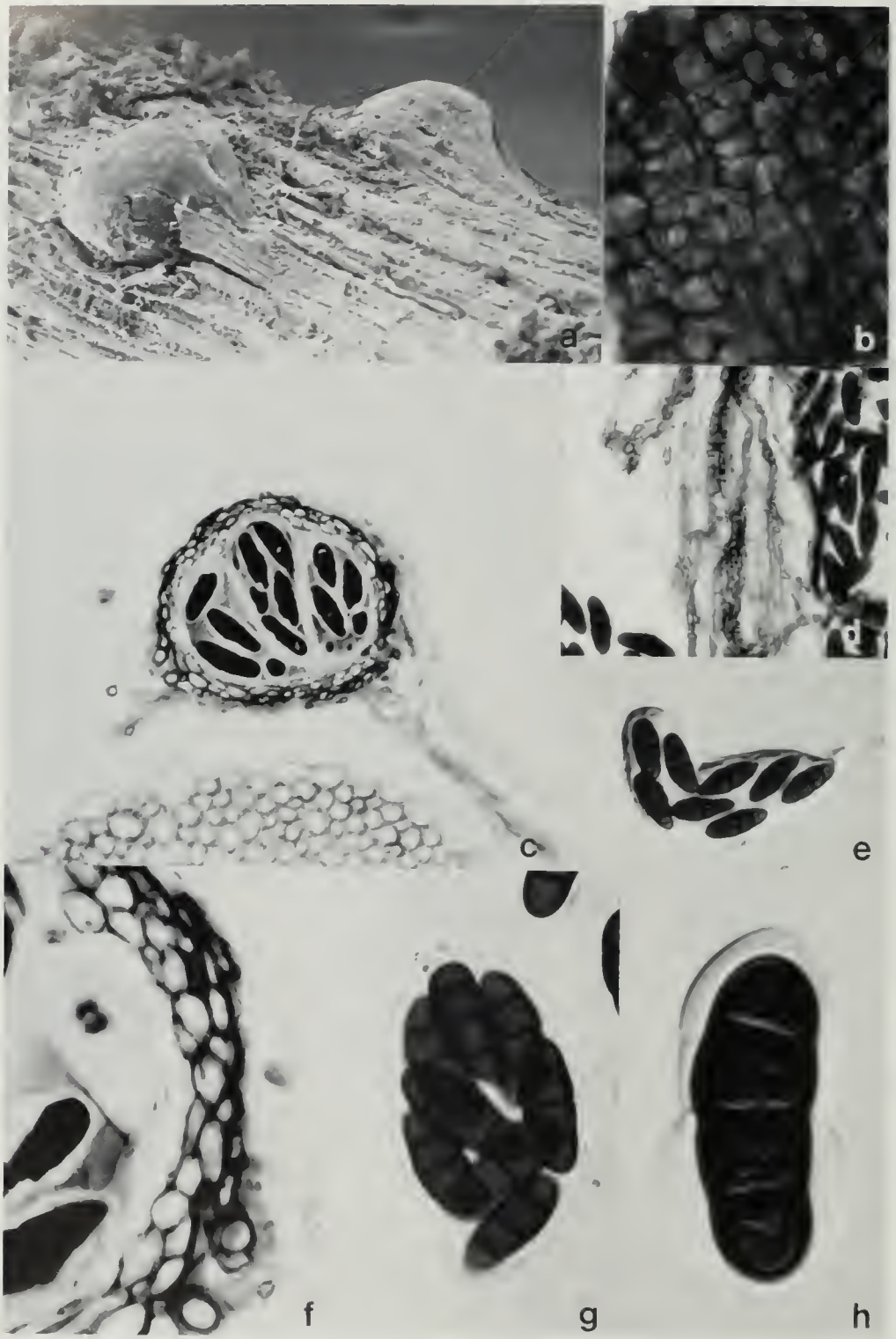

Figure 18. *Diadema sieversiae*. a. SEM of erumpent ascocarps, x125. b. ascocarp wall surface, x550. c. longitudinal median section through ascocarp, x250. d. hyphae on substrate surface, x200. e. elongated ascus, x250. f. longitudinal median section through ascocarp wall, x950. g. ascus, x525. h. ascospore, x1,050. a, b from holotype of *D. sieversiae*; c–h from isotype of *Massaria sieversiae*.

glabrous to slightly tomentose, with loose dark-walled, longitudinal hyphae on the substrate, surrounding and connecting the ascocarps, 130–190 µm diameter, 120–175 µm high. **Ascocarp wall** of textura angularis in surface view; in longitudinal section uniformly 12.6–20 µm thick, composed of 3–4 layers of brown-melanized, pseudoparenchymatic, polygonal, isodiametric-elongate cells (3.6–5.6 x 7.2–13 µm) with a brown-melanized crust, at base 3–4 inner layers of small, hyaline pseudoparenchyma. **Apex** broadly rounded, with inner 3–4 layers of hyaline, pseudoparenchymatic cells (2–5 µm diameter), no evidence of papillate or caplike opening, ostiole not seen. Interascal pseudoparenchyma present. **Asci** (110–)130–170 x 40–70 µm, few, basal, fasciculate, ovoid-saccate, thick-walled, sessile, rounded apex, with apical chamber, with 8 tri- to tetraseriate ascospores. **Ascospores** (43.5–)50.6–56.0 (–57.9) x (16–)20–23.5(–25.5) µm, broadly fusiform, with acutely rounded end cells, second cell enlarged, straight to slightly curved; 3-septate, septa slightly unevenly distributed, order of septation 2:1:2, primary septum slightly supramedian and constricted, occasionally constricted at other septa; brown, wall smooth, sharply delimited sheath entirely surrounding spore [2.0–5.5(–10.5) µm thick, often constricted at midseptum, sheath occasionally gelatinizing and becoming amorphous (7–12 µm thick)], without appendages.

Holotype: United States: Utah: 193727, on *Sieversia turbinata* (Rydb.) Greene, Big Cottonwood Canyon, Salt Lake Co., A.O. Garrett 702, 3 July 1913 (NYS).

Exsiccatae: United States: Colorado: Bottomless Pit, July 13, 1906, Clements, Crypt. Form. Colorad. 234 (isotype of *Massaria sieversiae*, NY, FH).

Comments: *Diadema sieversiae*, found on stems of *Acomastylis turbinata*, is characterized by globose ascocarps with thin walls of brown polygonal cells, dark-walled hyphae on the substrate, and broadly fusiform, dark brown ascospores with a prominant gelatinous sheath. It bears a strong resemblance to *D. obtusa*, but in that species the spores are slightly shorter and the dark brown hyphae in the host are not as prevalent. The ascocarp shapes differ somewhat, but I also saw no indication of a cap or disclike opening mechanism in *D. sieversiae*. Interthecial tissues were seen between the asci.

Diadema sieversiae was described by Peck (1913) as a species of *Lophiostoma*, but it bears no compressed beak or ostiole that would warrant inclusion in that genus. Barr (1967) transferred it to *Wettsteinina* because of the medium- to small-sized ascocarps immersed in dead host tissues and the oblong to saccate asci interspersed with interthecial tissue. Shoemaker and Babcock (1987) excluded it from *Wettsteinina* because of the dark brown ascospores with thick septa that are unlike the usual spores for *Wettsteinina*. It was left in *Lophiostoma* and later (Shoemaker and Babcock 1989a) was not included in *Diadema*. Clearly this fungus does not belong in *Lophiostoma*, and it bears a much greater resemblance to *Diadema* than to *Wettsteinina*. Even if it ultimately does not stay in *Diadema*, because of the lack of a disclike cap opening (as suggested for *D. obtusa* by Shoemaker and Babcock 1989a), it seems useful to place this species in *Diadema*, in the hope that additional collections may be discovered.

Massaria sieversiae, which was transferred to *Leptosphaeria*, is synonymous with *Diadema sieversiae*.

Leptosphaeria Species Referable to the Hymenoascomycetes

The following *Leptosphaeria* species are all referable to the class Hymenoascomycetes (*sensu* Barr 1987a). The presence of perithecia and unitunicate asci separates these fungi from those in the Loculoascomycetes possessing pseudothecia and bitunicate asci. The families represented are Clypeosphaeriaceae, Diaporthaceae, and Amphisphaeriaceae.

Clypeosphaeriaceae

•*Clypeosphaeria mamillana* (E.M. Fries:E.M. Fries) J.B.E. Lambotte, Memoires de la Societe Royale des Sciences de Liege, ser 2, 14:128. 1887. See Figure 19.

≡ *Sphaeria mamillana* E.M. Fries:E.M. Fries, Systema Mycologicum 2:487. 1823.

= *Sphaeria clypeiformis* G. de Notaris, Memorie della Accademie della Scienze di Torino Series 2, No. 7, p. 113. 1853; Micromycetes Italici Novi vel Minus Cogniti 7, p. 113. 1845. Non *Sphaeria clypeiformis* L.V. de Lacroix *in* G.L. Rabenhorst.

