

SEIMATOSPORIUM (=CRYPTOSTICTIS) PARASITES OF ROSA, VITIS, AND CORNUS¹

R. A. SHOEMAKER

Plant Research Institute, Canada Department of Agriculture, Ottawa, Canada

Received November 22, 1963

Abstract

A key, illustrations, and descriptions are provided for the four species of *Seimatosporium* Corda parasitic on *Rosa*. *Seimatosporium rosae* Corda (= *Cryptostictis cynosbati* (Fuckel) Sacc.), the generic type, occurs on rose stems and fruit in Europe and North America. *Seimatosporium lichenicola* (Corda) Shoemaker and E. Müller causes cankers on rose stems, occurs on rose fruits and on stems of *Vitis* and *Cornus* in Europe and North America. ***Seimatosporium caudatum*** (Preuss) n. comb. occurs on stem cankers and leaf spots of roses in Europe and North America. ***Seimatosporium discosioides*** (Ell. & Ev.) n. comb. causes a leaf spot of rose in North America. From a study of types and other specimens, *Cryptostictis* Fuckel is accepted as a synonym of *Seimatosporium* and the following new combinations are made: ***Seimatosporium anomalum*** (Harkn.), ***S. arbuti*** (Bonar), ***S. cadicola*** (B.C. Sutton), ***S. consocium*** (Peck), ***S. davisiae*** (McAlp.), ***S. effusum*** (Vestergr.), ***S. falcatum*** (B.C. Sutton), ***S. foliicola*** (Berk.), ***S. grevilleae*** (Loos), ***S. hakeae*** (B.C. Sutton), ***S. hollosii*** (Toth), ***S. kennedyae*** (McAlp.), ***S. loniceriae*** (Cooke), ***S. mariae*** (Clinton), ***S. parasiticum*** (Dearness & House).

Introduction

The generic disposition of the conidial states of *Clathridium massarinum* (Sacc.) Berlese and *Clathridium corticola* (Fuckel) Shoemaker & E. Müller involved consideration of *Seimatosporium* Corda, *Sporocadus* Corda, and *Cryptostictis* Fuckel. The part of this work done in cooperation with Dr. Emil Müller was reported (Shoemaker and Müller 1964). In that paper *Seimatosporium* (= *Sporocadus*) was adopted for the conidial states of both species. The present report is an extension of that work based on a comparison of types, collections from Europe and North America, and cultures where available. The type species of *Cryptostictis*, *Sporocadus*, and *Seimatosporium* and two additional species on *Rosa* were studied. The earliest name, *Seimatosporium*, is taken up in the text for *Cryptostictis*. A key, descriptions, and illustrations showing the range in variation in conidium morphology are provided for the species occurring on *Rosa*, and new combinations are made for the other species formerly included in *Cryptostictis*.

All specimens are cited using the DAOM accession number. The numbers on the Dearness Herbarium specimens are numbers given to species, not specimens. Herbaria are cited using the abbreviations of Index Herbariorum (Lanjouw and Stafleu 1956).

Key

The key is provided to help identify the four parasitic species of *Seimatosporium* that have been found on stems and leaves of *Rosa*. The key is designed so that it can be used for collections with non-setose or setose conidia because of the variability noted in the presence of setae on conidia.

¹Contribution No. 347, Plant Research Institute.

KEY TO SPECIES OF *Seimatosporium* ON *Rosa*

- Conidia 5–7 μ wide with septa 0.6–1.0 μ broad, and acervulus mycelium 7–10 μ wide (Fig. 2)..... *lichenicola*
- Conidia, septa, and mycelium narrower..... 1
1. Conidia straight, 4–6 μ wide, setae exceeding the spore (Fig. 3)..... *caudatum*
- Conidia not straight, narrower..... 2
2. Conidia curved, 3–4 μ wide, with basal cell shorter than wide, setae equalling the spore (Fig. 1)..... *rosae*
- Conidia inequilateral, 3–5 μ wide, with basal cell longer than wide, setae shorter, recurved (Fig. 4)..... *discosoides*

Descriptions

Seimatosporium rosae Corda, Sturm's Deutschl. Flora III, 3, 13, 79. 1833.

Fig. 1.

= *Hendersonia cynosbati* Fuckel, Symbolae Mycologicae p. 392. 1869.

≡ *Cryptostictis cynosbati* (Fuckel) Sacc., Sylloge Fungorum 3, 443. 1884.

Acervuli intraepidermal, circular to elliptical in surface view, 300–400 μ diameter, covered by a thin wall of narrow, closely septate, yellow mycelium 3–4 μ wide, with adjoining epidermal cells packed with rounded mycelial cells 3–5 μ in diameter, opening by an irregular slit. Conidia 4-celled, central cells longer than end cells, septa thin and pigmented, mostly fusoid, curved, 11–15 \times 3–4 μ with light-brown central cells and hyaline end cells, bearing one uniformly thin, simple, seta usually about as long as the spore from the acute apex, and one similar seta obliquely from near the truncate base, sometimes narrowly clavate, straight, non-setose, and pigmented in the upper three cells. Conidiophores in a basal palisade, hyaline, thin-walled, simple, rarely septate, marked by fine annellations near the apex, 5–12 \times 1.5–2 μ .

