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Fungus Flora of Panicum virgatum L.

J. A. Helin
Iowa State University

Fungus Flora of *Panicum virgatum* L.[1]

J. A. HELIN[2]

Abstract. The pathogenic fungi collected on *Panicum virgatum* in Iowa included *Elsinoe* sp., *Phyllachora graminis, Colletotrichum graminicola, Selenophoma donacis, Puccinia panici, Tilletia maclagani,* and *Uromyces graminicola.* Those which were saprophytic or of doubtful pathogenicity included *Ophiobolus herpotrichus, Leptosphaeria microscopica, Mycosphaerella recutita, Phaeoseptoria elymi,* and *Phaeoseptoria festucae.* Reported for the first time on *Panicum virgatum* are *Elsinoe* sp., *Ophiobolus herpotrichus, Leptosphaeria microscopica, Mycosphaerella recutita, Phaeoseptoria elymi,* and *P. festucae.* This is the initial report of *Colletotrichum graminicola* and *Selenophoma donacis* in Iowa on this host.

The native grasses common throughout Iowa support a diversified group of fungi, both parasites and saprophytes. As a part of an intensive study of the Iowa grass fungus flora, collections of native grasses have been made in all sections of the state with special emphasis on those of the central area. *Panicum virgatum* L., commonly known as switch grass, was frequently collected along roadsides, railroad right-of-ways, and in prairie areas. The wide variety of fungi found associated with *P. virgatum* proved to be a very interesting group of organisms. They are arranged alphabetically within their respective classes.

ASCOMYCETES

Elsinoe sp.

A paper by Tiffany and Helin (6), in press, deals with this organism. It is an active parasite and is unique in that no members of this genus have been previously reported on the grasses.

On *Panicum virgatum*: West of Ames, Sept. 10, 1957, L. H. Tiffany; South of the Agronomy Farm, Ames, Sept. 10, 1957, L. H. Tiffany; Kalsow Prairie, July 26, 1959, L. H. Tiffany and J. Helin; Boone Co., Aug. 7, 1959, July 8, 1960, July 13, 1960, J. Helin; Roland, July 27, 1960, J. Helin; Woodman Hollow, July 30, K. Juhl; Kalsow Prairie, July 18, 1960, J. Helin; Boxholm, Aug. 5, 1960, J. Helin; Ledges State Park, Aug. 9, 1960, J. Helin; Story Co., Aug. 15, 1960, J. Helin.

Leptosphaeria microscopica Karst.

Perithecia on leaves of many grass hosts, black, globose, in rows between vascular bundles penetrating the epidermis with short black necks; asci numerous, broadly clubshaped, bitunicate, 8-spored, 68-104 by 15-18 microns; ascospores biseriate in the upper part of the ascus, uniseriate below, pale yellow to golden in color, 3-septate, broadly fusoid, inequilateral, constricted at the septa, the second cell often more swollen than the rest, 22-28 by 7-8.5 microns.

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[2] Department of Botany and Plant Pathology, Iowa State University, Ames.

The imperfect stage found associated with *L. microscopica* was identified as *Phaeoseptoria festucae* Sprague (8).

On *Panicum virgatum:* Ames, Oct. 5, 1959, J. Helin.

Perithecia measured 200-210 by 150 microns, asci 68-75 by 10-12 microns, slightly narrower than the measurement given by Webster (8). The central cells of the spores were pigmented, yellow-brown, while the end cells were hyaline in young spores. Ascospores of *Leptosphaeria* are typically uniform in color. This organism was placed in *L. microscopica* because its description closely agreed to that of *L. microscopica,* and it was associated with *Phaeoseptoria festucae.*

Ophiobolus herpotrichus (Fr.) Sacc.

Perithecia immersed in the host tissue with only the neck emergent, commonly on basal internodes of many grasses, spherical or flattened at the base, black; neck surrounded by numerous dark brown, thick walled hairs about 4 microns wide; 250-500 microns in diameter; neck long or short, up to 150 microns; asci numerous, bitunicate, cylindrical or clubshaped, tapering to a long stalk below; 8-spored, 110-218 by 8-11 microns; filiform branched paraphyses numerous; ascospores filiform, yellow to pale brown, with numerous small guttulae, up to 20 septa when mature, 120-185 by 2-3 microns (9).

On *Panicum virgatum:* Kalsow Prairie, July 26, 1959, L. H. Tiffany.