≡ *Clypeosphaeria notarisii* L. Fuckel, Symbolae Mycologicae, p. 117. 1870.

≡ *Leptosphaeria (Clypeosphaeria) notarisii* M.C. Cooke, Grevillea 17:91. 1889.

See Barr (1989) for other synonyms.

Ascocarps scattered, separate or gregarious, immersed-subepidermal beneath blackened clypei, papilla crumpent, glabrous, conic-globose, 300–400 µm diameter, 400–450 µm high. **Ascocarp wall** of textura angularis in surface view; in longitudinal section uniformly 18–25 µm thick, composed of 10–15 layers of hyaline, elongate-compressed, scleroplectenchymatic cells (0.7–1.5 x 7–15 µm), outer 2–3 layers of hyaline, rounded, polygonal cells (2.0–3.6 µm diameter). **Papilla** conic, 130–160 µm high, 50–75 µm wide at the apex, 150–225 µm wide at the base; wall 15–30 µm thick at apex, 35–65 µm thick at base, composed of 10–15 layers of small, brown-melanized, thick-walled, rounded, polygonal cells at base (1.5–3.6 µm diam), cells converging and appearing as elongate, setaelike structures at apex, surrounding a 25–50 µm wide circular ostiole with periphyses. **Paraphyses** 0.5–1.5 µm wide, numerous. **Asci** 150–170 x 8–10 µm, unitunicate, numerous, basal to peripheral, cylindrical, short-stalked, rounded apex, apical ring J+, with 8 overlapping uniseriate ascospores. **Ascospores** 21–26 x 5.7–8 µm, ovoid-oblong, straight to slightly curved; at times 1-septate near base, large cell appearing 3-septate with separation of cytoplasm; brown, smooth, without sheath or appendages, germ slits not seen.

Exsiccatae: Austria: On *Rubus fruticosus*, Fuckel, F. rhen. 1823 (FH); Mappen. on *Epilobium angustifolii*, as *Sordaria clypeiformis* f. *Epilobii*, Fuckel, F. rhen. 2036 (FH); Herb. Barbey-Boissier 146 = F. rhen. 1823, as *C. notarisii* (NY); Great Britain: Lynn, on *Epilobium hirsutum*, as *Sphaeria clypeata* Nees., Jan. 1877, Plowright, Sphaer. Brit. 57 (FH); Italy: on *Rubus fruticosus*, as *Sphaeria clypeiformis*, Aug. 1857, leg. Caldesi, Rabenhorst, Herb. myc. 645 (FH); as *Sphaeria clypeiformis*, 1857, leg. Caldesi, de Notaris, Erb. Critt. Ital. 47 (FH); La Spezia, as *C. notarisii*, Aug. 1880, Roumeguere, F. Gall. exs. 2095 (NY); Vittorio (Treviso), on *Rubus fruticosus*, as *C. notarisii*, Sept. 1897, Saccardo, Mycotheca ital. 101 (NY); Conegliano, as *C. notarisii*, Aug. 1877, Mycotheca veneta 1159 (NY); St. Romani-ad-Vigennam, as *S. clypeiformis* de Lcrx., 1859, leg. T. de Lacroix, Rabenhorst, F. europ. 331 (RO).

Other material examined: Italy: Capraria, on *Rubus*, as *Sphaeria sepincola ruborum*, 1837,

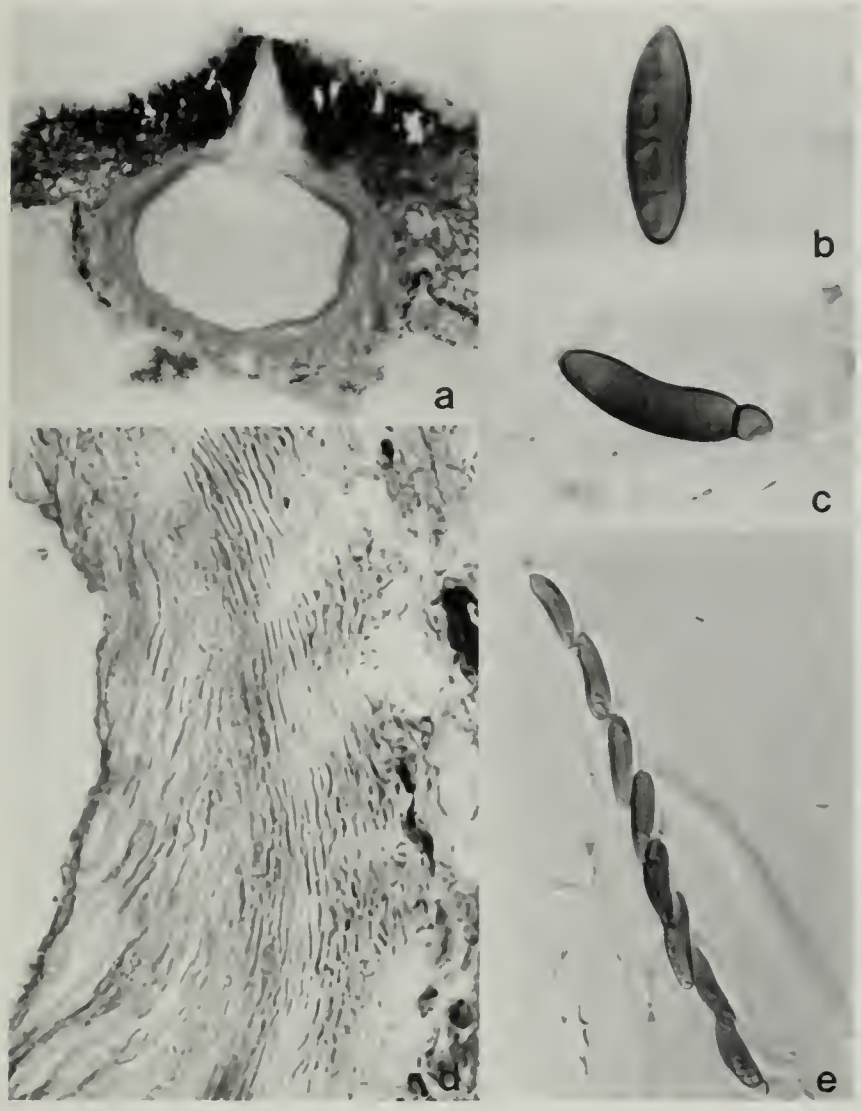

Figure 19. *Clypeosphaeria mamillana*. a. longitudinal median section through ascocarp, x100. b, c. ascospores, x1,150. d. longitudinal median section through ascocarp wall, x950. e. ascus, x525. All from lectotype of *C. notarisii*.

de Notaris (Lectotype of *Sphaeria clypeiformis*); two collections of *Sphaeria clypeata*, 1840; Spezia, Aug. 1857, Herb. N.A. Pedicino, 1883; on *Rubus*, as *S. clypeiformis*, Mar. 17, 1842, de Notaris (all RO).

Comments: *Clypeosphaeria notarisii*, a synonym of *Clypeosphaeria mamillana*, is characterized by cylindrical asci with an elongate, J+ apical ring and curved, brown ascospores appearing 3-septate with separation of the cytoplasm. Barr (1989) gives the synonymy and a short history of *Clypeosphaeria* and argues for the utilization of the family Clypeosphaeriaceae.

Clypeosphaeria was established by Fuckel (1870), who included *C. notarisii* as a new name for *Sphaeria clypeiformis* de Not. A specimen of *Sphaeria sepincola ruborum* was mentioned in the description of *Sphaeria clypeiformis*, and a collection of this at RO is here designated as the lectotype of *S. clypeiformis* (ITALY: Capraria, on *Rubus*, 1837, de Notaris, RO).

Diaporthaceae

•*Diaporthe eres* T.R.J. Nitschke, Pyrenomycetes germanici, p. 245. 1867. See Figure 20.

= *Sphaeria controversa* J. Desmazierès (pro parte), Annales des Sciences Naturelles, Paris, Botanique, Series 2, 17:102. 1842.

≡ *Leptosphaeria controversa* (J. Desmazierès) V. Cesati & G. de Notaris, Commentario della Societa Crittogamologica Italiana 1:235. 1863.

≡ *Diaporthe controversa* (J. Desmazierès) T.R.J. Nitschke *in* L. Fuckel, Symbolae Mycologicae Nachtrag 1:319. 1871.

See Wehmeyer (1933) for other synonyms.