The type specimen of *Cryptostictis cynosbati* has at least two species present. I separated what I think corresponds to *Cryptostictis cynosbati* as DAOM 89542, and illustrated the fungus in Fig. 1. The conidium at the lower left is my conception of Fuckel's Pl. IV, Fig. 23, redrawn on the basis of the dimensions, pigmentation, curvature, and length of setae given in his diagnosis. The point of attachment of the setae and the distance between the septa was changed to correspond with that observed in the specimen. There is good agreement between this conidium and the others drawn from what I take to be *Cryptostictis cynosbati*. There is not particularly good agreement between my illustration and Guba's Fig. 98c (1961) or with Sutton's Fig. 9 (1963). Sutton studied the type, but did not state whether the drawings are from it or from other collections on *Sedum*, *Rhododendron*, and *Paeonia*. The conidia Sutton drew are broader, not curved, and with shorter setae than described for *Cryptostictis cynosbati* by Fuckel. The material I found on the type matches the type of *Seimatosporium rosae*. The second, more abundant species found on the collection is the conidial state of *Clathridium corticola*, *Seimatosporium lichenicola*, which was separated as DAOM 91459, and is discussed below.

The fungus occurs on stems and fruit of *Rosa* without causing much malformation, and is noted from Canada, Czechoslovakia, and Germany.

Specimens: 55560 ex PR. Herb. Corda 155620. (TYPE) *Seimatosporium rosae* Ca. (on *Rosa canina* L. stems, Podababa, near Prague, CZECHOSLOVAKIA, according to the description); 89542 ex G. Herb. Barbey-Boissier 2328. (TYPE) *Cryptostictis cynosbati* (Fckl.) Fungi rhenani 455 (sub *Discosia*) Ad *Rosae*

pimpinelli foliae fructig. aridos ad huc pendulos, raro, Autumno, In Sylva ca. Gaugalgeshheim, GERMANY (see 91459 for second species); 91460 ex Herb. Dearness 1667. as *Pestalozzia monochaetoidea* Sacc. & Ell. on *Rosa* sp., sweet brier stem, under kitchen window, London, Ontario, CANADA, 7 May 1892, J. Dearness.

Clathridium corticola (Fuckel) Shoemaker & E. Müller. Can. J. Botany, 42, 404. 1964. Stat. conid. Fig. 2.

Seimatosporium lichenicola (Corda) Shoemaker & E. Müller. Can. J. Botany, 42, 405. 1964.

≡ *Sporocadus lichenicola* Corda, Icones Fungorum 3, 24. 1839.

= *Hendersonia hysterooides* (Fuckel) Fuckel, Symbolae Mycologicae p. 392. Pl. 4. Fig. 24. 1869.

≡ *Cryptostictis hysterooides* Fuckel, Fungi rhenani 1838.

Acervuli beginning in stomata, spreading in the epidermis as radiating, dark brown mycelium composed of polygonal cells 7–10 μ wide that, at maturity, constitute the poorly defined wall, elliptical in surface view, 300–400 \times 150–250 μ , and 50–80 μ deep, opening by one longitudinal irregular slit. Conidia with three rigid septa 0.6–1.0 μ thick, mostly straight, clavate, widest at the apical septum, non-setose, dark reddish brown with a darker apical mark like an inverted V and a lighter brown to hyaline thin-walled, truncate basal cell, 12–17 \times 5–7 μ , sometimes broadly fusoid with hyaline end cells bearing simple slender setae 5–12 \times 0.3 μ , one obliquely from near the truncate, 2 μ wide base, and one centrally from the acute apex. Conidiophores in a basal palisade, hyaline, thin-walled, sparsely septate, 10–40 \times 2 μ , sparingly branched, marked by a series of annellations. In culture forming clavate, non-setose, triseptate, mostly 12–14 \times 5–6 μ conidia with three dark brown upper cells, on annellophores in open acervuli.

The variation in conidium morphology of this species is chiefly connected with the presence or absence of setae. The size of conidia is quite constant, the septa are regularly three in number, and relatively thick. In setose conidia the apical cell is acute, hyaline, and thin-walled, and makes the conidium fusoid in shape. In the non-setose conidia the apical cell is rounded, is pigmented, and appears to have a thicker wall, and contributes to the clavate shape of the conidia. A study of four collections on *Vitis* revealed an intergrading series from predominantly setose conidia to completely non-setose. These are the first four collections drawn on Fig. 2 and include the type of *Cryptostictis hysterooides*. Sutton (1963) noted that the apical appendage may often be lacking, and in Fig. 18 drew 2 of the 12 conidia without basal appendages, but described and figured the end cells as hyaline. Guba (1961) in Fig. 98a showed the pigmented, rounded, non-setose apical cell. This point is stressed because the presence of setae has been given considerable weight in generic separations and used to separate *Seimatosporium* and *Sporocadus*. Cultures from setose conidia from *Vitis* (89672) produced non-setose conidia matching those of 90913 from *Rosa* and 89543 from *Cornus*. All three cultures had similar growth habits. Because of this and the intergrades observed in natural collections all the collections are referred to *Seimatosporium lichenicola*.

