

Proceedings of the Iowa Academy of Science

Volume 32 | Annual Issue

Article 29

1925

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Recommended Citation

Uppal, B. N. (1925) "A Provisional List of the Species of Septoria in Iowa," *Proceedings of the Iowa Academy of Science*, 32(1), 189-199.
Available at: <https://scholarworks.uni.edu/pias/vol32/iss1/29>

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A PROVISIONAL LIST OF THE SPECIES OF SEPTORIA IN IOWA

B. N. UPPAL¹

INTRODUCTORY

There are over 1,200 species of the genus *Septoria*, all of them being parasitic. Most of the members of the genus occur on wild hosts, but several of them cause diseases of great importance on cultivated plants.

The earlier investigators have frequently made an unrecorded host the basis of a new species. Moreover, the morphological characters for the separation of various species are so few that great inaccuracies have crept in when investigators have ignored the value of the age of the spores in recording spore measurements. Also, it has been a custom with these investigators that, instead of giving a range of spore length with its two extremes, they have been content with giving an average. As spore length is an important factor in the determination of the species of *Septoria*, such a practice has tended to create confusion in the literature and has resulted in the making of a large number of species, many of which are undoubtedly synonymous.

It seems evident, therefore, that the genus *Septoria* is in great need of systematic and morphological study, yet very little has been done in the way of solving this problem. Garman and Stevens (2), realizing this need, have tabulated species of *Septoria*, recorded in Saccardo's *Sylloge Fungorum*, in order of length of spores. They hope that such a method of listing species would prove very convenient for study in morphology besides affording means for rapid determination. Beach's (1) work on "Biologic specialization in the genus *Septoria*" is of interest in that he shows that certain species of *Septoria* vary considerably in morphological characters under different environmental conditions, and he therefore rightly questions the value of spore and pycnidial measurements in specific descriptions.

The writer has examined critically the species of the genus available from Iowa in the herbarium at Iowa State College, and

¹ The writer gratefully acknowledges the suggestions and criticisms of Dr. I. E. Melhus and Dr. J. C. Gilman.

in some cases the determinations were corrected. In this work attempt has been made to list both the extremes of spore length, together with a representative average. It is hoped that such a method will facilitate the determination of the species.

The species of *Septoria* in the herbarium of Iowa State College, together with those reported in literature from Iowa, have been brought together in alphabetical order as a means of ready reference. Under each species a brief description has been given, together with host or hosts on which the organism has been reported, the locality and the name of the collector. A host index of the species has been appended.

SOME SEPTORIA SPECIES AND THEIR DESCRIPTION

Septoria aceris, B. & Br.

On *Acer negundo* L. (3)

Septoria alismatis Oud.

On *Alisma plantago* L. (4)

Septoria alliorum West.

Pycnidia epiphyllous, half immersed, reddish brown, in irregular spots with greenish white center, scattered; conidia cylindrical, flexuous, obtuse at both ends, 24-32 (extremes 12 and 42) x 1-1½ μ .

On leaves of *Allium porrum* L. E. W. Holway, Decorah, June 4, 1883.

Septoria ampeliana B. & C.

Spots reddish, conidia linear, curved, 30-50 μ long.

On leaves of *Vitis vinifera* L. H. S. Coe, Ledges Park, Boone, August, 1912.

Septoria anemones Desm.

Pycnidia epiphyllous, small, gregarious, in blackish spots, median pale green; conidia 20-24 x 1-1½ μ , filiform, very slender, flowing out of the apices of pycnidia.

On leaves of *Anemone virginiana* L. E. W. D. Holway, Decorah, July, 5, 1885.

Septoria argyraea Sacc.

On *Elaeagnus angustifolia* L. (3)

Septoria atro-purpurea Pk.

On *Aster novae-angliae* L. (3)

Septoria aurea var. *destruens* Ell. & Ev.

Spots amphigenous, greenish, with black margins; pycnidia 80-100 μ diam.; conidia 36-78 x 2-2.5 μ .

On leaves of *Ribes aureum* Pursh. B. N. Uppal, State College Campus, Ames, July 5, 1924. L. H. Pammel, Ames, 1893.