Ascocarps scattered, separate or clustered, immersed-subepidermal often beneath blackened stromatic tissue, papilla erumpent singly or in loose clusters, glabrous, globose, flattened at top and base, 300–400 µm diameter, 250–350 µm high. **Ascocarp wall** of textura angularis in surface view; in longitudinal section 25–35 µm thick at the sides, 15–20 µm thick at the base, composed of 7–8 layers of hyaline, elongate-compressed, scleroplectenchymatic cells (0.7–1.5 x 10–15 µm), wall near apex 45–50 µm thick, composed of 10–12 layers of brown-melanized, polygonal, isodiametric cells (2–3 µm diam). **Papilla** long cylindrical, central or eccentric, 125–180 µm high, 50–75 µm wide; wall 25–35 µm thick, composed of small, brown-melanized, thick-walled, rounded, polygonal cells (1.5–3.0 µm diameter), surrounding a 25–40 µm wide circular ostiole with periphyses. **Paraphyses** 0.5–1.5 µm wide, numerous, septate, unbranched. **Asci** 38–55 x 6–8.5 µm, unitunicate, numerous, basal to peripheral, dehiscent, clavate, short-stalked, rounded apex, with 8 biseriate ascospores. **Ascospores** 10.5–13.5 x 2.0–3.6 µm, fusiform, straight to slightly curved; 1-septate, constricted; hyaline, with four distinct oil droplets, smooth, without sheath, occasionally with small, cellular bipolar appendages.

Isotype: FRANCE: Habitat in caulibus plantarum, in ramis exsiccatis Fraxini, Rubi, Aceris Negundinis, etc. Desm. Pl. Crypt. Fr. exs. XXVI 1255 (PC, FH, BPI).

Comments: *Sphaeria controversa* (pro parte) is synonymous with *Diaporthe eres* (Wehmeyer 1933) and is characterized by ascocarps immersed beneath blackened stromata, with central or eccentric, long cylindrical necks with periphyses. As they mature, the numerous asci loosen and become free within the centrum. Ascospores are hyaline and 1-septate and have four distinct oil droplets.

The exsiccati collections all consisted of several different twigs of unknown identity, none of which appeared to be *Rubus*, most with varying amounts of the fungus on them.

Amphisphaeriaceae

•*Discostroma fuscella* (M.J. Berkeley & C.E. Broome) S.M. Huhndorf comb. nov. See Figure 21.

≡ *Sphaeria (Obtectae) fuscella* M.J. Berkeley & C.E. Broome, Annals and Magazine of Natural History, London, Series 2, 9:325. 1852. (Basionym).

≡ *Leptosphaeria fuscella* (M.J. Berkeley & C.E. Broome) V. Cesati & G. de Notaris, Commentario della Società Crittogamologica Italiana 1:236. 1863.

= *Sphaeria corticola* L. Fuckel, Symbolae Mycologicae, p. 114, 1870.

≡ *Leptosphaeria corticola* (L. Fuckel) P.A. Saccardo, Michelia Commentarium Mycologicum Fungos in Primis Italicos Illustrans 1:342. 1878; Fungi Italici autographice delineati (additis nonnullis extra-italicis asterisco notatis), Patavii, table 288. 1878.

≡ *Metasphaeria corticola* (L. Fuckel) P.A. Saccardo, Sylloge Fungorum Omnium Hucusque Cognitorum Digessit P.A. Saccardo 2:166. 1883.

≡ *Griphosphaeria corticola* (L. Fuckel) F. v. Höhnel, Annales Mycologici 16:87. 1918.

≡ *Clathridium corticola* (L. Fuckel) R.A. Shoemaker & E. Müller, Canadian Journal of Botany 42:404. 1964.

≡ *Discostroma corticola* (L. Fuckel) J. Brockmann, Sydowia 28:313. 1975.

= *Sphaeria (Leptosphaeria) leiostega* J.B. Ellis, Bulletin of the Torrey Botanical Club (and Torreya) 8:91. 1881.

≡ *Leptosphaeria leiostega* (J.B. Ellis) J.B. Ellis, Catalogue of Plants Found in New Jersey, Geological Survey of New Jersey, Final Report of the State Geologist 2(1):525. 1889.

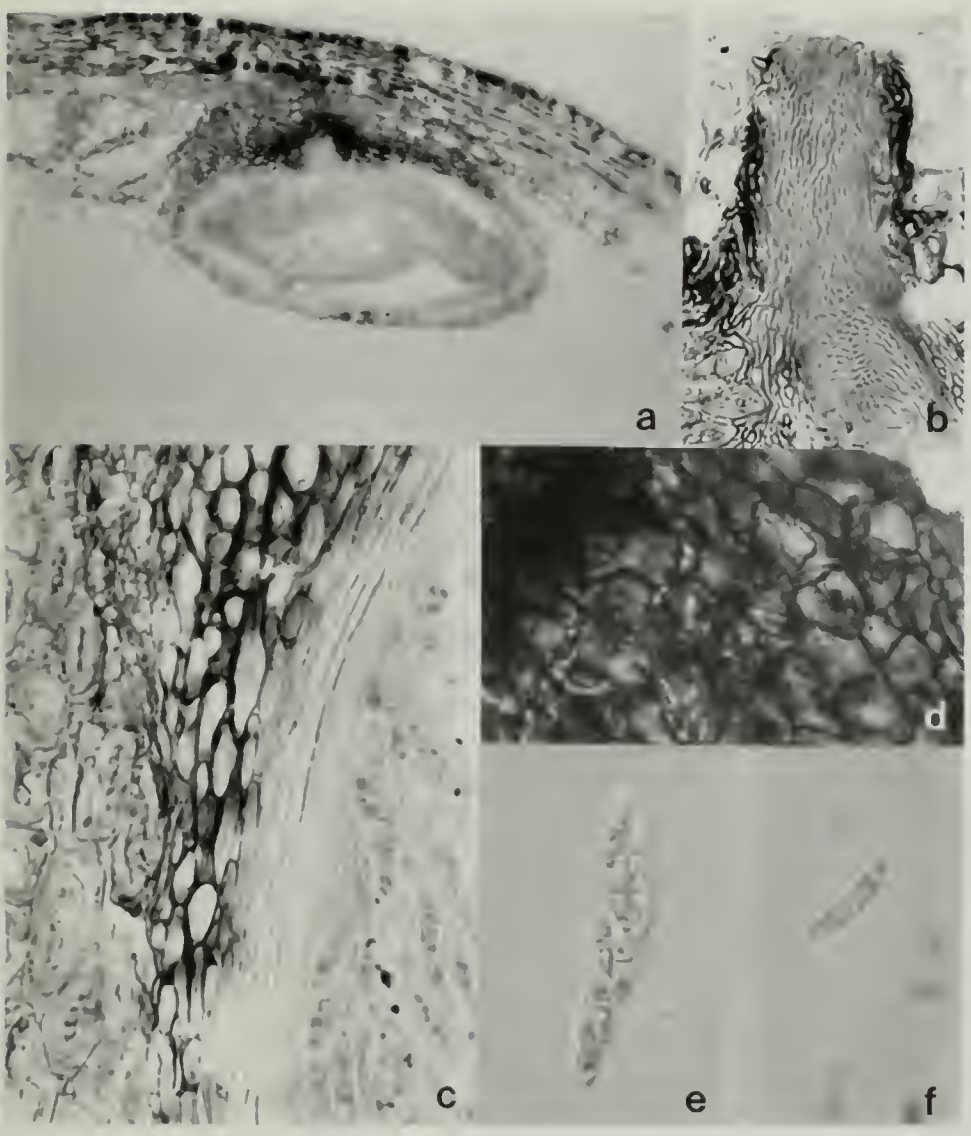

Figure 20. *Diaporthe eres*. a. longitudinal median section through ascocarp, x150. b. section through ascocarp neck showing periphyses, x400. c. longitudinal median section through ascocarp wall, x950. d. ascocarp wall surface, x550. e. ascus, x1,050. f. ascospore, x1,150. All from type of *Leptosphaeria controversa*.

≡ *Leptosphaeria lejostega* (J.B. Ellis) F. Hazslinszky, Matematikai és Természettudományi Közlemenyek Vonatkozólag a Hazai Viszonyokra 25(2):148. 1892.

≡ *Metasphaeria lejostega* (J.B. Ellis) P.A. Saccardo, Sylloge Fungorum Omnium Hucusque Cognitorum Digessit P.A. Saccardo 2:164. 1883.

For other synonyms see Brockmann (1975).