Perithecia were formed in dead leaf tissue rather than on basal internodes. Ascospores were slightly shorter than the above 75-80 by 2 microns but were immature. This organism has not been previously recorded on *P. virgatum.*

Mycosphaerella recutita (Fr.) Johans.

Perithecia grouped in parallel rows, amphigenous, dark brown, moderately thin walled; asci egg shaped to elliptical or pear shaped, 22-32 by 10-12 microns; ascospores 3-ranked or clumped together, elongate-cylindrical or clavate, sometimes spindle shaped, 1-septate, hyaline, enlarged above, and 11-14 by 3.5-4 microns (4).

On *Panicum virgatum:* Ledges State Park, July 6, 1959, J. Helin.

Perithecia on *P. virgatum* were 60-90 microns in diameter, asci were 30-36 by 10-12 microns, slightly larger than reported; however, ascospores were 11-14 by 3 microns, closely agreeing with the description. *M. recutita* has not been previously reported on *P. virgatum.*

Phyllachora graminis (Pers.) Fckl.

Amphigenous clypei scattered, long elliptical to linear, often fusiform in outline, 0.1-1.0 mm by 0.2-5.0 mm, frequently confluent, black; perithecia grouped; asci cylindrical, 8-spored, 70-

100 by 8-10 microns; ascospores 1-celled, uniseriate, hyaline, 9-12 by 4.5-6 microns (5).

On *Panicum virgatum:* Kalsow Prairie, July 26, 1959, L. H. Tiffany; Lakeside Laboratory, Lake Okoboji, Aug. 1, 1960, L. H. Tiffany.

P. graminis is found on a wide range of hosts including *P. virgatum* in Iowa (6).

Fungi Imperfecti

Colletotrichum graminicola (Ces.) Wils.

Acervuli dark brown or black, elongate, with few to many setae, dark brown or black, 1- to 2-septate, 60-120 microns long and 6-8 microns thick at the base; conidiophores very short, 6-12 by 1-2 microns; conidia falcate, spindle- or boat-shaped, 2- to several guttulate, 18-26 by 3-4 microns (5).

On *Panicum virgatum:* Kalsow Prairie, June 27, 1958, L. H. Tiffany; Ames, June 15, 1959, J. Helin; Ledges State Park, July 6, 1959, J. Helin; Kalsow Prairie, July 26, 1959, L. H. Tiffany and J. Helin; Boone Co., Aug. 7, 1959, J. Helin; Ames, Aug. 19, 1959, J. Helin; Ames, Oct. 5, 1959, J. Helin; Ames, June 3, 1960, J. Helin; Boone Co., June 14, 1960, J. Helin; Story Co., June 27, 1960, J. Helin; Clear Lake, July 1, 1960, J. Helin; Boone Co., July 8, 1960, J. Helin; Kalsow Prairie, July 18, 1960, J. Helin; Ames, July 22, 1960, J. Helin; Roland, July 27, 1960, J. Helin; Lakeside Laboratory, Lake Okoboji, July 31, 1960, L. H. Tiffany; Boxholm, Aug. 5, 1960, J. Helin.

Lesions are very characteristic on *P. virgatum* with a distinct purple discoloration when young, becoming brown at the center of the lesion with age and finally bleached with black rows of acervuli. Local collections were quite variable with conidia slightly larger than the measurements given by Sprague (5). *Colletotrichum graminicola* causes anthracnose, a common disease on a wide range of grass hosts. It has not been previously reported on *P. virgatum* in Iowa. The frequent and widespread occurrence of this pathogen makes it possibly the most damaging parasitic organism on *P. virgatum* in the state.

Phaeoseptoria elymi Sprague

Pycnidia on leaves, scattered, globose, erumpent, brown, ostiolate, 180 microns in diameter; conidia uniformly bacillarfiliform, blunt at each end, lightly pigmented, 8-14 septate, 50-75 by 2-2.5 microns (4).

On *Panicum virgatum:* Kalsow Prairie, June 27, 1958, L. H. Tiffany; Ames, June 3, 1960, J. Helin.

Conidia of *P. elymi* are disinctive, for they lack the taper common to other species of *Phaeoseptoria.* Conidia from the latter collection were wider, 3-4 microns, but of the same form as described for *P. elymi. P. virgatum* is a new host for *Phaeoseptoria elymi. P. elymi* was isolated but failed to produce conidia in culture.

Phaeoseptoria festucae Sprague

Pycnidia on leaves, globose to subglobose, black, suberumpent, 55-100 by 50-90 microns; conidiophores 3-4 by 1.4-1.7 microns; conidia 50-85 by 2.8-4.8 microns, 8-11 septate, flavid, clavulate-filiform with a tapering, finally blunt base, and a tapering pointed to slightly blunt apex (4).