Septoria besseyi Peck.

On *Fraxinus* sp. (4)

Septoria bromi Sacc.

On *Bromus secalinus* L. (4)

Septoria brunellae Ell. & Holw.

Spots dark rust brown, sharply defined with a narrow raised border; pycnidia thickly scattered over the upper surface of the spots, black, slightly

prominent, 100-130 μ in diameter; conidia linear-clavate, sub-fuscous, multi-septate, nearly straight 40-75 x 1 $\frac{1}{2}$ -2 μ .

On leaves of *Prunella vulgaris* L. E. W. D. Holway, Decorah, August 3, 1884.

Septoria cacaliae E. & K.

On *Cacalia atriplicifolia* L. (3).

Septoria campanulae (Lev.) Sacc.

Pycnidia hypophylloous, gregarious, innate, finely wrinkled, at first prominent, later depressed, in pallid spots, with poor ostiole; conidia cylindrical, continuous, linear, curved, obtuse at both ends, 18-22 (extremes 18 and 28) x 2-3 μ .

On leaves of *Campanula americana* L. E. W. D. Holway, Decorah, June 22, 1884.

Septoria cannabina Pk.

On *Cannabis sativa* L. (3)

Septoria celtis-gallae W. R. Ger.

On *Celtis occidentalis* L. (3).

Septoria cerasina Peck.

Spots scattered or confluent, small, sub-angular, brown or reddish-brown; pycnidia few, collapsing when dry, almost marginate, pale or amber coloured; conidia filiform straight, often curved, 50-75 μ long.

On *Prunus pennsylvanica* L. f. H. H. Hume, August 31, 1899.

Septoria chrysanthemella Cav.

On *Chrysanthemum* (cultivated) (4).

Septoria cirsii Niessl.

On *Cnicus altissimum* (L.) Spreng. (3).

Septoria conspicua Ell. & Mart.

Spots amphigenous, rusty-brown, with a narrow slightly raised border, suborbicular, 2-5 mm., or, by confluence, one cm. in diam., thickly scattered over the leaf; pycnidia amphigenous, black, convex, numerous, 100-130 μ in diam.; conidia filiform, 36-56 (20 and 60) x 1-1.25 μ , guttulate, subhyaline.

On leaves of *Steironema quadriflorum* (Sims.) Hitchc. George W. Carter, Ames, October 24, 1892.

Septoria convolvuli Desm.

Spots orbicular, afterwards confluent, irregular, reddish or rusty-brown, finally with white center; pycnidia innate, small, epiphyllous brown, protruding; conidia, curved, 5-6 guttulate, 40-52 (extremes 18 and 58) x 1.5 μ .

On leaves of *Convolvulus sepium* L. H. H. Hume, Ames, August 21, 1899.

Septoria cornicola Desm.

Spots grey, rarely round, with dark purple border; pycnidia dark brown, globose depressed, scattered, mostly epiphyllous, 100-110 μ in diam.; conidia hyaline, cylindrical, curved, 2-4 septate, 40-56 (lowest extreme 20) x 2-2.5 μ , obsolete.

On leaves of *Cornus sibirica*. I. E. Melhus, Shenandoah, October 10, 1923.

Septoria cryptotaeniae Ell. & Rau.

Spots white, thin, irregular, border obsolete; pycnidia epiphyllous, erumpent, sub-globose, blackish brown very delicate 100-120 μ in diam.; conidia filiform, hyaline, tinted with green, cylindrical, ends slightly acute, curved, 24-38 (extremes 16 and 42) x 1.5 μ faintly guttulate.

On leaves of *Cryptotaenia canadensis* (L.) DC. H. T. Hill, Ames, September 28, 1907.

Septoria dianthi Desm.

On *Dianthus* sp. (4)

Septoria divaricatae Ell. & Ev.

Spots whitish, amphigenous, confluent, with purple border; pycnidia numerous, punctiform, epiphyllous, lenticular $100-120\mu$ dull black; conidia 20-25 (extremes 10 and 38) x $0.75-1\mu$, nearly straight instead of flexuous, non-septate, guttulate.