Ascocarps scattered, separate or clustered, immersed-subepidermal beneath blackened clypei, glabrous, depressed globose, flattened top and bottom, with papilla protruding through surface, 300–500 µm diameter, 150–250 µm high. **Ascocarp wall** of textura prismatica in surface view; in longitudinal section 8–18 µm thick at base, 18–27 µm thick at sides, composed of 6–8 layers of brown, elongate-compressed, scleroplectenchymatic cells (12–

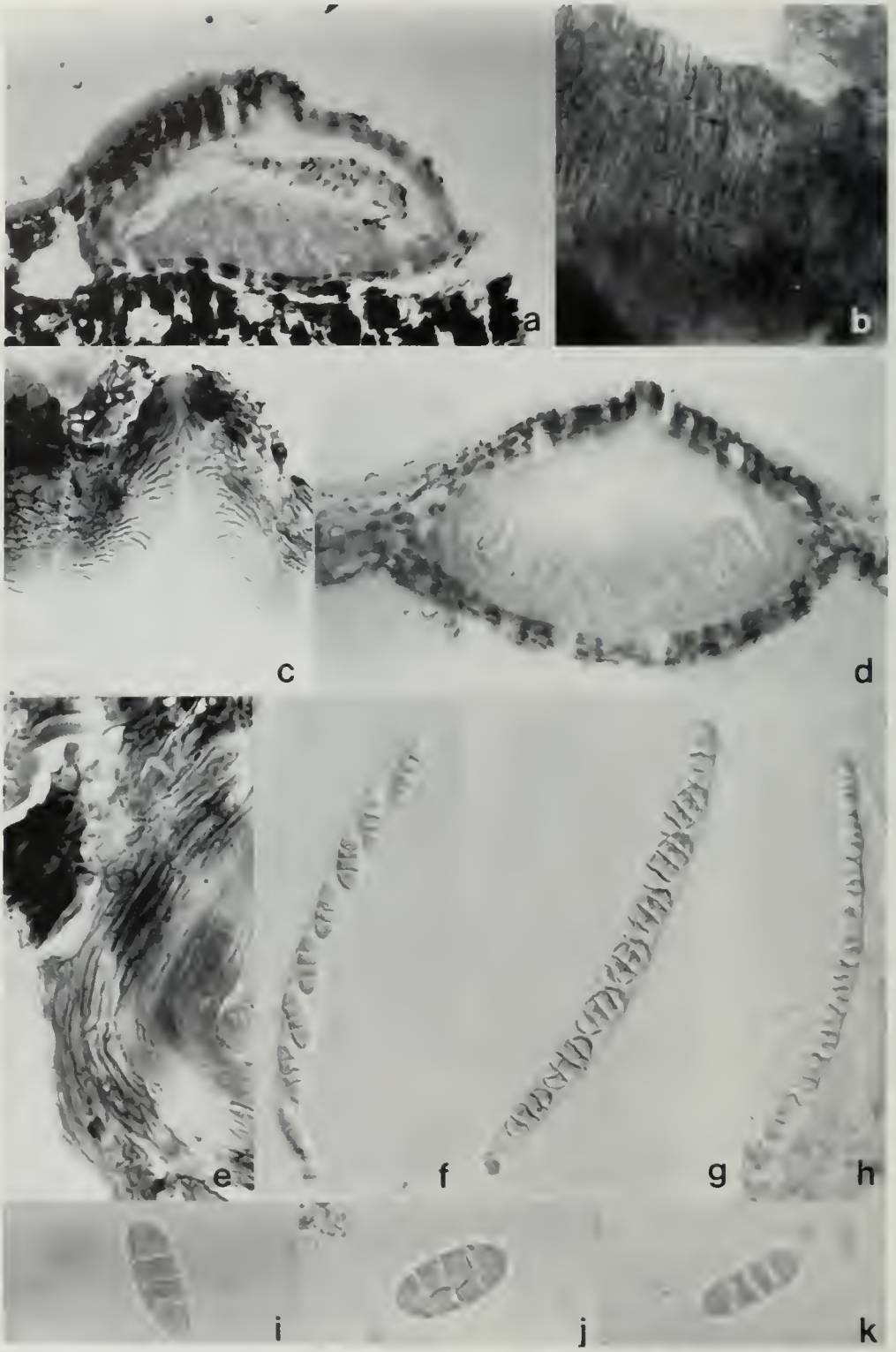

Figure 21. *Discostroma fuscella*. a. longitudinal median section through ascocarp, x150. b. ascocarp wall surface, x550. c. section through ascocarp wall neck region, x550. d. longitudinal median section through ascocarp, x150. e. longitudinal median section through ascocarp wall, x950. f–h. asci, x525. i–k. ascospores, x1,050. a–c, e, f, and i from holotype of *D. fuscella*; d, g, and j from lectotype of *Sphaeria leiostega*; h and k from holotype of *S. corticola*.

25 x 2–3 µm); near apex, wall 21–36 µm thick, composed of 6–7 outer layers of brown, polygonal-isodiametric cells (7–11.5 x 2–3; 2.1–3.6 µm diameter) and 6–7 inner layers of compressed-elongate, scleroplectenchymatic cells. **Papilla** conical, 50–75 µm high, 20–30 µm wide at the apex, 35–50 µm wide at the base; wall 7–10 µm thick, composed of 7–10 layers of small, brown-melanized, thick-walled, rounded, polygonal cells, surrounding a 10–20 µm wide circular ostiole with periphyses. **Paraphyses** 0.5–1.5 µm wide, numerous, septate, unbranched. **Asci** (101–)115–132 (–137) x 7–12(–14) µm, unitunicate, numerous, basal in a broad hymenium, cylindrical, short-stalked, rounded apex, apical ring J+, with 8 overlapping uniseriate ascospores. **Ascospores** 15–21 x 5–9.5 µm, ellipsoidal, end cells rounded; 3-septate, septa often close together and end cells longer, seldom with 4 or more septa (up to 7), occasionally with vertical septa in central cells only or in every cell, order of septation variable, often 2:1:2, primary septum median and occasionally constricted; hyaline, smooth, without sheath or appendages.

Holotype: GREAT BRITAIN: Easton, Norths., on dead twigs of rose (*Rosa* sp.), March 9, 1850 (K).

Exsiccatae: AUSTRIA: Fuckel, Fungi Rhenani 911 (Isotype of *Sphaeria corticola*, G, FH); CZECHOSLOVAKIA: Welka, on *Prunus spinosa*, as *Metasphaeria corticola* f. *Pruni*, Oct. 3, 1912, Petrak, Fl. Boh et Mor. exsic. 61 (FH); Welka, on *Rosa canina*, as *Metasphaeria corticola* f. *Rosae*, Apr. 17, 1912, Petrak, Fl. Boh et Mor. exsic. 62 (FH); Ohrensdorf, on *Rubus thyrsoideus*, as *Metasphaeria corticola* f. *Rubi*, Sept. 25, 1911, Petrak, Fl. Boh et Mor. exsic. 63 (FH); SWEDEN: Lockerud, Wenenborg, on *Rubus fruticosus*, as *Leptosphaeria lejostega* (Ellis) Eliasson, Aug. 1892, Rehm, Asc. 1189 (FH); UNITED STATES: NEW JERSEY: Newfield, as *Sphaeria (Lept.) leiostega*, Ellis, N. American Fungi 888 (NY).

Other material examined: AUSTRIA: Nassau, on *Prunus domestica* and *P. spinosa*, Fuckel (Isotype, as *Metasphaeria corticola* (Fuckel) Sacc., FH); UNITED STATES: KANSAS: Rockport, Rooks Co., on *Cornus asperifolia*, as *Metasphaeria leiostega*, Dec. 24, 1894, E. Bartholomew (FH); Rooks Co., on *Ribes aureum*, as *Clypeosphaeria hendersonia* 2555, Mar. 15, 1899, E. Bartholomew (NY); MICHIGAN: 573, Ann Arbor, on *Ribes frondium*, as *Metasphaeria leiostega*, Apr. 1, 1893, L.N. Johnson (NY); NEW JERSEY: Newfield, on wild rose (*Rosa lucida* ?), May 6, 1879, J.B. Ellis (lectotype of *Sphaeria leiostega*, NY); Newfield, on *Viburnum lentago*, as *Sphaeria leiostega*, Dec. 1878, J.B. Ellis (NY); Newfield, Gloucester Co., on Hickory, as *Sphaeria leiostega* (NY); on *Staphylea trifolia*, as *Metasphaeria leiostega*, Dec. 23, 1891 (NY); on *Viburnum*, as *Metasphaeria leiostega* (NY); 1273, on wild currant, as *Metasphaeria leiostega*, Jan. 4, 1890 (NY); on *Comptonia*, as *Metasphaeria leiostega* Mar. 1890, J.B. Ellis (NY); Vineland, on *Vaccinium corymbosum*, as *Sphaeria leiostega*, Jan. 22, 1878; Jan. 10, 1880 (NY); NEW YORK: Washington Co., Vaughans, J. Vaughan's Copse, near Devines Woods, north of Hudson Falls, on *Ribes americanum (floridum)*, as *Metasphaeria leiostega*, Apr. 24, 1917, P.P. 25255, S.H. Burham (FH).

Comments: *Discostroma fuscella* is characterized by subepidermal perithecia with short protruding papillae, cylindrical asci with a J+ apical ring and hyaline, 3-septate, elliptical ascospores with broadly rounded ends. Certain collections have wider spores and vertical septa, most often in the central cells, but often also in the end cells. Most notably, vertical septa are found in the lectotype of *Sphaeria leiostega*. All other characters are identical to those of *D. fuscella*.

