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Plant Parasitic Fungi of Ten Tallgrass Prairies of Iowa: Distribution and Prevalence

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During the 1980s and 1990s, collections of fungal parasites on above ground parts of prairie plants in Iowa were made throughout the growing seasons. This report presents the fungi recorded from three groups of Iowa tallgrass prairies. The western group was composed of Dinesen, Steele and Stinson Prairie State Preserves, a Loess Hills group of collecting sites in Five Ridge and Runkel Prairie State Preserves and prairies at Waubonsie State Park. 180 species of fungi were collected on 116 hosts from these prairies. A central Iowa group of prairies associated with the Des Moines Lobe landform, Anderson, Doolittle, Kalsow and Ames High (Pohl) Prairie State Preserves, yielded 162 species of fungi from 91 hosts. Two sand prairie state preserves, Cedar Hills and Marietra, provided 78 fungi on 54 hosts. 116 of the species encountered in the current study were not reported in a previous 1990 study of four northern Iowa prairies.

INDEX DESCRIPTORS: prairie plant disease fungi, smut fungi, plant rusts, leaf spot fungi.

Native plants and introduced cultivated plants share a common hazard to survival and successful reproduction from diseases caused by plant parasitic fungi. The economic impact of these fungi on the survival, growth, and yield of cultivated plants has stimulated much research with the resulting information utilized in various management practices for the control of parasitic fungi. In contrast, little attention has been given to the fungal parasites of prairie plants and to their effect on native plant health and survival.

Historically, the limited information available concerning fungal diseases of midwestern tallgrass prairie plants has come mostly from three sources. Trelease (1884) published a preliminary list of Wisconsin plant disease fungi, supplemented by additional short papers by Davis (1893, 1897, 1903, 1909, 1914, 1919a, 1919b, 1921, 1924, 1926). Greene (1940, 1965, 1968) continued study of the fungi on native Wisconsin plants, including those on prairie plants. In Iowa, Gilman and Archer (1929) documented the parasitic fungi of Iowa followed by two supplemental reports (Gilman 1932, 1949). Again, some disease fungi on native prairie plant species were included.

In 1990, Tiffany et al. reported on the plant parasitic fungi from four tallgrass prairie state preserves in northern Iowa: Ada Hayden Prairie State Preserve in Howard County, Stinson Prairie State Preserve in Kossuth County, and Freda Haffner Kettlehole State Preserve and Cayler Prairie State Preserves in Dickinson County. Intensive studies of specific diseases on their host plants in these prairies were conducted by various researchers (Gabel and Tiffany 1987, 1999; Snetselaar and Tiffany 1991). The rust fungi on native plants in the Loess Hills region, including those on prairie plants, were summarized by Tiffany and Knaphus (1985). Two smut diseases of *Andropogon gerardii* have been studied (Snetselaar and Tiffany 1990; Snetselaar and Tiffany 1991, 1992; Tiffany and Knaphus 1995).

As late as the early 1900s, prairies were not an unusual natural feature of the Iowa landscape (Smith 1998). At the present time our prairie heritage has been reduced to scattered prairie remnants, usually quite small (Smith 1990). To successfully maintain the original

mix of prairie plant species, we need all the information we can obtain about factors that will influence plants in these small holdings over time. Specific parasitic fungi on a host species may affect the survival of plants or limit growth and reproduction. If we know what fungi are present now and study their distribution and dispersal techniques, we can perhaps minimize the hazards of plant species loss in a remnant prairie. If only susceptible plants of a particular species have existed in a prairie and the species has been eliminated, knowledge of this possibility will help us to interpret absence of that host in similar remnant prairies.

This report presents information on the presence and prevalence of the fungi on the above ground parts, leaves, stem and inflorescences, of specific host plants of 10 native prairie preserves in Iowa (Table 1).

MATERIALS AND METHODS

Through the 1980s and 1990s, most intensively from 1985 to 1999, collections of diseased prairie plants were made from three groups of Iowa prairies throughout the growing season (Table 1). Some prairies were visited several times each year, others less frequently. Most of the prairies were visited three times each year, in early June, in late July, and in late August or early September. The reasons for several visits are: fungal fruiting structures and spores necessary for identification may be produced only at a specific time, fungal growth and development are affected by different temperature and moisture levels, and maturity of the host plants may be necessary for host identification. Some leaf spot parasites can be manipulated in the laboratory to produce spores by placing the diseased material in a moist chamber and observing for several days. Because it is usually necessary to have spores to identify fungi, it is also necessary to continue field observations for several years to successfully record the fungal population.

The prairies studied share similar environments but are distinctive in some features of geological history, soils and plant communities. Iowa climate is classified as continental with warm summers and cold winters (Waite 1978). Mean high temperatures range from 23°–24°C, and mean lows from –8° to –9°C. Annual average precipi-

¹ deceased

Table 1. Iowa tallgrass prairie preserves examined for plant parasitic fungi.

Prairie	County	Size
Western Group		
Dinesen Prairie State Preserve	Shelby	8.1 ha
Fire Ridge State Preserve	Plymouth	319.7 ha
Sheeder Prairie State Preserve	Guthrie	10.1 ha
Steele Prairie State Preserve	Cherokee	80.9 ha
Runkel Prairie State Preserve	Monona	133.5 ha
Waubonsie State Park Prairies	Fremont	—
Central Group		
Ames High (Pohl) Prairie Preserve	Story	8.9 ha
Anderson Prairie State Preserve	Emmet	80.9 ha
Doolittle Prairie State Preserve	Story	10.5 ha
Kalsow Prairie State Preserve	Pocahontas	64.8 ha
Sand Prairie Group		
Cedar Hills Prairie State Preserve	Black Hawk	10.6 ha
Marietta Sand Prairie State Preserve	Marshall	6.9 ha

tation varies from around 25 inches in northwestern Iowa to 35 inches in the southern counties with about half of the annual precipitation occurring from May through August (Waite and Shaw 1982).

Many of the Iowa prairie preserves have specific management plans, which often includes periodic spring burning. Burning has an impressive effect on the incidence of disease fungi during the season following the burn. Fungal inoculum on over wintered plant debris has been eliminated and most plants are quite healthy. However, reestablishment of specific fungi on their host plants reaches pre-burn levels within two years following a fire (Shearer and Tiffany 1989). Percifield and Nutter (2003) found that prescribed burning delayed development and significantly reduced disease severity of parasitic fungi on three host species studied in four Iowa prairies.