On living leaves of *Phlox divaricata* L. var. *laphamii* Wood. E. W. D. Holway, Decorah, June 4, 1883.

Septoria equiseti Desm.

On *Equisetum* sp. (4)

Septoria erigeronitis Pk.

On *Erigeron ramosus* (Walt.) BSP. (3)

Septoria eupatorii Rob. & Desm.

On *Eupatorium urticaefolium* Reichard. (3)

Septoria helianthi Ell. & Kell.

Spots brown, definite, 2.5-7.5 mm. with yellow elevated margin; pycnidia epiphyllous, immersed, brown, collapsing, 105μ ; conidia linear-filiform, 3-5 septate, 44-70 (extremes 30 and 78) x $2-3\mu$.

On leaves of *Helianthus tuberosus* L. H. S. Coe, Ledges Park, Boone, August, 1912.

Septoria irregularis Peck.

Spots small, angular, often confluent, at first yellowish above, then reddish-brown with a narrow darker border, brown or grayish brown beneath; pycnidia hypophyllous, sometimes amphigenous, irregular, black; conidia numerous, filiform, hyaline 30-45 (extremes 26 and 62) μ long, 0-2 septate.

On living leaves of *Rhus toxicodendron* L. H. S. Coe, Ledges Park, Boone, August, 1912.

Septoria lactucicola Ell. & Mart.

Pycnidia punctiform, minute, scattered, brown, in concentric rugose spots, 12-30 mm. diam.; conidia filiform, often curved, 25-30 (extremes 16 and 36) μ long.

On *Lactuca canadensis* L. H. S. Coe, Ledges Park, Boone, August, 1912. C. M. King, Ames, Fall 1910. H. H. Hume, Soper's Mills, August 26, 1899.

On *Lactuca scariola* L. H. S. Coe, Ledges Park, Boone, August, 1912.

Septoria leptostachya E. & K.

On *Phryma leptostachya* L. (3).

Septoria lobeliae Peck.

Spots circular, often confluent, dry, pallid or milk white, with dark- or brown purple margin; pycnidia small, numerous, clustered, black, innate, amphigenous; conidia filiform, simple, 20-28 (extremes 14 and 34) x about 2μ .

On *Lobelia siphilitica* L. E. W. D. Holway, Decorah, July 27, 1889.

Septoria lupulina Ell. & Kell.

Spots pale yellow-white, sub-angular and limited by the veinlets, 2-4 mm. across, subconfluent and occupying the greater part of the leaf; pycnidia scattered, innate but visible through the cuticle on the upper side of

the leaf, appearing of a dark lead (?) colour, sublenticular (150μ), of coarse cellular structure; conidia 30-50 (extremes 20 and 56) x 2-2.5 μ curved, a little thicker at one end, obtuse.

On leaves of *Humulus lupulus* L. H. S. Coe, Ledges Park, Boone, August, 1912.

Septoria lycopersici Speg.

Spots large, often confluent and covering the entire leaf, sordid dark-cinereous, sub-indeterminate; pycnidia scattered, hypophyllous, lenticular-hemispheric, prominent, black, membranous, olivaceous; conidia elongate, cylindrical, 70-110 x 3.3 μ , many-septate, blunt on both ends, thin roundish, hyaline.

On leaves of *Lycopersicon esculentum* Mill. A. S. Van Sant, Clarinda, September 6, 1908. Robert E. Buchanan, Ames, September 20, 1908. G. W. Lee, Sac City, August 5, 1908. Mrs. M. C. Woods, Waterloo, August 20, 1911. C. M. King, Ames, August 20, 1915.

Septoria malvicolae Ell. & Mart.

On *Malva rotundifolia* L. (4)

Septoria microsperma Ph.

On *Betula* (3)

Septoria mimuli Winter

On *Mimulus ringens* L. (3)

Septoria nabali B. & C.

On *Prenanthes racemosa* Michx. (3)

Septoria nodorum Berk.

Spots pallid, ochraceous, with darkish girdle, depressed or confluent; pycnidia flattened or elongate, sub-epidermal, at first light brown in colour, later becoming dark brown or black; conidia oblong, cylindrical, straight, obtuse and rounded at the ends, curved or angularly bent, hyaline, 3-septate, guttulate, 20-25 (extremes 18 and 32) x 2-4 μ .