Discostroma corticola, the most common name of this fungus, is identical to the earlier named *Sphaeria fuscella*. Previous interpretations of *Sphaeria fuscella* have caused some confusion in the literature. The type material contains a fungus resembling *D. corticola*, with hyaline ascospores. However, it has been considered to be a 3-septate, brown-spored fungus because of Berkeley and Broome's (1852) description of ascospores as "pale brown, oblong-elliptic, obtuse, triseptate, sometimes slightly curved." In the accompanying Latin description they do not mention the color of the ascospores. On the type material (K), labeled "*Sphaeria fuscella* B & B. In *Rosa*, Easton, March 9, 1850," are three rose twigs, one of which is labeled (with a dotted line and a figure) as *Sphaeria (Subtectae) intermixta* B & B. The other two twigs contain abundant

material of the hyaline-spored fungus resembling *D. corticola*. Also on this material is a figure of *Sphaeria fuscella* showing an ascus and spores with "hyaline" written next to the spores. Wehmeyer (1957) suggested that a mixture of fungi in this and another collection of *S. fuscella* resulted in a confused description. He felt the name should be a nomen dubium and not used as a basis for later names. I believe, from the description and the fungus found on the type material, and from the figure on the type material, that Berkeley and Broome's confused description was not based on a mixture of fungi but was a miscommunication of the actual information. I believe they were aware that *S. fuscella* had hyaline, not brown spores; thus, it is suitable for use as a basis for later names.

Species incertae sedis

The following species were examined but could not be placed in any taxa with certainty because the type specimens contained no ascocarps and no other collections were available on which to base the descriptions.

•*Leptosphaeria eriobotryae* H. Sydow, P. Sydow & E. Butler, Annales Mycologici 9:409. 1911.

Holotype: Hab. in foliis *Eriobotrya japonicae*, Saharanpur, 27. 6. 1906, leg. Inayat (E.J. Butler no. 1365). (S) Isotype: (W, HCIO)

•*Leptosphaeria minima* (J.E. Duby) ex P.A. Saccardo, Michelia Commentarium Mycologicum Fungos in Primis Italicos Illustrans 2:320. 1881.

≡ *Sphaeria minima* J.E. Duby *in* C. Roumeguère, Fungi Selecti Gallici Exsiccati, Century 7, No. 694. Anno 1880. Nom. nud.

≡ *Mycotodea minima* (J.E. Duby ex P.A. Saccardo) W. Kirschstein *in* O.C. Schmidt, Kryptogamenflora der Mark Brandenburg und Angrenzender Gebiete herausgegeben von den Botanishen Verein der Provinz Brandenburg 7(3):432. 1938.

Isotype: Sur les feuilles du *Potentilla argentea* L., Mende, Prost. (G, FH, ILL, NY)

•*Leptosphaeria sorbi* A. Jaczewski, Annales Mycologici 1:30. 1903.

Holotype: in foliis vivis *Sorbi aucupariae*, IX. 18 1914 , Gjatsk. Smolensk. Gouv. Jaczewski. (LE)

Appendix: *Leptosphaeria* Species Described from the Rosaceae

The following is a list of all *Leptosphaeria* species described from the Rosaceae and the species' nomenclatural synomyms. This information is taken from Crane and Shearer (1991). The taxonomic synonyms applied herein and the herbaria contacted have been added. The fungal specimens cited in this dissertation were studied at or on loan from various herbaria. Requests were made to various herbaria for type material for all of the described species. Unfortunately, type material could not be located for all of the species because either the material was destroyed, lost, or not deposited at a certain institution, or the institutions involved did not reply or do not lend specimens. Abbreviations follow Holmgren et al. (1981).

L. abbreviata (M.C. Cooke) P.A. Saccardo, Sylloge Fungorum Omnium Hucusque Cognitorum Digessit P.A. Saccardo 2:26. 1883. ≡*Sphaeria abbreviata* M.C. Cooke, Handbook of British Fungi, p. 893. 1871. On dead stems of *Rubus* sp., Rosaceae. Great Britain.
≡*Saccothecium sepincola* (E.M. Fries:E.M. Fries) E.M. Fries var. *abbreviata* S.M. Huhndorf, comb. nov.

L. aculeorum G. Passerini, Atti della R. Accademia dei Lincei Memoriae, Rome, Series 4, 6:458–459. (1889) 1890. On stems of *Rosa canina* L., Rosaceae. Italy. (non vidi). Type material was not found at PARMA, PISA, PAD.

L. arunci S.M. Zeller, Mycologia, Lancaster, Pennsylvania 19:134–135. 1927. On dead stems of *Aruncus silvestris* Kostel. (=*Aruncus dioicus* (Walter) Fernald), Rosaceae. United States (Oregon).
= *Kalmusia clivensis* (M.J. Berkeley & C.E. Broome) M.E. Barr.

L. cercocarpi H. Sydow & P. Sydow, Annales Mycologici, Berlin 5:339. 1907. On dead leaves of *Cercocarpus ledifolius* Nutt. ex Torr. & Gray, Rosaceae. United States.

L. concentrica J.B. Ellis & B.M. Everhart, The North American Pyrenomycetes. A Contribution to Mycologic Botany, p. 354. 1892. On leaves of *Malus* sp., Rosaceae. United States.
≡*Paraphaeosphaeria concentrica* (J.B. Ellis & B.M. Everhart) S.M. Huhndorf, comb. nov.

L. coniothyrium (L. Fuckel) P.A. Saccardo,Nuovo Giornale Botanico Italiano e Bolletino della Società Botanica Italiana, Firenze 7:317. 1875. ≡*Sphaeria coniothyrium* L. Fuckel, Symbolae Mycologicae, p. 115. 1870. ≡*Melanomma coniothyrium* (L. Fuckel) L. Holm, Symbolae Botanicae Upsalienses, Uppsala 14(3):56. 1957. On stems of *Alnus glutinosa* (L.) Gaertner, *Broussonetia* sp., *Chimonanthus* sp., *Kerria* sp., *Menispermum canadense* L., *Rosa* sp., *Rubus fruticosus* L., *Salix vitellina* L., *Sambucus nigra* L., Betulaceae, Moraceae, Calycanthaceae, Rosaceae, Menispermaceae, Salicaceae, Caprifoliaceae. Austria, France, Germany, Italy, Portugal.
≡*Kalmusia coniothyrium* (L. Fuckel) S.M. Huhndorf, comb. nov.

L. controversa (J. Desmazierès) V. Cesati & G. de Notaris, Commentario della Societa Crittogamologica Italiana, Milan 1:235. 1863. ≡*Sphaeria controversa* J. Desmazierès, Annales des Sciences Naturelles, Paris, Botanique, Series 2, 17:102. 1842. ≡*Diaporthe controversa* (J. Desmazierès) T.R.J. Nitschke *in* L. Fuckel, Symbolae Mycologicae Nachtrag 1:319. 1871. On plant stems, on dry branches of *Acer* sp., *Fraxinus* sp., *Rubus* sp., Aceraceae, Oleaceae, Rosaceae. France.
=*Diaporthe eres* T.R.J. Nitschke, fide L.E. Wehmeyer, The Genus *Diaporthe* Nitschke and its Segregates, p. 63. 1933.

L. corticola (L. Fuckel) P.A. Saccardo, Michelia Commentarium Mycologicum Fungos in Primis Italicos Illustrans 1:342. 1878; Fungi Italici autographice delineati (additis nonnullis extra-italicis asterisco notatis), Patavii, table 288. 1878. ≡*Sphaeria corticola* L. Fuckel, Symbolae Mycologicae, p. 114. 1870. ≡*Metasphaeria corticola* (L. Fuckel) P.A. Saccardo, Sylloge Fungorum Omnium Hucusque Cognitorum Digessit P.A. Saccardo 2:166. 1883. ≡*Griphosphaeria corticola* (L. Fuckel) F. v. Hoehnel, Annales Mycologici, Berlin 16:87. 1918. ≡*Clathridium corticola* (L. Fuckel) R.A. Shoemaker & E. Mueller, Canadian Journal of Botany, Ottawa 42:404.

1964. ≡*Discostroma corticola* (L. Fuckel) I. Brockmann, Sydowia 28:313. 1975. On cortex of branchlets, on dry stems of *Cornus sanguinea* L., *Lonicera caprifolium* L., *Prunus baccata* Borkh., *Prunus domestica* L., *Prunus spinosa* L., *Rosa* sp., Caprifoliaceae, Rosaceae. Austria, Canada, Czechoslovakia, Germany, Hungary, Italy, Switzerland.
=*Discostroma fuscella* (M.J. Berkeley & C.E. Broome) S.M. Huhndorf, comb. nov.

L. dryadis E. Rostrup, Botanisk Tidsskrift, Kjøbenhavn 25:305. 1903. On decorticated wood stems and fruits of *Dryas octopetala* L., Rosaceae. Iceland.
=*Leptosphaeria dryadophila* S.M. Huhndorf, nom. nov.