This species causes a canker on stems of roses (Jenkins 1937; Brooks and El Alaily 1939). It undoubtedly has a wider host and geographic range than is indicated by the collections cited which support records on stems and fruit of *Rosa*, stems of *Cornus* and *Vitis* from Canada, Czechoslovakia, France, Germany, Switzerland, and U.S.A.

Specimens: 40995 ex PR. Herb. Corda 155664. (TYPE) *Sporocadus lichenicola*. Ht. Lobk. (Fürstl. Lobkowitzschen Garten, auf Aetschen der Hundsrose, *Rosa canina* L., Prague, CZECHOSLOVAKIA) 1838. Corda; 89540 ex G. Herb Barbey-Boissier 004042. (TYPE) *Cryptostictis hysterioides* Fckl. Ad *Vitis viniferae* sarmentorum corticem, rarissime, Autumno, Ca. Budenheim, GERMANY; 93084 Roumeguère, Fungi selecti gallici exs. 4286. *Cryptostictis hysterioides* Fckl. on *Vitis vinifera*, Francheville, Rhône, FRANCE, Mai, J. Therry; 89672 on *Vitis vinifera* L. stem, scarce, cultivated in a field near Forêt d'Uchaux, Vaucluse, FRANCE, R. A. Shoemaker (isolated from single conidia); 14355 as *Coryneum microstictum* Berk. & Broome on *Vitis piasezkii* Maxim., Arboretum, Ottawa, Ontario, CANADA, June 1944, D. B. O. Savile, det. I. L. Connors; 93085 D. Saccardo, Mycotheca italica 1367 as *Coryneum microstictum* B. et Br. f. *Vitis-viniferae* in ramis *Vitis viniferae*, Selva, Treviso, ITALY, Aug. 1903; 91459 ex G. Herb. Barbey-Boissier 2328. as *Cryptostictis cynosbati* (Fckl.) Fungi rhenani 455 (sub *Discosia*). Ad *Rosae pimpinellifoliae* fructig. aridos ad huc pendulos, raro, Autumno, In sylva ca. Gaugalgeseim, GERMANY (second species: see also 89542); 93087 ex Herb. Dearness 5608. as *Coryneum microstictum* B. & Br. on stems of *Rosa*, Phillipsburg, Pa., U.S.A., 5.14.1924, Mrs. Emigh, Herb. L. O. Overholts 9261; 90913 culture from ascospores of *Clathridium corticola* (Fuckel) Shoemaker & E. Müller, on *Rosa* sp. stem, Airola-Nante, Tessin, SWITZERLAND, 1200 meters, 10 June 1961, E. Müller, R.A.S.; 93086 Rabenhorst, Fungi europaei 1232, as *Coryneum microstictum* Berk. & Br. ad *Corn. albae* ramos Frankfurt ad M., GERMANY, leg. Bagge; 89543 on *Cornus sanguinea* L. stems, Katzenssee, near Zurich, SWITZERLAND, E. Müller, R.A.S. (isolated from conidia).

Seimatosporium caudatum (Preuss) n. comb. Fig. 3.

- ≡ *Sporocadus caudata* Preuss, Linnaea 24, 146. 1851.
- ≡ *Pestalotia caudata* (Preuss) Cooke, Nuovo G. Bot. ital. 10, 27. 1878.
- ≡ *Cryptostictis caudata* (Preuss) Sacc., Sylloge Fungorum 3, 444. 1884.
- = *Cryptostictis ludibunda* Vestergren, Oefv. K. Vet.-Akad. Förh. 10, 41. 1897.
- = *Coryneum confusum* Kabat & Bubak, in Bubak & Kabat, Hedwigia 52, 361. 1912.

Acervuli circular in surface view, 80–200 μ diam., intraepidermal, with a thin wall of yellow, 3–4 μ wide mycelium, but without appreciable surrounding mycelium. Conidia with three thin septa about equally spaced, mostly straight, fusoid, 11–15 \times 4–6 μ , with light brown central cells and hyaline end cells bearing one simple, uniformly thin, (5) 10–25 μ long seta from the apex and a similar seta obliquely from near the truncate base, sometimes clavate, non-setose, with pigment in the upper three or all four cells. Conidiophores in a basal palisade, aseptate, hyaline, thin-walled, simple or once-branched, 5–15 \times 1.5–2 μ , with fine annellations near the apex.

The type of this species was not obtained for the study. The collections match the diagnosis and figures given by Sutton, who studied the type (1963). In culture the apical setae rarely form and the basal setae are shorter than on the host, and the conidia approach the appearance of *Seimatosporium lichenicola*.