On nodes, internodes, and glumes of *Triticum vulgare* L. Collected by R. O. Cromwell; identified by B. N. Uppal.

Septoria nodorum Berk. is synonymous with *Septoria glumarum* Pass.

Septoria noli-tangere Gerard.

Spots roundish or oblong, brown; pycnidia minute, about 70 μ in diam. black, aggregated in center of spots, often epiphyllous; conidia filiform, hyaline, sometimes curved, obtuse at both ends, 24-28 x about 1.75 μ .

On leaves of *Impatiens pallida* Nutt. E. W. D. Holway, Decorah, June 8, 1883 and 1886. J. P. Anderson, Decatur Co., 1904.

Septoria oenotherae Westd.

Spots epiphyllous, roundish, small, at first greenish, later becoming brown, with wine-red girdle; pycnidia black, punctiform, aggregated in the center of spot; conidia filiform, curved, hyaline, minute, many-guttulate. 35-40 (extremes 20 and 44) x 1.5-1.75 μ .

On leaves of *Oenothera biennis* L. E. W. D. Holway, Decorah, June 22, 1884. Raymond, Ames, 1891.

Septoria ostryae Peck.

Spots small, sub-circular, reddish-brown; pycnidia scattered, situated in the center of the spot, blackish brown; conidia linear, strongly curved, indistinctly septate, hyaline, 40-60 μ long.

On leaves of *Ostrya virginiana* (Mill.) K. Koch. H. H. Hume, Soper's Mills, August 26, 1899.

Septoria pachyspora E. & Holw.

Pycnidia epiphyllous, black, 100-130 μ , on snow white, thin, small (1-2 mm.) subangular or nearly round spots surrounded by a broad, purplish shaded border; conidia arcuate-fusiform 4-6- septate, 35-60 x 3 μ , with greenish yellow tinge.

On leaves of *Zanthoxylum americanum* Mill. E. W. D. Holway, Decorah, August 1, 1884.

Septoria passerinii Sacc.

Grayish coloured spots, irregular margin; pycnidia longitudinally seriate or scattered, sub-epidermal, black, smooth, globose to subglobose, ostiole oval to elliptical; conidia cylindrical, straight or slightly curved, rounded at the ends, hyaline, 3- septate, 30-45 (extremes 24 and 48) x 1.7-3 μ .

On leaves of *Hordeum jubatum* L. Collected by R. O. Cromwell; identified by B. N. Uppal.

Septoria pileae Thiim.

On *Pilea pumila* (L.) Gray (3)

Septoria piricola Desm.

On *Pyrus malus* L. (4)

Septoria platanifolia Cke.

On *Platanus occidentalis* L. (3)

Septoria podophyllina Peck.

Spots large, indefinite, reddish brown, pycnidia epiphyllous, few, clustered on or near the center of the spot, pallid or blackish slightly prominent, collapsing when dry; conidia filiform, variable in length, straight or slightly curved, 28-40 (extremes 16 and 52) x 1.5 μ .

On leaves of *Podophyllum peltatum* L. E. W. D. Holway, Decorah, July 4, 1885.

Septoria polygonorum Desm.

Epiphyllous; spots small, circular, with purple margins; pycnidia innate, minute, dark-pallid, with a wide circular opening, afterwards concave; conidia filiform smooth, flexuous, 4-5 guttulate, hyaline, 40-60 (extremes 28 and 64) x 1 μ .

On leaves of *Polygonum pensylvanicum* L. F. C. Stewart, Ames, September 8, 1894. L. H. Pammel, Ames, September 1, 1908. H. S. Coe, Ledges Park, Boone, August, 1912.

On leaves of *Polygonum persicaria* L. H. S. Coe, Ledges Park, August, 1912.

Septoria pyri Cast.

On *Pyrus malus* L. and *Pyrus coronaria* L. (3)

Septoria quer ceti Thuem.

On *Quercus* sp. (4)

Septoria rhamontici Thuem.