L. dryadis E. Rostrup, Norske Ascomyceter i Christiania Universitetets Botaniske Museum. Christiania [Oslo] (I. Kommission Hos Jacob Dybwad), p. 24. 1904. [Issued in Skrifter Udgivne af Videnskabselskabet i Christiania. Mathematisk-naturvidenskabelig klasse. Christiania (Oslo) No. 274.] Non vidi. On upper surface of dried leaves of *Dryas octopetala* L., Rosaceae. Norway. (n. v.)

L. eriobotryae H. Sydow, P. Sydow & E. Butler, Annales Mycologici, Berlin 9:409. 1911. On leaves of *Eriobotrya japonica* (Thunb.) Lindley, Rosaceae. India.
Species incertae sedis.

L. fuscella (M.J. Berkeley & C.E. Broome) V. Cesati & G. de Notaris, Commentario della Società Crittogamologica Italiana, Milan 1:236. 1863. ≡*Sphaeria (Obtectae) fuscella* M.J. Berkeley & C.E. Broome, Annals and Magazine of Natural History, London, Series 2, 9:325. 1882. On dead twigs of *Rosa* sp., Rosaceae. Great Britain.
≡*Discostroma fuscella* (M.J. Berkeley & C.E. Broome) S.M. Huhndorf, comb. nov.

L. hazslinszkii P.A. Saccardo, Sylloge Fungorum Omnium Hucusque Cognitorum Digessit P.A. Saccardo 2:28. 1883. [Based on *Ditopella* sp., published by F.A. Hazslinszky, Verhandlungen der Zoologisch-Botanischen Gesellschaft in Wien 20:217. 1870.] On dead branches of *Rosa* sp., Rosaceae. Rumania. (n. v.). Type material was not found at B, BP, F, FI, L, NBG, UPS, W, WAG. No reply from IBF, TNP. It is not known whether type material is at PAD because this institution has stopped lending specimens until further notice.

L. (*Clypeosphaeria*) *hendersoniae* (J.B. Ellis) M.C. Cooke, Grevillea, London 17:91. 1889. ≡*Sphaeria (Obtectae) hendersonia* J.B. Ellis *in* M.C. Cooke and J.B. Ellis, Grevillea, London 6:14–15. 1877. ≡*Clypeosphaeria hendersoniae* (J.B. Ellis) P.A. Saccardo, Sylloge Fungorum Omnium Hucusque Cognitorum Digessit P.A. Saccardo 2:91. 1883. On canes of *Rubus* sp., Rosaceae. United States.
=*Kalmusia coniothyrium* (L. Fuckel) S.M. Huhndorf, comb. nov.

L. hollosiana L.E. Wehmeyer, Mycologia, Lancaster, Pennsylvania 55:319. 1963. ≡*Leptosphaeria maritima* L. Hollós, Annales Historico-Naturales Musei Nationalis Hungarici 5:46. 1907. Non *L. maritima* Ellis & Everhart, Non *L. maritima* Saccardo. On stems of *Biebersteinia emodii* Jaub. & Spach., *Potentilla argyrophylla* Wallich ex Lehm., *Potentilla fragarioides* L., *Triglochin maritima* L., *Trisetum spicatum* (L.) K. Richter, Geraniaceae, Gramineae, Juncaceae, Rosaceae. India. (n. v.). Type material was not found at BP, PAV, PRE.

L. leiostega (J.B. Ellis) J.B. Ellis, Catalogue of Plants Found in New Jersey. Geological Survey of New Jersey, Final Report of the State Geologist, Trenton 2(1):525. 1889. ≡*Sphaeria (Leptosphaeria) leiostega* J.B. Ellis, Bulletin of the Torrey Botanical Club (and Torreya), New York 8:91. 1881. On various dead twigs and limbs of *Carya* sp., *Rosa* sp., *Vaccinium* sp., Juglandaceae, Rosaceae, Ericaceae. United States (New Jersey).
=*Discostroma fuscella* (M.J. Berkeley & C.E. Broome) S.M. Huhndorf, comb. nov.

L. lejostega (J.B. Ellis) F. Hazslinszky, Matematikai és Természettudományi Közlemenyek Vonatkozólag a Hazai Viszonyokra, Budapest 25(2):148. 1892. ≡*Sphaeria (Leptosphaeria) leiostega* J.B. Ellis, Bulletin of the Torrey Botanical Club (and Torreya), New York 8:91. 1881. ≡*Metasphaeria lejostega* (J.B. Ellis) P.A. Saccardo, Sylloge Fungorum Omnium Hucusque Cognitorum Digessit P.A. Saccardo 2:164. 1883. On branches of *Carya* sp., *Rosa* sp., *Vaccinium* sp., Juglandaceae, Rosaceae, Ericaceae. United States (New Jersey).

L. leucoplaca (K.F. Wallroth) E.A. Vainio, Acta Societatis pro Fauna et Flora Fennica, Helsingforsiae 49(2):143–144. 1921. ≡*Verrucaria leucoplaca* K.F. Wallroth, Flora Cryptogamica Germaniae 1:299. 1831. ≡*Pyrenula leucoplaca* (F.G. Wallroth) G.W. Koerber, Systema Lichenum Germaniae, p. 361. 1855. ≡*Verrucaria alba* H.A. Schrader var. *leucoplaca* (F.G. Wallroth) L.E. Schaerer *in* Enumeratio Critica Lichenum Europaeorum, Quos Ex Nova Methodo Digerit, p. 219. 1850. ≡*Eopyrenula leucoplaca* (K.F. Wallroth) R.C. Harris, The Michigan Botanist, Ann Arbor 12:19. 1973.

On bark of *Acer* sp., *Alnus* sp., *Carya* sp., *Corylus* sp., *Fraxinus* sp., *Juglans* sp., *Populus* sp., *Quercus* sp., *Salix* sp., *Sorbus* sp., *Tilia* sp., *Ulmus* sp., Aceraceae, Juglandaceae, Betulaceae, Oliaceae, Salicaceae, Fagaceae, Rosaceae, Tiliaceae, Ulmaceae. Finland. (n. v.). No reply from STR.

L. lucilla P.A. Saccardo, Nuovo Giornale Botanico Italiano e Bolletino della Società Botanica Italiana, Firenze 7:310–311. 1875. Indiscriminately on wilted leaves of *Pyrus communis* L., Rosaceae. Italy.
≡*Phaeosphaeria lucilla* (P.A. Saccardo) S.M. Huhndorf, comb. nov.

L. mandshurica M. Miura, Flora of Manchuria and East Mongolia, Part III, Cryptogams, Fungi (Contributions of the Southern Manchuria Railway Company 27):175. 1928. On leaves of *Pyrus malus* L. [as *Malus domestica* Borkh.], Rosaceae. China. (n. v.). Type material was not found at TI, TKB. No reply from TFM, TOFO, TNS.

L. minima (J.E. Duby) ex P.A. Saccardo, Michelia Commentarium Mycologicum Fungos in Primis Italicos Illustrans 2:320. 1881.
≡*Sphaeria minima* J.E. Duby *in* C. Roumeguère, Fungi Selecti Gallici Exsiccati, Century 7, No. 694. Anno 1880. Nom. nud.
≡*Mycotodea minima* (J.E. Duby ex P.A. Saccardo) W. Kirschstein *in* O.C. Schmidt, Kryptogamenflora der Mark Brandenburg und Angrenzender Gebiete herausgegeben von den Botanishen Verein der Provinz Brandenburg, Leipzig 7(3):432. 1938. On leaves of *Potentilla argentea* L., Rosaceae. France. Species incertae sedis.

L. miyakeana P.A. Saccardo, Sylloge Fungorum Omnium Hucusque Cognitorum Digessit P.A. Saccardo 24:999. 1928. ≡*Phaeosphaeria eriobotryae* I. Miyake, Botanical Magazine, Tokyo 27:41–42. 1913. ≡*Trematosphaerella eriobotryae* (I. Miyake) F.L. Tai, Sylloge Fungorum Sinicorum, p. 330. 1979. On leaves of *Eriobotrya japonica* (Thunb.) Lindley, Rosaceae. China. (n. v.). Type material was not found at TI, TKB. No reply from TFM, TOFO, TNS. It is not known whether type material is at PAD since this institution has stopped lending specimens until further notice.

L. mume K. Hara, Byôchu-gai Zasschi (Journal of Plant Protection), Tokyo 5:884. 1918. [As *mune* in original publication.] On dead branch of *Prunus mume* Sieb. & Zucc., Rosaceae. Japan. (n. v.). Type material was not found at TI, TKB. No reply from TFM, TOFO, TNS.

L. nashi (K. Hara) P.A. Saccardo *in* A. Trotter, Sylloge Fungorum Omnium Hucusque Cognitorum Digessit P.A. Saccardo 24:999. 1928. ≡*Leptosphaerella nashi* K. Hara, Kajyu-byogai-ron Nihon-kankitsu-Kai, Schiznoka [Fruit Tree Diseases], pp. 142–145. 1916. ≡*Phaeospora nashi* (K. Hara) K. Hara, Jitsuyo-Sakumotsu-Byorigaku [Manual of Plant Pathology], p. 270. 1925. On leaves of *Pyrus sinensis* Hort., Rosaceae. Japan. (n. v.). Type material was not found at TI, TKB. No reply from TFM, TOFO, TNS.