Collections of diseased host material were made in a non-destructive manner. Wherever possible only diseased plant parts, leaves, stems, or inflorescences were taken. Where host identification was not possible in the field, adequate material for identification in the laboratory was included. Diseased materials were examined in the laboratory, and the fungi were identified if spores were present. Specimens identified to fungus and host were pressed and deposited in the mycology section of the Ada Hayden Herbarium at Iowa State University. Only those collections that could be thus identified were included in the results even though some leaf spots were distinctive. Host plants and fungi that could be identified only to genus are listed in the tables but are not included in the summary of hosts or fungi. Nomenclature of the host plants is that presented in Eilers and Roosa (1994). Fungal nomenclature usually follows that of the volume "Fungi on plants and plant products in the United States" (Farr et al. 1989). Powdery mildew identifications are those accepted by Braun (1987). Other fungi were identified using the appropriate reference or references (Arthur and Cummins 1962; Barr 1968; Braun 1998; Cummins 1971; Cummins 1978; Chupp 1953; Davis 1893, 1897, 1903, 1909, 1914, 1919a, 1919b, 1921, 1924, 1926; Farr et al. 1989; Fischer 1953; Gabel and Tiffany 1987; Greene 1940; Greene 1965; Greene 1968; Gilman 1932; Gilman 1949; Gilman and Archer 1929; Hanlin 1987; Hansford 1946; Holm 1968;

Hughes 1958; Luttrell and Bacon 1977; Mankin 1969; Pollack 1987; Rossman 1987; Shear 1937; Sprague 1950; Sutton 1980; Sydow and Sydow 1914; Tiffany and Mathre 1961; Trelease 1892; Walker 1980; White Jr. and Glenn 1994; Yohem et al. 1985).

Information on the prairie preserves included in this study is available in "The Guide to Iowa Prairie Preserves" (Herzberg and Pearson 2001). More detailed information is available on individual prairie preserves in the following publications: Brotherson (1983), Crum (1972), Freckman (1966), Kennedy (1969), Rosberg (1997), Wetzel et al. (1999).

For convenience the prairies included in this study have been considered in three groups. The first group of prairies was located in western Iowa. The Loess Hills landform region prairies monitored in this study are reported as a single assemblage from three sites. At the northern edge of the Loess Hills in Plymouth County, Five Ridge State Preserve, 319.7 ha, is one of the largest prairies in the state. The Runkel State Preserve, 133.5 ha, in Monona County is associated with the Loess Hills Wildlife Area. The third member of the Loess Hills assemblage consists of prairies at the southern and western edge in Waubonsie State Park in Fremont County. These Loess Hills prairies include the typical plants of the other tallgrass prairies studied but also include western host plants such as *Yucca glauca* that in Iowa are limited in distribution to this region (Novecek et al. 1985). Included in the western group of prairies is Steele Prairie State Preserve, 80.9 ha, a tallgrass prairie with rolling topography in Cherokee County in the Northwest Iowa Plains landform region (Prior 1991). It had been hayed annually since 1880 until it was designated a state preserve in 1987.

The last two prairies in the western group are both small prairies with gently rolling topography in the Southern Iowa Drift Plain landform region (Prior 1991). Dinesen Prairie State Preserve, 8.1 ha, is a remnant tallgrass prairie in Shelby County, with a history of haying in the fall. The fourth prairie is Sheeder Prairie State Preserve, 10.1 ha, in Guthrie County.

The second group of prairies is in the central area of the state in the Des Moines Lobe landform region (Prior 1991). Anderson Prairie State Preserve, 80.9 ha, in Emmet County is the most northern prairie included in this study and is at the western edge of this landform region. It is a rolling prairie that had been used as a pasture and for haying. Kalsow Prairie State Preserve, 64.8 ha, is in Pocahontas County and has many small potholes typical of the Des Moines Lobe landform. It also has been pastured and hayed. The third prairie of the second group, Doolittle Prairie State Preserve, 10.5 ha, in Story County, is a prairie with several seasonal marshes. It had been hayed and a small portion had been plowed. Ames High (Pohl) Prairie State Preserve, 8.9 ha, also in Story County is somewhat disturbed.

A group of two sand prairies with an obvious soil difference from other prairies are also the most eastern of the prairies studied. Cedar Hills Sand Prairie State Preserve, 14.6 ha, in Black Hawk County has wind blown sand ridges and is in the Iowan Surface landform region (Prior 1991). Marietta Sand Prairie State Preserve, 6.9 ha, with similar wind blown soil, is on the northern edge of the Southern Iowa Drift Plain landform region (Prior 1991) in Marshall County.

RESULTS AND DISCUSSION

In the previous study of plant parasitic fungi from four northern Iowa prairies, (Hayden Prairie State Preserve in Howard County, Stinson Prairie State Preserve in Kossuth County, Cayler Prairie and Freda Haffner Kettlehole State Preserves in Dickinson County) 216 species of fungi were present on 129 host plants (Tiffany et al. 1990). In this survey 180 fungi on 116 hosts were recorded from the western prairie group (Tables 2 and 3). 162 fungi were recorded from 91

Table 2. Host index of parasitic fungi on plants of four western Iowa prairies. (d = Dinesen Prairie, l = Loess Hills Prairies, s = Steele Prairie, sh = Sheeder Prairie).

Host Taxon	Prairie
Agavaceae	
<i>Yucca glauca</i> Nutt. ex Fraser	
<i>Kellermania yuccigena</i> Ell. & Everh.	l
<i>Microsphaeropsis concentrica</i> (Desm.) Morgan-Jones	l
<i>Mycosphaerella acervata</i> (Ell. & Everh.) Barr	l
<i>Planistromella uniseptata</i> Ramsley	l
<i>Puccinia sporoboli</i> Arth. var. <i>robusta</i> Cumm. & H.C. Greene	l
<i>Stigmina concentrica</i> (Cooke & Ellis) Deighton	l
Apiaceae	
<i>Eryngium yuccifolium</i> Michx.	
<i>Cylindrosporium eryngii</i> Ell. & Kellerm.	s, sh
<i>Zizia aurea</i> (L.) Koch	
<i>Cercospora ziziae</i> Ell. & Everh.	s, sh
<i>Septoria ziziae</i> Ell. & Everh.	s
<i>Stagonospora thaspiae</i> (Ell. & Everh.) H.C. Greene	s, sh
Apocynaceae	
<i>Apocynum sibiricum</i> Jacq.	
<i>Septoria littorea</i> Sacc.	sh
Asclepiadaceae	
<i>Asclepias incarnata</i> L.	
<i>Phyllosticta</i> sp.	s
<i>Asclepias sullivantii</i> Engelm. ex Gray	
<i>Colletotrichum fusarioides</i> (Ell. & Kellerm.) O'Gara	l, s
<i>Asclepias syriaca</i> L.	
<i>Cercospora clavata</i> (Gerard) Cooke	l, s
<i>Colletotrichum fusarioides</i> (Ell. & Kellerm.) O'Gara	s
<i>Puccinia chloridis</i> Speg.	l, s
<i>Puccinia seymouriana</i> Arth.	l, s
<i>Stagonospora zonata</i> J.J. Davis	s
<i>Asclepias tuberosa</i> L. ssp. <i>interior</i> Woodson	
<i>Puccinia chloridis</i> Speg.	s
<i>Stagonospora zonata</i> J.J. Davis	s, sh
<i>Asclepias verticillata</i> L.	
<i>Puccinia chloridis</i> Speg.	l
Asteraceae	
<i>Ambrosia artemisiifolia</i> L.	
<i>Erysiphe cichoracearum</i> DC.	sh
<i>Ambrosia trifida</i> L.	
<i>Erysiphe cichoracearum</i> DC.	sh
<i>Plasmopara balsedii</i> (Farl.) Berl. & DeToni in Sacc.	sh
<i>Puccinia canaliculata</i> (Schwein.) Lagerh.	l
<i>Puccinia xanthii</i> Schwein.	l
<i>Artemisia ludoviciana</i> Nutt.	
<i>Nematostoma occidentale</i> (Ell. & Everh.) Barr	l, s, sh
<i>Aster azureus</i> Lindl.	
<i>Coleosporium asterum</i> (Diet.) Syd. & P. Syd.	sh
<i>Placosphaeria baydenii</i> (Berk. & M.A. Curtis) Petr.	sh
<i>Puccinia cnici-oleracei</i> Pers.	sh
<i>Aster cordifolius</i> L.	
<i>Puccinia dioicae</i> P. Magn.	l
<i>Aster ericoides</i> L.	
<i>Ascochyta compositarum</i> J.J. Davis	s
<i>Aster laevis</i> L.	
<i>Ascochyta compositarum</i> J.J. Davis	s
<i>Coleosporium asterum</i> (Diet.) Syd. & P. Syd.	s