On *Rheum rhamonticum* L. (3)

Septoria rhoina B. & C.

Spots somewhat whitish, margins broad and black girdled; pycnidia central; conidia vermicular, 48-64 (extremes 32 and 80 μ) long, flexuous, hyaline.

On leaves of *Rhus glabra* L. I. E. Melhus and L. W. Durrell, Germania, July 25, 1924.

Septoria ribis Desm.

Hypophylloous; spots small, irregular, bounded by the leaf veins, purplish

brown; pycnidia innate, minute, convex, blackish brown; cirri in mass black; conidia elongate, linear, curved, guttulate, 40-50 (extremes 18 and 56) μ long.

On leaves of *Ribes gracile* Michx. L. H. Pammel Muscatine, August, 1899. H. H. Hume, Ames, August 25, 1899. And others.

On *Ribes nigrum* L. Geo. W. Carver, Ames. September 12, 1892. L. H. Pammel, Ames, September, 1900.

Septoria rubi West.

Spots circular, reddish brown, later with white center and purple margin; pycnidia epiphyllous, dark-brown, depressed, few; conidia filiform, 40-55 (extremes 36 and 58) x 1.5 μ , faintly guttulate, indistinctly 2-3-many-septate, hyaline.

On leaves of *Rubus allegheniensis* Porter. H. S. Coe, Ledges Park, Boone, August, 1912.

On leaves of *Rubus odoratus* L. Geo. W. Carver, Ames, September, 1892. L. H. Pammel.

On leaves of *Rubus villosus* Ait. L. H. Pammel, Mason City, July 23, 1908. L. H. Pammel, Muscatine, August, 1899.

On leaves of *Rubus canadensis* L. Raymond, Ames, 1891.

Septoria rudbeckiae Ellis and Halsted.

On leaves of *Rudbeckia triloba* L. and *R. laciniata* L. (3), Iowa, August, 1887.

Septoria sambucina Pk.

On *Sambucus racemosa* L. (3)

Septoria scrophulariae Peck.

Spots small, parched, white, with purplish brown margin; pycnidia few, superficial; conidia filiform, curved, hyaline 30-44 (extremes 16 and 64) μ long.

On leaves of *Scrophularia nodosa* L. C. M. King, Ames Fall 1910. L. H. Pammel, Muscatine, August, 1899.

On leaves of *Scrophularia marilandica* L. H. T. Hill, Ames, August 28, 1907. Geo. W. Carver, Ames, September 29, 1892.

Septoria siccii Pk.

On *Echinocystis lobata* (Michx.) T. & G. (3).

Septoria silenes West.

Spots round confluent, pallid brown, wide; pycnidia minute, black, semi-immersed; conidia cylindrical, 30-44 (lowest extreme 17) x 2.5 μ .

On leaves of *Silene antirrhina* L. F. U. Faurot and A. E. Paddock, Ontario, May 28, 1900 and 1901.

Septoria silenicola Ell. & Martin.

Spots small, light yellow; pycnidia brownish-yellow, soft, innate, scattered, 56 μ in diam.; conidia yellowish, cylindrical curved, 3-septate, 36-48 x 3 μ .

On leaves of *Silene stellata* (L.) Ait. f. J. P. Anderson, Ledges Park, Boone, July 4, 1913.

Septoria smilacina Dur. & Mont.

Hypophyllous; spots white with brown regular margins; pycnidia immersed, prominent, ovoid, scattered in great number; conidia rod-like, straight, hyaline, obtuse, 20-40 x 2.7-6 μ , nucleolate, later 4 septate.

On leaves of *Smilax herbacea* L. R. Combs, Ames, July 18, 1894.

Septoria smilacinae Ell. & Mart.

On *Smilacina racemosa* (L.) Desf. (4)

Septoria solidaginis Thuem.

On *Solidago canadensis* L. (3).

Septoria speculariae B. & C.

Spots faintly pale; pycnidia prominent, scattered; conidia hyaline, filiform, not straight (slightly curved), 28-40 (extremes 12 and 45) x 1.25-2 μ .