L. (*Clypeosphaeria*) *notarisii* M.C. Cooke, Grevillea, London 17:91. 1889. ≡*Sphaeria clypeiformis* G. de Notaris, Memorie Della Accademia delle Scienze di Torino, Series 2, No. 7, p. 113. 1853; Micromycetes Italici Novi vel Minus Cogniti 7, p. 113. 1845. Non *Sphaeria clypeiformis* L.V. de Lacroix *in* G.L. Rabenhorst. ≡*Clypeosphaeria notarisii* L. Fuckel, Symbolae Mycologicae, p. 117. 1870. On barky runners of *Rubus fruticosus* L., Rosaceae. Italy.
=*Clypeosphaeria mamillana* (E.M. Fries: E.M. Fries) J.B.E. Lambotte.

L. obesula P.A. Saccardo *in* V. Mouton, Bulletin. Société R. de Botanique de Belgique, Bruxelles 26:176. 1887. On stems of *Acer pseudoplatanus* L., *Angelica* sp., *Spiraea ulmaria* L. (=*Filipendula ulmaria* Maxim.), Aceraceae, Umbelliferae, Rosaceae. Belgium. (n. v.). Type material was not found at DUKE. No reply from AUT, CGE, LD. It is not known whether type material is at PAD because this institution has stopped lending specimens until further notice.

L. oligotheca F. Petrak & H. Sydow, Annales Mycologici, Berlin 22:359. 1924. [Described from the type material of *Laestadia potentillae* E. Rostrup, Botanisk Tidsskrift, Kjobenhavn 25:300. 1903.] On leaves of *Potentilla maculata* Pour. (=*Potentilla aurea* L.), Rosaceae. Denmark, Iceland.
=*Leptosphaerulina pulchra* (H.G. Winter) M.E. Barr.

L. (*Clypeosphaeria*) *osculanda* (C.G.T. Preuss) M.C. Cooke, Grevillea, London 17:91. 1889. ≡*Sphaeria osculanda* G.T. Preuss, Linnaea. Institut botanique de l'Université de Genève 26:713. 1853. ≡*Clypeosphaeria osculanda* (G.T. Preuss) P.A. Saccardo, Sylloge Fungorum Omnium Hucusque Cognitorum Digessit P.A. Saccardo 2:91. 1883. On branches of *Rubus* sp., Rosaceae. Germany. (n. v.). Type material was not found at B.

L. oxyspora J. Feltgen, Vorstudien zu einer Pilz-Flora des Grossherzogthums, Luxemburg 1(2):165-166. 1901. On dry stems of *Rubus idaeus* L., Rosaceae. Luxemburg. (n. v.).

Type material is probably at LUX but was not obtained because the collections are undergoing reorganization.

L. pachytheca P.A. Saccardo, Nuovo Giornale Botanico Italiano e Bolletino della Società Botanica Italiana, Firenze, New Series 22:39. 1915. Nom. illeg. Art. 64.1. On dead branches of *Amygdalus communis* L. [=*Prunus dulcis* (Mill.) D.A. Webb], Rosaceae. Yugoslavia. (n. v.). It is not known whether type material is at PAD because this institution has stopped lending specimens until further notice.

L. (*Leptosphaerella*) *pomona* P.A. Saccardo, Nuovo Giornale Botanico Italiano e Bolletino della Società Botanica Italiana, Firenze 8:176. 1876. On upper surface of leaves of *Pyrus malus* L. (=*Malus domestica* Borkh.), Rosaceae. Italy.
≡*Phaeosphaeria pomona* (P.A. Saccardo) S.M. Huhndorf, comb. nov.

L. pomona P.A. Saccardo forma *transilvanica* A. Negru et I. Ditzu, Notulae Systematicae e Sectione Cryptogamica Instituti Botanici Nomine V.L. Komarov Academicae Scientiarum U.R.S.S., Petropolis 16:152–153. 1963. On fruits of *Crataegus monogyna* Jacq., Rosaceae. Rumania. (n. v.). Type material was not found at BUCM. No reply from BUC, BUCA, BUCF, CL.

L. poterii G. Passerini, Atti dell' Accademia Nazionale dei Lincei. Memoire, Rome, Series 4, 6:459. (1889) 1890. On wilted stems of *Poterium sanguisorba* L., Rosaceae. Italy. (n. v.). Type material was not found at PARMA, PISA, PAD.

L. praetermissa (P.A. Karsten) P.A. Saccardo, Sylloge Fungorum Omnium Hucusque Cognitorum Digessit P.A. Saccardo 2:26. 1883. ≡*Sphaeria praetermissa* P.A. Karsten, Fungi Fenniae Exsiccati, Century 9, No. 852. Anno 1869. On dried canes of *Rubus idaeus* L., *Rubus odoratus* L., Rosaceae. Finland.

L. pruni N.N. Woronichin, Vestnik Tiflisskogo Botanicheskogo Sada, Tiflis (Moniteur du Jardin Botanique de Tiflis) 28:17–18. 1913. On living leaves of *Prunus domestica* L., Rosaceae. U.S.S.R. (Caucasus). (n. v.). Type material was not found at LE, LEP, TBI. No reply from TGM.

L. pulchra (H.G. Winter) P.A. Saccardo, Sylloge Fungorum Omnium Hucusque Cognitorum Digessit P.A. Saccardo 2:53–54. 1883. ≡*Sphaerella pulchra* H.G. Winter, Hedwigia, Dresden 11:145–146. 1872. ≡*Mycodotea pulchra* (H.G. Winter) W. Kirschstein, Annales Mycologici, Berlin 34:201. 1936; Kryptogamenflora de Mark Brandenburg und Angrenzender Gebiete herausgegeben von den Botanischen Verein der Provinz Brandenburg, Leipzig 7(3):433. 1938. On dry stems and leaves of *Potentilla caulescens* L., Rosaceae. Austria. Type material was not found at B, CORD, IBF, JE, LZ, WRSL. No reply from FI, IB, TO, WAG.
≡*Leptosphaerulina pulchra* (H.G. Winter) M.E. Barr, Contributions de l'Institut Botanique de L'Université de Montréal 73:7. 1959.

L. puttemansii A. Maublanc, Bulletin de la Société Mycologique de France, Paris 21:88–89. 1905. On leaves of *Eriobotrya japonica* (Thunb.) Lindley, Rosaceae. Brazil. (n. v.). Type material was not found at IBI, PC, RSA-POM, SP. No reply from RBR.

L. rimicola (G.H. Otth) P.A. Saccardo, Hedwigia, Dresden 35:XXIX. 1896; Sylloge Fungorum Omnium Hucusque Cognitorum Digessit P.A. Saccardo 11:XXIX. 1896. ≡*Cladosphaeria rimicola* G.H. Otth, Mitteilungen der Naturforschenden Gesellschaft in Bern 1870:106. 1871. Nom inval. Art. 43.1. [The genus *Cladosphaeria* was validated in 1894.] On fallen branches of *Prunus avium* L., Rosaceae. Switzerland.
=*Melanomma pulvis-pyrius* (C.H. Persoon:E.M. Fries) L. Fuckel.

L. rostrupii P.A. Saccardo & D. Saccardo *in* P.A. Saccardo, Sylloge Fungorum Omnium Hucusque Cognitorum Digessit P.A. Saccardo 17:721. 1905. ≡*Leptasphaeria dryadis* E. Rostrup. Non Rostrup 1903. On upper surface of dried leaves of *Dryas octopetala* L., Rosaceae. Norway. (n. v.). It is not known whether type material is at PAD since this institution has stopped lending specimens until further notice.

L. rustica P.A. Karsten, Fungi Fenniae Exsiccati, Century 10, No. 964. Anno 1870. ≡*Metasphaeria rustica* (P.A. Karsten) P.A. Saccardo, Sylloge Fungorum Omnium Hucusque Cognitorum Digessit P.A. Saccardo 2:157. 1883. On stems of *Spiraea ulmaria* L. (=*Filipendula ulmaria* Maxim.), Rosaceae. Finland.
=*Leptosphaeria doliolum* (C.H. Persoon:E.M. Fries) V. Cesati & G. de Notaris.

L. saccardiana J.H. Fabre, Annales des Sciences Naturelles, Paris, Botanique, Series 6, 9:89. 1878. ≡*Requienella saccardiana* (J.H. Fabre) J.H. Fabre, Annales des Sciences Naturelles, Paris, Botanique, Series 6, 15:56. 1883. On dried stems of *Crataegus oxyacantha* L., Rosaceae. France. (n. v.). Type material was not found at PC. No reply from L'HARMAS.