Table 2. Continued.

Host Taxon	Prairie
<i>Aster lanceolatus</i> Willd.	
<i>Ascochyta compositarum</i> J.J. Davis	sh
<i>Cercospora virgaureae</i> (Thuem.) Allesch.	sh
<i>Coleosporium asterum</i> (Diet.) Syd. & P. Syd.	sh
<i>Erysiphe cichoracearum</i> DC.	sh
<i>Puccinia cnici-oleracei</i> Pers.	sh
<i>Aster sagittifolius</i> Willd.	
<i>Cladosporium astericola</i> J.J. Davis	s
<i>Puccinia cnici-oleracei</i> Pers.	l
<i>Aster</i> sp.	
<i>Ascochyta compositarum</i> J.J. Davis	s
<i>Coleosporium asterum</i> (Diet.) Syd. & P. Syd.	l, s
<i>Erysiphe cichoracearum</i> DC.	s, sh
<i>Mycosphaerella</i> sp.	l
<i>Puccinia grindeliae</i> Pk.	s, sh
<i>Puccinia cnici-oleracei</i> Pers.	s
<i>Septoria atropurpurea</i> Pk.	s
<i>Conyza canadensis</i> (L.) Cronq.	
<i>Puccinia dioicae</i> P. Magn.	d
<i>Coreopsis palmata</i> Nutt.	
<i>Septoria coreopsidis</i> J.J. Davis	d, l, s, sh
<i>Erigeron annuus</i> (L.) Pers.	
<i>Puccinia cyperi</i> Arth.	l
<i>Puccinia dioicae</i> P. Magn.	l
<i>Erigeron strigosus</i> Muhl. ex Willd.	
<i>Cercospora virgaureae</i> (Thuem.) Allesch.	sh
<i>Puccinia dioicae</i> P. Magn.	l, sh
<i>Euthamia graminifolia</i> (L.) Nutt. ex Cass.	
<i>Mycosphaerella</i> sp.	s
<i>Grindelia squarrosa</i> (Pursh) Dunal	
<i>Camarosporium parasiticum</i> H.C. Greene	l
<i>Septoria grindeliae</i> Ell. & Barth.	l
<i>Helianthus grosseserratus</i> Martens	
<i>Colletotrichum helianthi</i> J.J. Davis	sh
<i>Erysiphe cichoracearum</i> DC.	s, sh
<i>Plasmopara halstedii</i> (Farl.) Berl. & DeToni in Sacc.	s
<i>Puccinia helianthi</i> Schwein.	d, s, sh
<i>Helianthus rigidus</i> (Cass.) Desf.	
<i>Colletotrichum helianthi</i> J.J. Davis	d, s, sh
<i>Erysiphe cichoracearum</i> DC.	sh
<i>Leptosphaeria heliopsidis</i> (Schw.:Fr.) L. Holm.	d
<i>Phyllosticta wisconsinensis</i> H.C. Greene	d, l, s, sh
<i>Plasmopara halstedii</i> (Farl.) Berl. & DeToni in Sacc.	d, sh
<i>Puccinia helianthi</i> Schwein.	d, l
<i>Septoria helianthi</i> Ell. & Kellerm.	d, l
<i>Heliopsis helianthoides</i> (L.) Sweet	
<i>Colletotrichum helianthi</i> J.J. Davis	s
<i>Erysiphe cichoracearum</i> DC.	sh
<i>Phyllosticta heliopsidis</i> H.C. Greene	s
<i>Septoria heliopsidis</i> Ell. & Dearn.	d, s, sh
<i>Lactuca canadensis</i> L.	
<i>Puccinia minusensis</i> Thuem.	l
<i>Liatris aspera</i> Michx.	
<i>Ascochyta</i> sp.	s
<i>Mycosphaerella</i> sp.	s
<i>Septoria liatridis</i> Ell. & J.J. Davis	s
<i>Liatris pycnostachya</i> Michx.	
<i>Septoria liatridis</i> Ell. & J.J. Davis	s

Table 2. Continued.