The fungus occurs on stems of *Rosa*, and in one specimen (3126) was clearly associated with a stem canker. It also was noted on a leaf spot of *Rosa cinnamomea* L. In 93088 most of the conidia were without setae which accounts for the description of the fungus as *Coryneum confusum*, but setose conidia are present and this name is reduced to synonymy.

This species is noted on leaf spots, stem cankers, and old stems of *Rosa* from Canada, Czechoslovakia, Germany, and Switzerland.

Specimens: 89544 on *Rosa* sp, stems, 20 km south of Innsbruck, AUSTRIA, 23 April 1962, R.A.S. (isolate 4626 from conidia); 3126 as *Coryneum microstictum* B. et Br. *Rosa* (hybrid tea) stem cankers, Victoria, British Columbia, CANADA, 12 May 1933, W. Newton; 89557 on *Rosa* sp. stems, 1000 meters, Solas, near Filisur, Graubünden, SWITZERLAND, 7 June 1962, R.A.S. (isolated); 89558 on *Rosa* sp. stems, 1200 meters, Savognin, Graubünden, SWITZERLAND, 2 June 1962, R.A.S. (isolated); 91068 on *Rosa* sp. stem, Montana, Wallis, SWITZERLAND, 13.v.1958, W. Loeffler, culture received 1962; 93088 ex Herb. Dearness, Kabat et Bubak: Fungi imperfecti exsiccati 738. *Coryneum confusum* Kab. et Bub., n. sp., Auf noch lebenden und absterbenden Blättern von *Rosa cinnamomea* L. in Anlagen in Turnau, Böhmen, CZECHOSLOVAKIA, 21 September 1908. Jos. Em. Kabat; 89541 ex G. Herb. Barbey-Boissier 2486, 1665, as *Coryneum microstictum* Berk. & Br. Ad *Rosae caninae* ramulos aridos, non raro, Vere (Oestrich, GERMANY, according to description).

***Seimatosporium discosioides* (Ell. & Ev.) n. comb. Fig. 4.**

≡ *Pestalozzia discosioides* Ell. & Ev., J. Mycology 4, 51. 1888.

≡ *Monochaetia discosioides* (Ell. & Ev.) Sacc., Sylloge Fungorum 18, 485. 1906.

= *Amphichaeta rosicola* H. C. Greene, Trans. Wis. Acad. Sci. Arts and Letters 47, 127 (1958) 1959.

= *Coryneum microstictum* Berk. & Broome var. *foliae* Dearness & Overholts, Mycologia 20, 243. 1928.

Acervuli in light brown leaf spots, epiphyllous, subcuticular, circular in surface view, 100–200 μ diam., with slight amount of 3 μ wide yellow mycelium at the base. Conidia 4-celled, 10–18 \times 3–5 (6) μ , with thin septa, usually slightly curved to straight, fusoid, with a short, curved, 3–7 μ long, simple seta from the apex and a similar seta obliquely from near the truncate base, sometimes straight, narrowly clavate, non-setose, and pigmented in the upper three or all four cells. Conidiophores in a basal palisade, aseptate, simple, hyaline, 5–15 \times 1.5–2 μ , marked by a series of annellations.

Dearness and Overholts described this species as a variety of *Coryneum microstictum* because the spores were not appendaged, or not very distinctly so according to a note from L. O. Overholts enclosed with the specimen in the Dearness Herbarium (93091). Appendaged spores, though infrequent, occur in the collection and match those found in other collections of this species.

This species causes leaf spots of *Rosa* in Ontario and Quebec, Canada, and in Delaware and New York, U.S.A.

Specimens: 91825 ex Herb. Dearness 473. *Monochaetia discosioides* (Ell. & Ev.) Dearn. on rose leaves (cult.), Coll. Commons, Del., U.S.A., Ellis & Everhart, N. Am. Fungi. Second Series 2180; 1558 *Pestalozzia discosioides* E. & E. on *Rosa* sp. leaves, Bear Island, Lake Timagami, Ontario, CANADA, 10 Aug. 1930, I. L. Conners; 1609 as 1558 but collected 13 Aug. 1930; 91810 ex Herb. Dearness 473. TRTC 1282. *Monochaetia discosioides* (E. & E.) Dearn. on *Rosa blanda* leaves, Bear Island, Lake Timagami, Ontario, CANADA, 13 Aug. 1930, H. S. Jackson, G. E. Thompson, S. M. Pady; 36467 *Coryneum microstictum* Berk. & Br. var. *foliae* Dearn. & Overh. on *Rosa* sp. leaves, La Trappe, Quebec, CANADA, September 1952, P. Claude, det. D. B. O. Savile; 44016 *Pestalotia discosioides* E. & E. on *Rosa* leaves, Farmers Rapids, Quebec, CANADA, 15 July 1932, I. L. Conners; 93091 ex Herb. Dearness 5608. (TYPE) *Coryneum microstictum* B. & B. var. *foliae* D. & Overh. on cult. rose leaves, Newcombe, N.Y., U.S.A., 22 August 1924. C. R. Orton & L. O. Overholts 9714.