L. sanguisorbae P.A. Karsten *in* A.N. Berlese, Icones Fungorum Omnium Hucusque Cognitorum ad usum Sylloges Saccardianae

Adcommodatae 1:78. 1892. On branches of *Sanguisorba officinalis* L., Rosaceae. Germany. (n. v.). Type material was not found at H, UPS.

L. sanguisorbae P.A. Karsten, Enumeratio Fungorum et Myxomycetum in Lapponia Orientali Aestate 1861 Lectorum, p. 214. 1886; Notiser Sallskapets Pro Fauna et Flora Fordhandlingar 8:214. 1866. [As *Sphaeria (Leptosphaeria) sangvisorbae*.] On dead stems of *Sanguisorba polygama* F. Nyl., Rosaceae. U.S.S.R. (n. v.).

L. sepincola (E.M. Fries:E.M. Fries) H.G. Winter, Dr. L. Rabenhorst's Kryptogamen-Flora von Deutschland, Oesterreich und der Schweiz, Second edition, 1(2):473. 1885. ∫*Sphaeria sepincola* E.M. Fries, Observationes Mycologicae, Seu Descriptiones tam Novarum, quam Notabilium Fungorum Exhibitae a C.H. Persoon, Lipsiae 1:181. 1815; Systema Mycologicum Sistens Fungorum 2:498. 1823. [As *saepincola*.] ≡*Pringsheimia sepincola* (E.M. Fries:E.M. Fries) F. v. Hoehnel, Annales Mycologici, Berlin 18:97. 1920. ≡*Metasphaeria sepincola* (E.M. Fries:E.M. Fries) P.A. Saccardo, Sylloge Fungorum Omnium Hucusque Cognitorum Digessit P.A. Saccardo 2:164. 1883. [As Fr? Fuckel.] ≡*Sphaerulina sepincola* (E.M. Fries:E.M. Fries) K.Starbäck, Botaniska Notiser, Lund 1890:117. 1890; Botanisches Zentralblatt, Jena & Dresden 46:261. 1891. ≡*Pleosphaerulina sepincola* (E.M. Fries:E.M. Fries) H. Rehm *in* F. v. Hoehnel, Annales Mycologici, Berlin 18:96. 1920. ≡*Sclerodothis sepincola* (E.M. Fries:E.M. Fries) F. Petrak, Annales Mycologici, Berlin 19:41. 1921. On dry stems of *Rosa* sp., *Rubus* sp., Rosaceae. Sweden.
≡*Saccothecium sepincola* (E.M. Fries:E.M. Fries) E.M. Fries, Summa Vegetabilium Scandinaviae, Seu Enumeratio, Systematica et Critica, Plantarum tum Cotyledonearum, Quam Nemearum Inter Mare Occidentale Et Album, Inter Eidoram et Nordkop, Hactenus Lectorum, una Cum Singulae Distributione Geographica, p. 398. 1849.

L. sieversiae (F.E. Clements) F. Petrak, Sydowia. Annales Mycologici, Horn, N.Ö. 6(1-4):6. 1952. ≡*Massaria sieversiae* F.E. Clements, Cryptogamae Formationum Coloradensium, Century III, No. 234. Anno 1906. Nom. nud. Art. 36.1. [Combination is not valid because the basionym is an invalidly published species.] On standing, dead stems of *Sieversia turbinata* (Rydb.) Greene, Rosaceae. U.S.A.
=*Diadema sieversiae* (C.H. Peck) S.M. Huhndorf, comb. nov.

L. sorbi A. Jaczewski, Annales Mycologici, Berlin 1:30. 1903. On leaves of *Sorbus aucuparia* L., Rosaceae. U.S.S.R.
Species incertae sedis.

L. spiraeae P.A. Karsten, Hedwigia, Dresden 27:260. 1888. On dry fallen branches of *Spiraea sorbifolia* L. (=*Sorbaria sorbifolia* A. Br.), Rosaceae. Finland. (n. v.). Type material was not found at H, UPS.

L. subcutanea (M.C. Cooke & J.B. Ellis) J.B. Ellis *in* N.L. Britton, Catalogue of Plants Found in New Jersey, Geological Survey of New Jersey, Final Report of the State Geologist, Trenton 2(1):525. 1889. ≡*Sphaeria (subtectae) subcutanea* M.C. Cooke & J.B. Ellis, Grevillea, London 7:41. 1878. ≡*Metasphaeria subcutanea* (M.C. Cooke & J.B. Ellis) P.A. Saccardo, Sylloge Fungorum Omnium Hucusque Cognitorum Digessit P.A. Saccardo 2:167. 1883. On decorticated limbs of *Pyrus communis* L., Rosaceae. United States. (New Jersey).
≡*Lophiostoma subcutanea* (M.C. Cooke & J.B. Ellis) S.M. Huhndorf, comb. nov.

L. superficialis F.A. Hazslinszky, Matematikai és Természettudományi Közlemenyek Vonatkozólag a Hazai Viszonyokra, Budapest 25(2):146. 1892. On unknown substrate of *Potentilla argentea* L., Rosaceae. Hungary. (n. v.). Type material was not found at B, BP, F, FI, L, NBG, UPS, W, WAG. No reply from IBF, TNP.

L. ternata F. Hazslinszky, Matematikai és Természettudományi Közlemenyek Vonatkozólag a Hazai Viszonyokra, Budapest 25(2):150. 1892. On branches of *Pyrus malus* L. (=*Malus domestica* Borkh.), Rosaceae. Hungary. (n. v.). Type material was not found at B, BP, F, FI, L, NBG, UPS, W, WAG. No reply from IBF, TNP.

L. thomasiana P.A. Saccardo & C. Roumeguère, Revue Mycologique, Toulouse 5:236. 1883. On dead runners of *Rubus* sp., Rosaceae. France. It is not known whether type material is at PAD because this institution has stopped lending specimens until further notice.
≡*Phaeosphaeria thomasiana* (P.A. Saccardo & C. Roumeguère) S.M. Huhndorf, comb. nov.

L. umbrosa G. Niessl *in* G.L. Rabenhorst, Fungi Europaei Exsiccati, Klotschii Herbarii vivi Mycologici Continuatio, Edition 3 (Edita Nova), Series 2, Century 20, No. 1934. Anno 1875; Just's Botanisch Jahresberichte, Berlin 3:262. 1887. ≡*Massaria umbrosa* (G. Niessl) H. Rehm *in* P.A. Saccardo, Sylloge Fungorum Omnium Hucusque Cognitorum Digessit P.A. Saccardo 9:761. 1891. On unknown substrate of *Actaea spicata* L., *Astrantia major* L.,

Gentiana asclepiadea L., *Solanum dulcamara* L., *Spiraea aruncus* L. (=*Aruncus dioicus* Fern.), Ranunculaceae, Umbelliferae, Gentianaceae, Solanaceae, Rosaceae. Austria.

L. vagabunda P.A. Saccardo, Nuovo Giornale Botanico Italiano e Bolletino della Società Botanica Italiana, Firenze 7:318. 1875. ≡*Sphaeria fuscella* P.A. Saccardo, Atti dell' Accademia Scientifica Veneto-Trentino-Istriana, Padova 2(1):145. 1873. [As *Sphaeria fuscella* M.J. Berkeley & C.E. Broome. Non *Leptosphaeria fuscella* (M.J. Berkeley & C.E. Broome) V. Cesati & G. de Notaris.] On branches of *Abies excelsa* (Lam.) Poiret, *Acer campestre* L., *Alnus glutinosa* (L.) Gaertner, *Ampelopsis heterophylla* (Thunb.) Sieb. & Zucc., *Clematis vitalba* L., *Cornus sanguinea* L., *Corylus avellana* L., *Dulcamara* sp., *Hypericum calycinum* L., *Kerria japonica* (L.) DC., *Quercus pedunculata* Ehrh., *Salix purpurea* L., Pinaceae, Aceraceae, Betulaceae, Vitaceae, Ranunculaceae, Cornaceae, Solanaceae, Guttiferae, Rosaceae, Fagaceae, Salicaceae. Italy. (n. v.). It is not known whether type material is at PAD because this institution has stopped lending specimens until further notice.

L. vagabunda P.A. Saccardo var. *divergens* P.A. Saccardo, Fungi Italici autographice delineati (additis nonnullis extra-italicis asterisco notatis), Patavii, No. 518. 1879; Sylloge Fungorum Omnium Hucusque Cognitorum Digessit P.A. Saccardo 2:31. 1883. On branches of *Kerria* sp., Rosaceae. Italy. (n. v.). It is not known whether type material is at PAD because this institution has stopped lending specimens until further notice.

L. vagabunda P.A. Saccardo var. *sarmenti* P.A. Saccardo, Fungi Italici autographice delineati (additis nonnullis extra-italicis asterisco notatis), Patavii, No. 428. 1879; Sylloge Fungorum Omnium Hucusque Congitorum Digessit P.A. Saccardo 2:31. 1883. On runners of *Rubus* sp., Rosaceae. Italy. (n. v.). It is not known whether type material is at PAD because this institution has stopped lending specimens until further notice.

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