Host Taxon	Prairie
<i>Ratidiba pinnata</i> (Vent.) Barn.	
<i>Entyloma compositarum</i> Farl.	l, s, sh
<i>Plasmopara halstedii</i> (Farl.) Berl. & DeToni in Sacc.	sh
<i>Rudbeckia hirta</i> L.	
<i>Ampelomyces quisqualis</i> Ces.:Schlecht. on <i>E. cichoracearum</i> DC.	s
<i>Erysiphe cichoracearum</i> DC.	l, s
<i>Silphium integrifolium</i> Michx.	
<i>Puccinia silphii</i> Schwein.	l, sh
<i>Silphium laciniatum</i> L.	
<i>Cercospora silphii</i> Ell. & Everh.	l, sh
<i>Puccinia silphii</i> Schwein.	s
<i>Uromyces silphii</i> Arth.	l
<i>Silphium perfoliatum</i> L.	
<i>Colletotrichum dematium</i> (Pers.) Grove	s, sh
<i>Phyllosticta cacaliae</i> H.C. Greene	sh
<i>Puccinia silphii</i> Schwein.	sh
<i>Uromyces silphii</i> Arth.	sh
<i>Solidago canadensis</i> L.	
<i>Puccinia dioicae</i> P. Magn.	l
<i>Solidago missouriensis</i> Nutt.	
<i>Coleosporium asterum</i> (Diet.) Syd. & P. Syd.	sh
<i>Entyloma compositarum</i> Farl.	sh
<i>Solidago</i> sp.	
<i>Cercospora stomatica</i> Ell. & J.J. Davis	l, s
<i>Cercospora virgaureae</i> (Thuem.) Allesch.	sh
<i>Coleosporium asterum</i> (Diet.) Syd. & P. Syd.	l, s
<i>Colletotrichum dematium</i> (Pers.) Grove	s, sh
<i>Entyloma compositarum</i> Farl.	l
<i>Phyllosticta cacaliae</i> H.C. Greene	l
<i>Phyllosticta solidaginis</i> Bres.	d
<i>Septoria atropurpurea</i> Pk.	sh
<i>Vernonia</i> sp.	
<i>Puccinia vernoniae</i> Schwein.	l
<i>Xanthium strumarium</i> L.	
<i>Puccinia xanthii</i> Schwein.	l
Campanulaceae	
<i>Lobelia siphilitica</i> L.	
<i>Puccinia lobeliae</i> W. Gerard & Pk.	sh
Caprifoliaceae	
<i>Symphoricarpos occidentalis</i> Hooker	
<i>Microsphaera diffusa</i> Cooke & Peck	l
Convolvulaceae	
<i>Convolvulus arvensis</i> L.	
<i>Puccinia convolvuli</i> Castagne	s, sh
Cyperaceae	
<i>Scirpus</i> sp.	
<i>Puccinia angustata</i> Pk.	s
Euphorbiaceae	
<i>Euphorbia corollata</i> L.	
<i>Puccinia emaculata</i> Schwein.	sh
<i>Euphorbia dentata</i> Michx.	
<i>Uromyces euphorbiae</i> Cooke & Pk. in Peck	l
<i>Euphorbia maculata</i> L.	
<i>Uromyces euphorbiae</i> Cooke & Pk. in Peck	sh
Fabaceae	
<i>Amorpha canescens</i> Pursh	
<i>Erysiphe polygoni</i> DC.	d

Table 2. Continued.

Host Taxon	Prairie
<i>Pyrenochaeta</i> sp.	s
<i>Uropyxis amorphae</i> (M.A. Curtis) Schrot.	l, sh
<i>Amphicarpaea bracteata</i> (L.) Fern.	
<i>Cercospora simulans</i> Ell. & Kellerm.	sh
<i>Erysiphe polygoni</i> DC.	sh
<i>Synchytrium decipiens</i> (Farl.) Farl.	s
<i>Astragalus canadensis</i> L.	
<i>Erysiphe polygoni</i> DC.	s
<i>Baptisia bracteata</i> Muhl. ex Ell. var. <i>glabrescens</i> (Larisey) Isely	
<i>Cercospora velutina</i> Ell. & Kellerm.	d
<i>Leptosphaeria</i> sp.	d
<i>Mycosphaerella</i> sp.	d
<i>Puccinia andropogonis</i> Schwein. var. <i>onobrychidis</i> Arth.	d
<i>Baptisia lactea</i> (Raf.) Thieret	
<i>Cercospora velutina</i> Ell. & Kellerm.	sh
<i>Puccinia andropogonis</i> Schwein. var. <i>onobrychidis</i> Arth.	d
<i>Stagonospora baptisiae</i> (Ell. & Everh.) J.J. Davis	sh
<i>Dalea candida</i> Willd.	
<i>Uropyxis petalostemonis</i> (Farl.) DeToni	l
<i>Dalea purpurea</i> Vent.	
<i>Uropyxis petalostemonis</i> (Farl.) DeToni	l
<i>Desmodium canadense</i> (L.) DC.	
<i>Ascochyta</i> sp.	sh
<i>Cercospora desmodiicola</i> Atk.	s, sh
<i>Microsphaeria diffusa</i> Cooke & Peck	s
<i>Parodiella hedysari</i> (Schw.) Hughes	s
<i>Phyllosticta desmodii</i> Ellis & Everh.	d, s
<i>Ramularia desmodii</i> Cooke	l
<i>Uromyces hedysari-paniculati</i> (Schwein.) Farl. in Ellis	s
<i>Lathyrus venosus</i> Muhl. ex Willd.	
<i>Leptosphaeria</i> sp.	s
<i>Septoria astragali</i> Roberge ex Desmaz.	s
<i>Uromyces fabae</i> (Grev.) Fuckel	s
<i>Lespedeza capitata</i> Michx.	
<i>Cercospora latens</i> Ell. & Everh.	l, s, sh
<i>Uromyces lespedezae-procumbentis</i> (Schwein.) Curt.	l
<i>Oxytropis lambertii</i> Pursh	
<i>Erysiphe polygoni</i> DC.	l
<i>Pediomelum argophyllum</i> (Pursh) Grimes	
<i>Cercosporidium cassiocarpum</i> (Sacc.) L.G. Brown & Morgan-Jones	sh
<i>Colletotrichum psoraleae</i> (Pk.) Arx	l
<i>Uromyces psoraleae</i> Pk. var. <i>argophyllae</i> (Seym.) Arth.	s
<i>Pediomelum esculentum</i> (Pursh) Ryd.	
<i>Colletotrichum psoraleae</i> (Pk.) Arx	l
<i>Vicia americana</i> Muhl. ex Willd.	
<i>Uromyces coloradensis</i> Ell. & Everh.	L
Lamiaceae	
<i>Mentha arvensis</i> L.	
<i>Erysiphe cichoracearum</i> DC.	s
<i>Monarda fistulosa</i> L.	
<i>Erysiphe cichoracearum</i> DC.	l, sh
<i>Puccinia menthae</i> Pers.:Pers.	sh
<i>Pycnanthemum virginianum</i> (L.) Dur. & Jackson	
<i>Phyllosticta monardae</i> Ell. & Barth.	s, sh
<i>Puccinia menthae</i> Pers.:Pers.	s

Table 2. Continued.