Some new combinations are made below in addition to the two made above and the two proposed earlier (Shoemaker and Müller 1964) for *Clathridium massarinum* stat. conid., *Seimatosporium ribis-alpini* (Fautrey) Shoemaker & E. Müller, and for *Clathridium corticola* stat. conid., *Seimatosporium lichenicola*.

Seimatosporium anomalum (Harkn.) n. comb.

≡ *Pestalotia anomala* Harkn., Bull. Calif. Acad. Sci., 1884. p. 13.

Seimatosporium arbuti (Bonar) n. comb.

≡ *Disaeta arbuti* Bonar, Mycologia 20, 299. 1928.

Seimatosporium cadicola (B. C. Sutton) n. comb.

≡ *Cryptostictis cadicola* B. C. Sutton, Commonwealth Mycol. Inst. Mycol. Papers 88, 14. 1963.

Seimatosporium consocium (Peck) n. comb.

≡ *Pestalotia consocia* Peck, Rep. N. Y. State Mus. 39, 48. 1886.

Seimatosporium davisiae (McAlp.) n. comb.

≡ *Amphichaeta davisiae* McAlp., Proc. Linn. Soc. N.S.W. 29, 118. 1904.

Seimatosporium effusum (Vestergr.) n. comb.

≡ *Pestalotia effusa* Vestergr., Oefv. K. Vet.-Akad. Förh. 10, 45. 1897.

Seimatosporium falcatum (B. C. Sutton) n. comb.

≡ *Cryptostictis falcata* B. C. Sutton, Commonwealth Mycol. Inst. Mycol. Papers 88, 25. 1963.

Seimatosporium foliicola (Berk.) n. comb.

≡ *Podisoma foliicola* Berk. in Smith, English Flora 5, 362. 1836.

Seimatosporium grevilleae (Loos) n. comb.

≡ *Amphichaeta grevilleae* Loos, Trans. Brit. Mycol. Soc. 33, 41. 1950.

Seimatosporium hakeae (B. C. Sutton) n. comb.

≡ *Cryptostictis hakeae* B. C. Sutton, Commonwealth Mycol. Inst. Mycol. Papers 88, 30. 1963.

Seimatosporium hollosii (Toth) n. comb.

≡ *Cryptostictis hollosii* Toth, Ann. hist.-nat. Mus. hung. 52, 103. 1960.

Seimatosporium kennedyae (McAlp.) n. comb.

≡ *Amphichaeta kennedyae* McAlp., Proc. Linn. Soc. N.S.W. 29, 119. 1904.

Seimatosporium lonicerae (Cooke) n. comb.

Dochmolopha lonicerae Cooke, Nuovo G. bot. ital. 10, 25, 1878.

Seimatosporium mariae (Clinton) n. comb.

≡ *Pestalozzia mariae* Clinton in Peck, Rep. N.Y. State Mus. 27, 102, 1875.

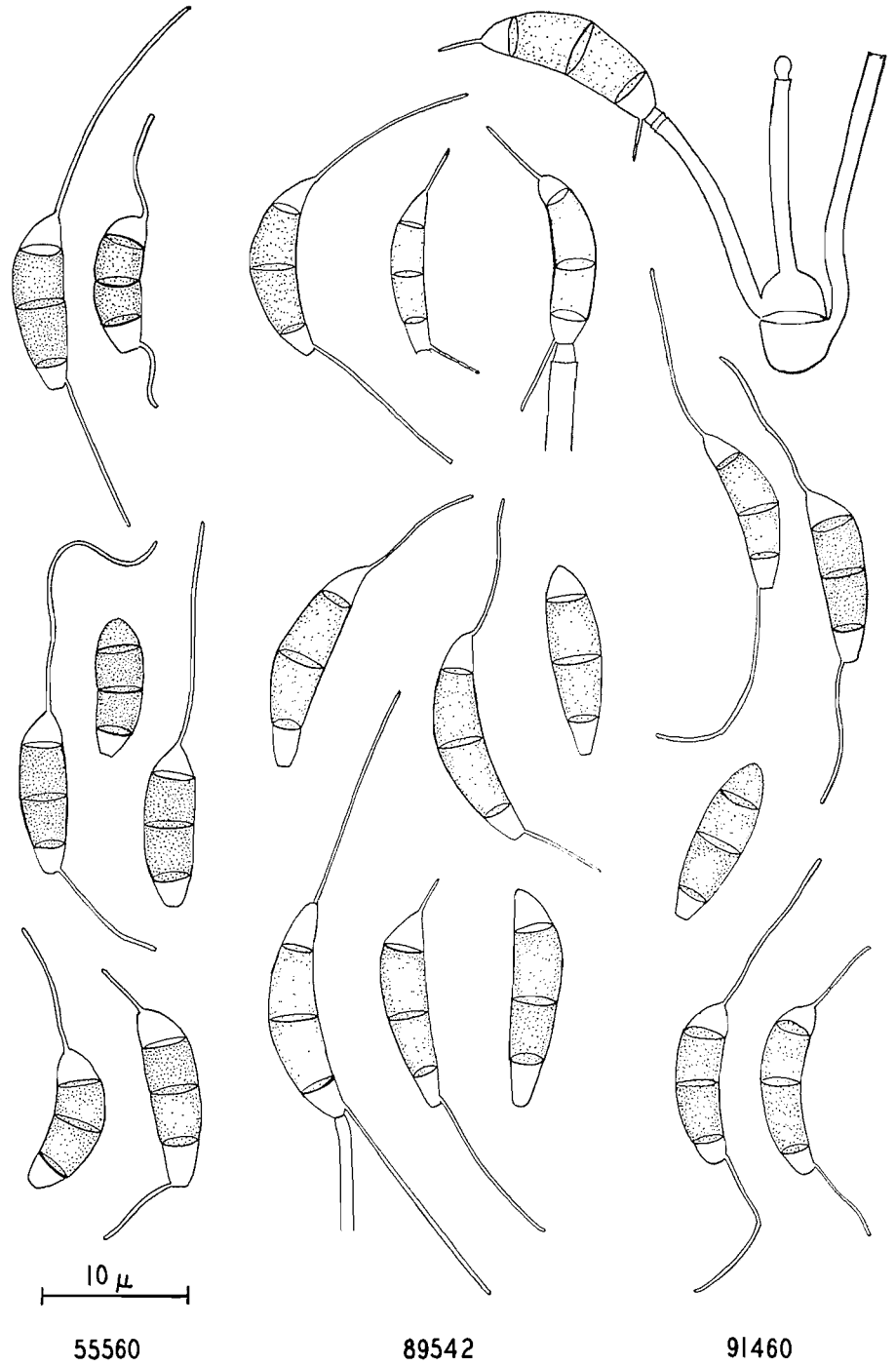
Seimatosporium parasiticum (Dearness & House) n. comb.