Webster's description of *P. festucae* presents the following measurements: pycnidia 120-190 microns in diameter; conidia 3-15 septate, 44-95 by 4-5.5 microns (8).

On *Panicum virgatum:* Ledges State Park, July 6, 1959, J. Helin; Ames, Aug. 19, 1959, J. Helin; Ames, Oct. 5, 1959, J. Helin; Ames, June 3, 1960, J. Helin; Lakeside Laboratory, Lake Okoboji, Aug. 1, 1960, L. H. Tiffany; Ledges State Park, Aug. 9, 1960, J. Helin; Story Co., Aug. 15, 1960, J. Helin; Jordan, Mar. 3, 1961, J. Helin.

P. festucae was the most common species of *Phaeoseptoria* collected on *Panicum virgatum.* Pycnidia were 120-160 by 150-275 microns, conidia were spindle-form, gradually tapered toward each end, stiffly curved, 7-8 septate, and 48-72 by 3.5-7 microns. Conidium width was generally in the 3-4.5 micron range, but in one collection it was 5-7 microns, which is wide for this species.

Isolations of *P. festucae* made from two collections on *Panicum virgatum* formed abundant pycnidia in culture. No ascogenous stages were formed. This is the first report of *P. festucae* on this host.

Selenophoma donacis (Pass.) Sprague and A. G. Johnson.

Spots more or less elliptical, straw-colored with purple, red or brown borders, giving an eyespot appearance which may fade later; on culms, sheaths, and leaves; pycnidia erumpent, small, brown, globose, ostiolate, 40-50 microns in diameter; conidia stoutly falcate to boomerang-shaped, 18-35 by 2.0-4.5 microns (5).

On *Panicum virgatum:* Kalsow Prairie, June 27, 1958, L. H. Tiffany; Boone Co., June 14, 1960, J. Helin.

The symptoms are very characteristic. S. *donacis* has been reported on *P. virgatum* by Sprague (5), but has not been collected on this host in Iowa.

BASIDIOMYCETES

Puccinia panici Diet.

Uredia epiphyllous, small, cinnamon brown; uredospores broadly ellipsoid, 19-27 by 21-30 microns, wall cinnamon brown, 1.5-2 microns thick, finely echinulate; telia usually epiphyllous, small, often forming lines, dark chestnut brown; teliospores ellipsoid or oblong, 16-24 by 27-45 microns, rounded or acute above, narrowed below, slightly or not constricted at septum, wall dark cinnamon- or chestnut-brown above, paler below, 1-1.5 microns thick at sides, 3-7 microns above; pedicel

nearly or quite colorless, one to one and one-half the length of the spore (1).

On *Panicum virgatum:* Ames, Oct. 5, 1959, J, Helin; Weise Slough, July 23, 1960, K. Juhl.

This rust is general in occurrence in the United States on *P. virgatum,* and has been collected in Iowa (3).

Tilletia maclagani (Berk.) Clint.

Sori inconspicuous in ovaries replacing the seeds; pericarp ruptures exposing the dusty, reddish-brown spore mass; true sterile cells few, pale yellow, 12-19 microns in diameter, globose to irregular, often collapsed, thick walled, 2.5-4 microns, smooth or obscurely papillose; spores pale yellowish to reddish brown, globose to slightly irregular, 18-25 microns in diameter, exospore 2-3 microns wide, finely verrucose and concolorous with the spore (2).

On *Panicum virgatum:* Boone Co., July 8, 1960, J. Helin.

Tilletia maclagani has been previously reported on *P. virgatum* in Iowa by Gilman and Archer (3). The diseased panicle had matured before the panicles from healthy plants.

Uromyces graminicola Burr.

Uredia as in *Puccinia panici* though the uredospores are smaller, 15-19 by 18-23 microns, the wall thicker, 2-2.5 microns; telia as in *P. panici;* teliospores 1-celled 13-19 by 21-32 microns, the spore wall 1.5-2 microns thick at the sides, 3-9 microns above (1).

On *Panicum virgatum:* Ames, Oct. 5, 1959, J. Helin; Story Co., Aug. 15, 1960, J. Helin; Jordan, Mar. 3, 1961, J. Helin.

This rust is common on *P. virgatum* and is generally distributed throughout the United States. It has been reported by Gilman and Archer (3) in Iowa.

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