Host Taxon	Prairie
<i>Stachys palustris</i> L. <i>Erysiphe galeopsidis</i> DC.	sh
Liliaceae	
<i>Allium stellatum</i> Nutt. ex Ker-Gawl. <i>Cladosporium allii</i> (Ell. & G. Martin) P.M. Kirk & J.C. Crompton <i>Uromyces sporoboli</i> Ell. & Everh.	l l
Malvaceae	
<i>Sphaeralcea coccinea</i> (Nutt.) Rydb. <i>Puccinia schedonnardi</i> Kellerm. & Swingle	l
Onagraceae	
<i>Calylophus serrulatus</i> (Nutt.) Raven <i>Puccinia dioicae</i> P. Magn. <i>Gaura biennis</i> L. <i>Ascochyta</i> sp. <i>Septoria gaurina</i> Ell. & Kellerm. <i>Sphaerellopsis filum</i> (Biv.-Bern.:Fr.) Sutton on uredia of <i>U. plumbarius</i> <i>Uromyces plumbarius</i> Pk. <i>Gaura parviflora</i> Dougl. <i>Septoria gaurina</i> Ell. & Kellerm. <i>Oenothera biennis</i> L. ssp. <i>centralis</i> Munz <i>Puccinia dioicae</i> P. Magn. <i>Septoria oenotherae</i> Westend. <i>Uromyces plumbarius</i> Pk.	l sh sh sh d, sh l l s, sh d
Poaceae	
<i>Andropogon gerardii</i> Vitm. <i>Ascochyta brachypodii</i> (Syd.) R. Sprague & A.G. Johnson <i>Claviceps purpurea</i> (Fr.:Fr.) Tul. <i>Colletotrichum caudatum</i> (Sacc.) Pk. <i>Mycosphaerella</i> sp. <i>Phyllachora luteo-maculata</i> (Schwein.) Orton <i>Puccinia andropogonis</i> Schwein. <i>Septoria andropogonis</i> J.J. Davis <i>Sphacelotheca occidentalis</i> (Seym.) Clinton <i>Sphaerellopsis filum</i> (Biv.-Bern.:Fr.) Sutton on <i>P. andropogonis</i> uredia <i>Stagonospora simplicior</i> Sacc. & Briard <i>Bouteloua curtipendula</i> (Michx.) Torr. <i>Bipolaris buchloes</i> (Lefebvre & A.G. Johnson) Shoemaker <i>Phyllachora cynodontis</i> (Sacc.) Niessl. <i>Pseudoseptoria everhartii</i> (Sacc. & Syd.) Sutton <i>Puccinia chloridis</i> Speg. <i>Sphaerellopsis filum</i> (Biv.-Bern.:Fr.) Sutton on <i>P. chloridis</i> uredia <i>Calamagrostis canadensis</i> (Michx.) Beauv. <i>Colletotrichum caudatum</i> (Sacc.) Pk. <i>Dilophospora alopecuri</i> (Fr.:Fr.) Fr. <i>Mycosphaerella</i> sp. <i>Phyllachora graminis</i> (Pers.:Fr.) Nitschke <i>Sclerotium rhizodes</i> Auersw. <i>Septoria calamagrostidis</i> (Lib.) Sacc. <i>Stagonospora avenae</i> (A.B. Frank) Bissett <i>Calamovilfa longifolia</i> (Hook.) Scribner <i>Puccinia sporoboli</i> Arth. var. <i>sporoboli</i> Cumm. <i>Dichanthelium oligosanthos</i> (Schultes) Gould var. <i>scribnerianum</i> (Nash) Gould <i>Phaeoramularia fusimaculans</i> (Atk.) X. Liu & Guo <i>Phyllachora punctum</i> (Schwein.) Orton & F. Stevens <i>Stagonospora simplicior</i> Sacc. & Briard <i>Elymus canadensis</i> L. <i>Ascochyta sorghi</i> Sacc. <i>Phyllachora graminis</i> (Pers.:Fr.) Nitschke <i>Puccinia recondita</i> Rob. ex Desm.	l sh l, s, sh d d, l, s, sh d, l, s, sh sh d, l, s sh d, l, s, sh l l, sh l, sh l, sh l s, sh s s sh s s s s l d, l, s, sh d, sh l, sh l, s sh l

Table 2. Continued.

Host Taxon	Prairie
<i>Septoria elymi</i> Ell. & Everh.	s
<i>Stagonospora arenaria</i> (Sacc.) Sacc.	s
<i>Stagonospora avenae</i> (A.B. Frank) Bissett	l, s
<i>Urocystis agropyri</i> (Pruess.) Schrot.	s
<i>Elymus virginicus</i> L.	
<i>Colletotrichum caudatum</i> (Sacc.) Pk.	sh
<i>Phyllachora graminis</i> (Pers.:Fr.) Nitschke	l, sh
<i>Puccinia recondita</i> Rob. ex Desm.	l
<i>Stagonospora arenaria</i> (Sacc.) Sacc.	sh
<i>Hordeum pusillum</i> Nutt.	
<i>Uromyces hordeinus</i> (Arth.) Barth.	l
<i>Koeleria macrantha</i> (Ledeb.) Schultes	
<i>Septoria quinqueseptata</i> Sprague	l
<i>Leersia oryzoides</i> (L.) Sw.	
<i>Pyricularia grisea</i> (Cke.) Sacc.	s
<i>Muhlenbergia racemosa</i> (Michx.) BSP	
<i>Phyllachora vulgata</i> Theiss. & Syd.	sh
<i>Puccinia schedonnardi</i> Kellerm. & Swingle	l, sh
<i>Muhlenbergia</i> sp.	
<i>Colletotrichum</i> sp.	l
<i>Phyllachora vulgata</i> Theiss. & Syd.	l
<i>Puccinia schedonnardi</i> Kellerm. & Swingle	l
<i>Panicum virgatum</i> L.	
<i>Beniowskia sphaeroides</i> (Kalchbr. & Cooke) E. Mason	l
<i>Colletotrichum caudatum</i> (Sacc.) Pk.	d, s, sh
<i>Colletotrichum graminicola</i> (Ces.) G.W. Wils.	s
<i>Elsinoë panici</i> Tiff. & Mathre	l, s
<i>Phyllachora graminis</i> (Pers.:Fr.) Nitschke	l
<i>Puccinia emaculata</i> Schwein.	l, sh
<i>Tilletia maclagni</i> (Berk.) G.P. Clint.	s
<i>Uromyces graminicola</i> Burr.	l
<i>Paspalum setaceum</i> Michx. var. <i>ciliatifolium</i> (Michx.) Vasey	
<i>Phyllachora paspalicola</i> P. Henn	l
<i>Phalaris arundinacea</i> L.	
<i>Claviceps purpurea</i> (Fr.:Fr.) Tul.	l
<i>Stagonospora foliicola</i> (Bres.) Bubak	s
<i>Schizachyrium scoparium</i> (Michx.) Nash	
<i>Ascochyta brachypodii</i> (Syd.) Sprague & A.G. Johnson	l
<i>Colletotrichum graminicola</i> (Ces.) G.W. Wils.	l, sh
<i>Phyllachora luteo-maculata</i> (Schwein.) Orton	l, s
<i>Puccinia andropogonis</i> Schwein.	d, l, s, sh
<i>Puccinia ellisiana</i> Thuem.	l
<i>Sphaerellopsis filum</i> (Biv.-Bern.:Fr.) Sutton on uredia of <i>P. andropogonis</i>	sh
<i>Stagonospora simplicior</i> Sacc. & Briard	d, l, sh
<i>Sorghastrum nutans</i> (L.) Nash	
<i>Colletotrichum caudatum</i> (Sacc.) Pk.	s, sh
<i>Elsinoe</i> sp. ?	sh
<i>Myriogenospora atramentosa</i> (Berk. & M.A. Curtis) Diehl	sh
<i>Phyllachora luteo-maculata</i> (Schwein.) Orton	l
<i>Stagonospora simplicior</i> Sacc. & Briard	d, l, s, sh
<i>Spartina pectinata</i> Lk.	
<i>Puccinia seymouriana</i> Arth.	l
<i>Puccinia sparganioides</i> Ell. & Barth	s
<i>Stagonospora spartinicola</i> Sprague	s
<i>Uromyces acuminatus</i> Arth.	s
<i>Sporobolus asper</i> (Michx.) Kunth	
<i>Puccinia vilfae</i> Arth. & Holw.	l
<i>Sporobolus cryptandrus</i> (Torr.) Gray	
<i>Uromyces sporoboli</i> Ell. & Everh.	l

Table 2. Continued.