≡ *Pestalotia monochaetoidea* Sacc. & Ell. var. *parasitica* Dearness & House, Bull. N.Y. State Mus. 76, 243, 1923.

References

- BROOKS, F. T. and EL ALAILY, Y. A. S. 1939. A canker and die-back of roses caused by *Griphosphaeria corticola*. Ann. Appl. Biol. 26, 213-226.
- GUBA, E. 1961. Monograph of *Monochaetia* and *Pestalotia*. Harvard University Press, Cambridge, Massachusetts.
- JENKINS, A. E. 1937. *Coryneum microstictum* on rose from Oregon. Mycologia, 29, 725-731.
- LANJOUW, J. and STAFLEU, F. A. 1956. Index Herbariorum I. The herbaria of the world. Regnum Vegetabile, 6, 1-224.
- SHOEMAKER, R. A. and MÜLLER, E. 1964. Generic correlations and concepts: *Clathridium* (= *Griphosphaeria*) and *Seimatosporium* (= *Sporocadus*). Can. J. Botany. This issue.
- SUTTON, B. C. 1963. Coelomycetes. II. *Neobarclaya*, *Mycophallage*, *Bleptosporium*, and *Cryptostictis*. Commonwealth Mycol. Papers, 88, 1-50.

NOTE: Figs. 1-4 follow.



55560

89542

91460

FIG. 1.