On leaves of *Specularia perfoliata* (L.) A. DC. I. E. Melhus, May, 1924. A. S. Hitchcock, Ames.

Septoria sphaerelloides E. & K.

On *Hypericum mutilum* L. (3).

Septoria stachydis Rob. & Desm.

Spots amphigenous, subolivaceous, later becoming pallid brown, quite dry, irregular, bounded by veins, scattered or confluent; pycnidia epiphyllous, minute, blackish-brown; conidia rod-like, curved or flexuous, subcontinuous, hyaline, 30-40 (extremes 22 and 48) x 1.7-2 μ .

On leaves of *Stachys palustris* L. Geo. W. Carver Ames, September 8, 1892.

Septoria symphoricarpi Ell. & Ever.

Spots subcircular, small (1-2 mm.), white with a brown border; pycnidia sub-lenticular, black, epiphyllous, few (1-5), prominent; conidia subcylindrical a little narrowed below, nearly straight, 30-45 (extremes 25 and 56) x 2 μ faintly 1-3-septate. The white spots are often included in larger irregularly-shaped rusty-brown spots and areas of the leaf, but the pycnidia are confined to white spots. Besides the large brown spots, the leaves are thickly spotted with smaller (1-2 mm.) brown spots.

On leaves of *Symphoricarpos occidentalis* Hook. A. L. Bakke, Forest City, 1908.

Septoria toxicodendri Curt.

On *Rhus toxicodendron* L. (3).

Septoria tritici Desm.

Amphigenous; spots sub-linear, longitudinal, whitish; pycnidia sub-epidermal, globose to sub-globose, in rows parallel to the vascular strands, brown to black, ostiole circular to oval; conidia slender, cylindrical, straight or slightly curved, hyaline, 3-7-septate, ends rounded 40-70 (extremes 18 and 78) x 1.75-2.7 μ .

On *Triticum vulgare* L. C. M. King, Ames, 1908.

The length of summer conidia differs that of conidia collected in winter. (8).

Septoria ulmi Fr.

On *Ulmus fulva* Michx. (4).

Septoria urticae Desm. & Rob.

Spots amphigenous, ochraceous, orbicular or irregular; pycnidia epiphyllous, minute, numerous, dark; conidia elongate, curved or flexuous, faintly guttulate, 40-50 x 2 μ , hyaline.

On leaves of *Urtica gracilis* Ait. H. S. Coe, Ledges Park, Boone, August, 1912.

Septoria verbena Rob. & Desm.

Spots suborbicular, determinate, white with purplish-violaceous margin; pycnidia small, 80-100 μ in diam., fuliginous (sooty); conidia cylindrical, straight or flexuous, 40-50 (extremes 26 and 80) μ long, hyaline.

On leaves of *Verbena hastata* L. H. S. Coe, ledges Park, Boone, August, 1912.

- Septoria veronicae* Desm.
On *Veronica virginica* L. (3).
Septoria virgaureae Desm.
On *Solidago serotina* Ait. (3).

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Smilacina racemosa	Septoria silenicola Ell. & Martin
Smilax herbacea L.	Septoria smilacinae Ell. & Mart.
Solidago canadensis L.	Septoria smilacina Dur. et Mont.
Solidago serotina Ait.	Septoria solidaginis Thuem.
Specularia perfoliata (L.) A. DC.	Septoria virgaureae Desm.
Stachys palustris L.	Septoria speculariae B. & C.
Steironema quadriflorum (Sims.) Hitchc.	Septoria stachydis Rob. & Desm.
Symporicarpos occidentalis Hook.	Septoria conspicua Ell. & Martin
Triticum vulgare L.	Septoria symphoricarpi Ell. & Ev.
Triticum vulgare L.	Septoria nodorum Berk.
Ulmus fulva Michx.	Septoria tritici Desm.
Urtica gracilis Ait.	Septoria ulmi Fr.
Verbena hastata L.	Septoria urticae Desm. & Rob.
Veronica virginica L.	Septoria verbenae Rob. & Desm.
Vitis vinifera L.	Septoria veronicae
Zanthoxylum americanum Mill.	Septoria ampeliana B. & C.
	Septoria pachyspora E. & Holw.

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