Host Taxon	Prairie
<i>Sporobolus heterolepis</i> (A. Gray) A. Gray	
<i>Colletotrichum caudatum</i> (Sacc.) Pk.	sh
<i>Phyllachora vulgata</i> Theiss. & Syd.	sh
<i>Puccinia sporoboli</i> Arth. var. <i>sporoboli</i> Cumm.	sh
<i>Septoria andropogonis</i> J.J. Davis var. <i>sporobicola</i> R. Sprague	sh
<i>Sporobolus neglectus</i> Nash	
<i>Uromyces sporoboli</i> Ell. & Everh.	l
<i>Sporobolus</i> sp.	
<i>Puccinia sporoboli</i> Arth. var. <i>sporoboli</i> Cumm.	l
<i>Septoria andropogonis</i> J.J. Davis var. <i>sporobicola</i> R. Sprague	sh
<i>Stipa comata</i> Trin. & Rupr.	
<i>Cercosporidium graminis</i> (Fuckel) Deighton	s
<i>Puccinia stipae</i> Arth. var. <i>stipae</i> Cumm.	l, s
<i>Stagonospora simplicior</i> Sacc. & Briard	l
<i>Stipa spartea</i> Trin.	
<i>Puccinia stipae</i> Arth. var. <i>stipae</i> Cumm.	l, s, sh
<i>Sphaerellopsis filum</i> (Biv.-Bern.:Fr.) Sutton on <i>P. stipae</i> uredia	s, sh
<i>Stagonospora simplicior</i> Sacc. & Briard	l, sh
<i>Ustilago hypodytes</i> (Schlecht.) Fr.	sh
Polemoniaceae	
<i>Phlox pilosa</i> L.	
<i>Cercospora omphacodes</i> Ell. & Holw.	s, sh
<i>Puccinia plumbaria</i> Peck	l
<i>Uromyces acuminatus</i> Arth.	s, sh
Polygonaceae	
<i>Polygonum amphibium</i> L. var. <i>emersum</i> Michx.	
<i>Puccinia polygami-amphibii</i> Pers.:Pers.	s
Primulaceae	
<i>Lysimachia ciliata</i> L.	
<i>Puccinia caracina</i> DC. var. <i>limosae</i> (P. Magn.) Jorst.	l
<i>Puccinia dayi</i> G.W. Clinton	sh
<i>Ramularia lysimachiae</i> Thuem.	sh
<i>Septoria conspicua</i> Ell. & G. Martin in G. Martin	s
<i>Uromyces acuminatus</i> Arth.	s
Ranunculaceae	
<i>Anemone canadensis</i> L.	
<i>Plasmopara pygmaea</i> (Unger) Schrot.	l, s
<i>Puccinia anemones-virginianae</i> Schwein.	s
<i>Puccinia recondita</i> Rob. ex Desm.	l
<i>Ramularia simplex</i> Pass.	s
<i>Septoria punicea</i> J.J. Davis	s
<i>Anemone cylindrica</i> Gray	
<i>Puccinia anemones-virginianae</i> Schwein.	l
<i>Ramularia simplex</i> Pass.	l, sh
<i>Septoria punicea</i> J.J. Davis	l, sh
<i>Anemone virginiana</i> L.	
<i>Puccinia recondita</i> Rob. ex Desm.	l
<i>Delphinium virescens</i> Nutt.	
<i>Puccinia recondita</i> Rob. ex Desm.	l
<i>Pulsatilla patens</i> (L.) P. Miller ssp. <i>multifida</i> (Pritz.) Zamels	
<i>Cerospora filiformis</i> (J.J. Davis) Chupp	l, s
<i>Puccinia pulsatillae</i> Kalchbr.	l
<i>Tranzschelia anemones</i> (Pers.:Pers.) Nannf. in S. Lundell & Nannf.	l
<i>Thalictrum dasycarpum</i> Fisch. & Ave-Lall.	
<i>Entyloma thalictri</i> J. Schrot. in Cohn	s
<i>Phytophthora infestans</i> (Mont.) de Bary f. sp. <i>thalictri</i> (G.W. Wils. & J.J. Davis) G.M. Waterhouse	s

Table 2. Continued.

Host Taxon	Prairie
Rhamnaceae	
<i>Ceanothus americanus</i> L. var. <i>pitcheri</i> T. & G.	
<i>Cercospora ceanothi</i> Kellerm. & Swingle	d, l
<i>Ceanothus herbaceus</i> Raf. var. <i>pubescens</i> (T. & G.) Shinnery	
<i>Cercospora ceanothi</i> Kellerm. & Swingle	l, sh
<i>Microsphaera penicillata</i> (Wallr.:Fr.) Lév.	l
<i>Phyllosticta ceanothi</i> L.E. Miles	l, sh
<i>Puccinia tripsaci</i> Dietel. & Holw.	l
Rosaceae	
<i>Fragaria virginiana</i> Duchesne	
<i>Cercospora vexans</i> Massal.	s, sh
<i>Diplocarpon earlianum</i> (Ell. & Everh.) F.A. Wolf	s
<i>Mycosphaerella fragariae</i> (Tul.) Lindau	s
<i>Phyllosticta</i> sp.	s
<i>Potentilla arguata</i> Pursh	
<i>Cercospora potentillae</i> Chupp & Greene	sh
<i>Diplocarpon earlianum</i> (Ell. & Everh.) F.A. Wolf	l, s, sh
<i>Phyllosticta fragaricola</i> Desm. & Rob.	s
<i>Septoria purpurascens</i> Ell. & G. Martin in G. Martin	sh
<i>Tapbrina potentillae</i> (Farl.) Johans.	sh
<i>Potentilla recta</i> L.	
<i>Phragmidium ivesiae</i> Syd. & P. Syd.	l, s, sh
<i>Potentilla</i> sp.	
<i>Marssonina potentillae</i> (Desm.) Magnus var. <i>tormentillae</i> (Trail) Magnus	l
<i>Tapbrina potentillae</i> (Farl.) Johans.	l
<i>Rosa arkansana</i> Porter var. <i>suffulta</i> (Greene) Cockerell	
<i>Cercospora rosicola</i> Pass.	l, s, sh
<i>Discosia artocreus</i> (Tode:Fr.) Fr.	s
<i>Monochaeta</i> sp.	s
<i>Phragmidium rosae-arkansanae</i> Diet.	l, s, sh
<i>Phragmidium speciosum</i> (Fr.) Cooke	l, sh
<i>Seimatosporium rosae</i> Corda in Sturm	s
<i>Sphaeloma rosarum</i> (Pass.) Jenk.	sh
Rubiaceae	
<i>Galium obtusum</i> Bigel.	
<i>Leptotrichia repanda</i> (Fr.) P. Karst.	s, sh
Rutaceae	
<i>Puccinia andropogonis</i> Schwein. var. <i>xanthoxyli</i> (Pk.) Arth.	l
Santalaceae	
<i>Comandra umbellata</i> (L.) Nutt.	
<i>Cercospora comandrae</i> Ell. & Dearn.	l
<i>Puccinia andropogonis</i> Schwein. var. <i>pustulata</i> (Arth.) Arth.	l, sh
Scrophulariaceae	
<i>Castilleja sessiliflora</i> Pursh	
<i>Puccinia andropogonis</i> Schwein. var. <i>micropunctata</i> Arth.	l
<i>Sphaerotheca fuliginea</i> (Schlecht.:Fr.) Pollacci	l
<i>Penstemon albidus</i> Nutt.	
<i>Puccinia andropogonis</i> Schwein. var. <i>penstemonis</i> Arth.	l
<i>Penstemon gracilis</i> Nutt.	
<i>Puccinia andropogonis</i> Schwein. var. <i>penstemonis</i> Arth.	l
<i>Penstemon grandiflorus</i> Nutt.	
<i>Cercospora penstemonis</i> Ell. & Everh.	l
<i>Puccinia andropogonis</i> Schwein. var. <i>penstemonis</i> Arth.	l
<i>Veronicastrum virginicum</i> (L.) Farw.	
<i>Sphaerotheca fuliginea</i> (Schlecht.:Fr.) Pollacci	sh
Verbenaceae	
<i>Verbena hastata</i> L.	
<i>Erysiphe cichoracearum</i> DC.	sh
<i>Verbena stricta</i> Venten.	
<i>Puccinia vilfae</i> Arth. & Holw.	l
<i>Septoria verbenae</i> Rob. in Desm.	l