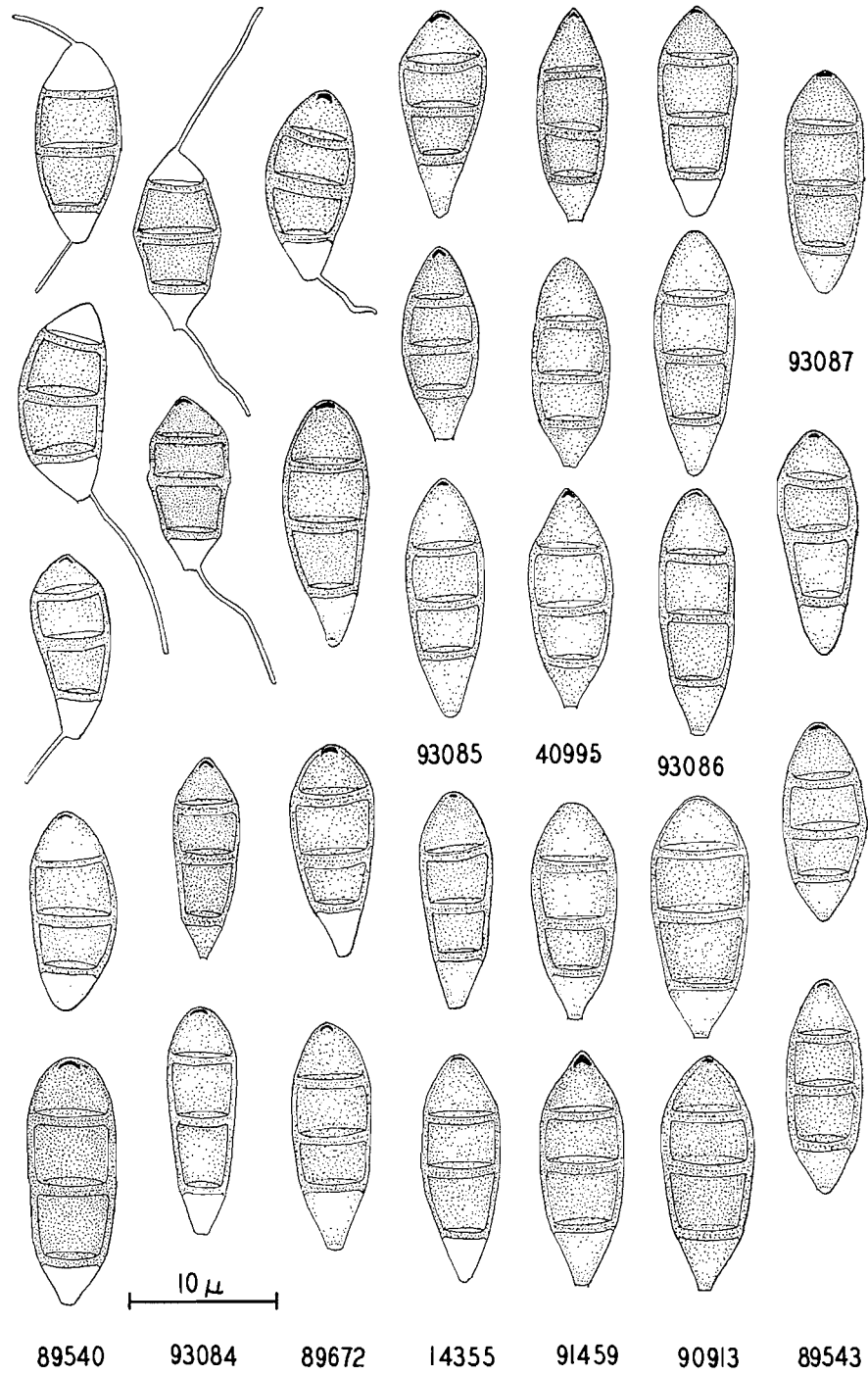


FIG. 2.