Table 3. Fungus index of parasitic fungi on plants of four western Iowa prairies. (d = Dinesen Prairie, l = Loess Hills Prairies, s = Steele Prairie, sh = Sheeder Prairie).

Fungus Taxon	Prairie
<i>Ampelomyces quisqualis</i> Ces.: Schlecht.	
<i>Erysiphe cichoracearum</i> DC. on <i>Rudbeckia hirta</i> L.	s
<i>Ascochyta brachypodii</i> (Syd.) R. Sprague & A.G. Johnson	
<i>Andropogon gerardii</i> Vitm.	l
<i>Schizachyrium scoparium</i> (Michx.) Nash	l
<i>Ascochyta compositarum</i> J.J. Davis	
<i>Aster ericoides</i> L.	s
<i>Aster laevis</i> L.	s
<i>Aster lanceolatus</i> Willd.	sh
<i>Aster</i> sp.	s
<i>Ascochyta sorghi</i> Sacc.	
<i>Elymus canadensis</i> L.	l, s
<i>Ascochyta</i> sp.	
<i>Desmodium canadense</i> (L.) DC.	sh
<i>Gaura biennis</i> L.	sh
<i>Liatris aspera</i> Michx.	s
<i>Beniowskia sphaeroidea</i> (Kalchbr. & Cooke) E. Mason	
<i>Panicum virgatum</i> L.	l
<i>Bipolaris buchloes</i> (Lefebvre & A.G. Johnson) Shoemaker	
<i>Bouteloua curtipendula</i> (Michx.) Torr.	l
<i>Camarosporium parasiticum</i> H.C. Greene	
<i>Grindelia squarrosa</i> (Pursh) Dunal	l
<i>Cercospora ceanothi</i> Kellerm. & Swingle	
<i>Ceanothus americanus</i> L. var. <i>pitchei</i> T. & G.	d, l
<i>Ceanothus herbaceus</i> Raf. var. <i>pubescens</i> (T. & G.) Shinnery	l, sh
<i>Cercospora clavata</i> (Gerard) Cooke	
<i>Asclepias syriaca</i> L.	l, s
<i>Cercospora comandrae</i> Ell. & Dearn.	
<i>Comandra umbellata</i> (L.) Nutt.	l
<i>Cercospora desmodiicola</i> Atk.	
<i>Desmodium canadense</i> (L.) DC.	s, sh
<i>Cercospora filiformis</i> (J.J. Davis) Chupp	
<i>Pulsatilla patens</i> (L.) P. Miller sp. <i>multifida</i> (Pritz.) Zamels	l, s
<i>Cercospora latens</i> Ell. & Everh.	
<i>Lespedeza capitata</i> Michx.	l, s, sh
<i>Cercospora omphacodes</i> Ell. & Holw.	
<i>Phlox pilosa</i> L.	s, sh
<i>Cercospora penstemonis</i> Ell. & Kellerm.	
<i>Penstemon grandiflorus</i> Nutt.	l
<i>Cercospora potentillae</i> Chupp & Greene	
<i>Potentilla arguta</i> Pursh	sh
<i>Cercospora rosicola</i> Pass.	
<i>Rosa arkansana</i> Porter var. <i>suffulta</i> (Greene) Cockerell.	l, s, sh
<i>Cercospora silphii</i> Ell. & Everh.	
<i>Silphium laciniatum</i> L.	l, sh
<i>Cercospora simulans</i> Ell. & Kellerm.	
<i>Amphicarpa bracteata</i> (L.) Fern.	sh
<i>Cercospora stomatica</i> Ell. & J.J. Davis	
<i>Solidago</i> sp.	l, s
<i>Cercospora velutina</i> Ell. & Kellerm.	
<i>Baptisia bracteata</i> Muhl. ex Ell. var. <i>glabrescens</i> (Larisey) Isely	d
<i>Baptisia lactea</i> (Raf.) Thieret	sh
<i>Cercospora vexans</i> Massal.	
<i>Fragaria virginiana</i> Duchesne	s, sh
<i>Cercospora ziziae</i> Ell. & Everh.	
<i>Zizia aurea</i> (L.) Koch	s, sh
<i>Cercospora virgaurea</i> (Thuem.) Allesch.	
<i>Aster lanceolatus</i> Willd.	sh
<i>Erigeron strigosus</i> Muhl. ex Willd.	sh
<i>Solidago</i> sp.	sh

Table 3. Continued.