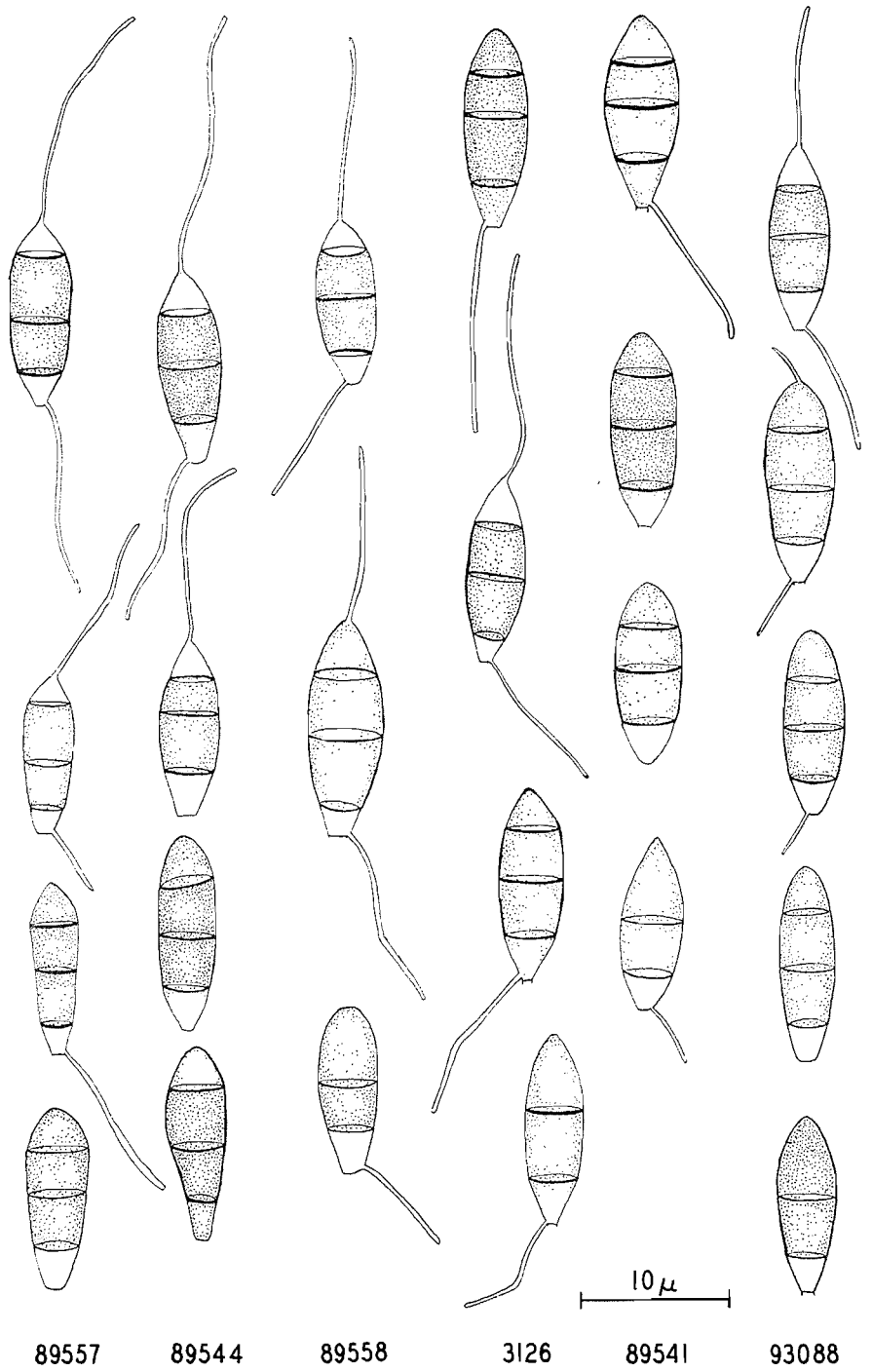


FIG. 3.

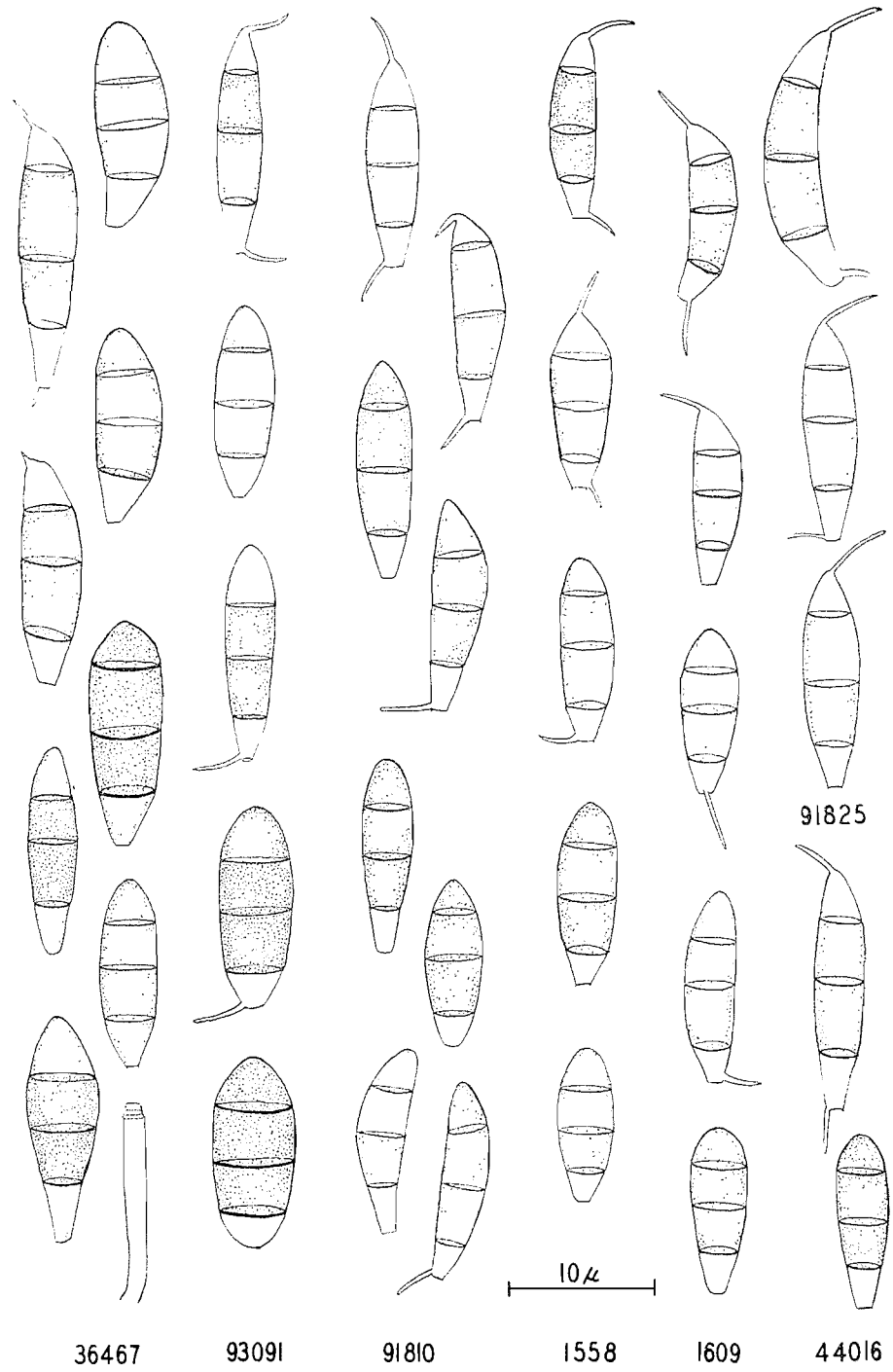


FIG. 4.