Fungus Taxon	Prairie
<i>Cercosporidium cassiocarpum</i> (Sacc.) L.G. Brown & Morgan-Jones	
<i>Pediomelum argyophyllum</i> (Pursh) Grimes	sh
<i>Cercosporidium graminis</i> (Fuckel) Deighton	
<i>Stipa comata</i> Trin. & Rupr.	s
<i>Cladosporium allii</i> (Ell. & G. Martin) P.M. Kirk & J.G. Crompton	
<i>Allium stellatum</i> Nutt. ex Ker-Gawl.	l
<i>Cladosporium astericola</i> J.J. Davis	
<i>Aster sagittifolius</i> Willd.	s
<i>Claviceps purpurea</i> (Fr.:Fr.) Tul.	
<i>Andropogon gerardii</i> Vitm.	sh
<i>Phalaris arundinacea</i> L.	l
<i>Coleosporium asterum</i> (Diet.) Syd. & P. Syd.	
<i>Aster azureus</i> Lindl.	sh
<i>Aster laevis</i> L.	s
<i>Aster lanceolatus</i> Willd.	sh
<i>Aster</i> sp.	l, s
<i>Solidago missouriensis</i> Nutt.	sh
<i>Solidago</i> sp.	l, s
<i>Colletotrichum caudatum</i> (Sacc.) Pk.	
<i>Andropogon gerardii</i> Vitm.	l, s, sh
<i>Calamagrostis canadensis</i> (Michx.) Beauv.	s, sh
<i>Elymus virginicus</i> L.	sh
<i>Panicum virgatum</i> L.	d, s, sh
<i>Sorghastrum nutans</i> (L.) Nash	s, sh
<i>Sporobolus heterolepis</i> (A. Gray) A. Gray	sh
<i>Colletotrichum dematium</i> (Pers.) Grove	
<i>Silphium perfoliatum</i> L.	s, sh
<i>Solidago</i> sp.	s, sh
<i>Colletotrichum fusarioides</i> (Ell. & Kellerm.) O'Gara	
<i>Asclepias sullivantii</i> Engelm. ex Gray.	l, s
<i>Asclepias syriaca</i> L.	s
<i>Colletotrichum graminicola</i> (Ces.) G.W. Wils.	
<i>Panicum virgatum</i> L.	s
<i>Schizachyrium scoparium</i> (Michx.) Nash	l, sh
<i>Colletotrichum helianthi</i> J.J. Davis	
<i>Helianthus grosseserratus</i> Martens	sh
<i>Helianthus rigidus</i> (Cass.) Desf.	d, s, sh
<i>Helipsis helianthoides</i> (L.) Sweet	s
<i>Colletotrichum psoraleae</i> (Pk.) Arx	
<i>Pediomelum argophyllum</i> (Pursh) Grimes	l
<i>Pediomelum esculentum</i> (Pursh) Ryd.	l
<i>Colletotrichum</i> sp.	
<i>Muhlenbergia</i> sp.	l
<i>Cylindrosporium eryngii</i> Ell. & Kellerm.	
<i>Eryngium yuccifolium</i> Michx.	s, sh
<i>Dilophospora alopecuri</i> (Fr.:Fr.) Fr.	
<i>Calamagrostis canadensis</i> (Michx.) Beauv.	s
<i>Diplocarpon earlianum</i> (Ell. & Everh.) F.A. Wolf	
<i>Fragaria virginiana</i> Duchesne	s
<i>Potentilla arguta</i> Pursh	l, s, sh
<i>Discosia artocreas</i> (Tode:Fr.) Fr.	
<i>Rosa arkansana</i> Porter var. <i>suffulta</i> (Greene) Cockerell	s
<i>Elsinoë panici</i> Tiff. & Mathre	
<i>Panicum virgatum</i> L.	l, s
<i>Elsinoë</i> sp.	
<i>Sorghastrum nutans</i> (L.) Nash	sh
<i>Entyloma compositarum</i> Farl.	
<i>Ratidiba pinnata</i> (Vent.) Barnh.	l, s, sh
<i>Solidago missouriensis</i> Nutt.	sh
<i>Solidago</i> sp.	l

Table 3. Continued.

Fungus Taxon	Prairie
<i>Entyloma thalictri</i> J. Schröt. in Cohn	
<i>Thalictrium dasycarpum</i> Fisch. & Ave-Lall.	s
<i>Erysiphe cichoracearum</i> DC.	
<i>Ambrosia artemisiifolia</i> L.	sh
<i>Ambrosia trifida</i> L.	sh
<i>Aster lanceolatus</i> Willd.	sh
<i>Aster</i> sp.	s, sh
<i>Helianthus grosseserratus</i> Martens	s, sh
<i>Helianthus rigidus</i> (Cass.) Desf.	sh
<i>Heliopsis helianthoides</i> (L.) Sweet	sh
<i>Rudbeckia hirta</i> L.	l, s
<i>Mentha arvensis</i> L.	s
<i>Monarda fistulosa</i> L.	l, sh
<i>Verbena hastata</i> L.	sh
<i>Erysiphe galeopsidis</i> DC.	
<i>Stachys palustris</i> L.	sh
<i>Erysiphe polygoni</i> DC.	
<i>Amorpha canescens</i> Pursh	d
<i>Amphicarpaea bracteata</i> (L.) Fern.	sh
<i>Astragalus canadensis</i> L.	s
<i>Oxytropis lambertii</i> Pursh	l
<i>Kellermania yuccigena</i> Ell. & Everh.	
<i>Yucca glauca</i> Nutt. ex Fraser	l
<i>Leptosphaeria heliopsidis</i> (Schwein.:Fr.) L. Holm.	
<i>Helianthus rigidus</i> (Cass.) Desf.	d
<i>Leptosphaeria</i> sp.	
<i>Baptisia bracteata</i> Muhl. ex Ell. var. <i>glabrescens</i> (Larisey) Isely	d
<i>Lathyrus venosus</i> Muhl. ex Willd.	s
<i>Leptotrochila repanda</i> (Fr.) P. Karst	
<i>Galium obtusum</i> Bigel.	s, sh
<i>Marssonina potentillae</i> (Desm.) Magnus var. <i>tormentillae</i> (Trail) Magnus	
<i>Potentilla</i> sp.	l
<i>Microsphaera diffusa</i> Cooke & Peck	
<i>Desmodium canadense</i> (L.) DC.	s
<i>Symphoricarpos occidentalis</i> Hooker	l
<i>Microsphaera penicillata</i> (Wallr.:Fr.) Lévl.	
<i>Ceanothus herbaceus</i> Raf. var. <i>pubescens</i> (T. & G.) Shinnars	l
<i>Microsphaeropsis concentrica</i> (Desm.) Morgan-Jones	
<i>Yucca glauca</i> Nutt. ex Fraser	l
<i>Monochaeta</i> sp.	
<i>Rosa arkansana</i> Porter var. <i>suffulta</i> (Greene) Cockerell	s
<i>Mycosphaerella acervata</i> (Ell. & Everh.) Barr	
<i>Yucca glauca</i> Nutt. ex Fraser	l
<i>Mycosphaerella fragariae</i> (Tul.) Lindau	
<i>Fragaria virginiana</i> Duchesne	s
<i>Mycosphaerella</i> sp.	
<i>Andropogon gerardii</i> Vitm.	d
<i>Aster</i> sp.	l
<i>Baptisia bracteata</i> Muhl. ex Ell. var. <i>glabrescens</i> (Larisey) Isely	d
<i>Calamagrostis canadensis</i> (Michx.) Beauv.	s
<i>Euthamia graminifolia</i> (L.) Nutt. ex Cass.	s
<i>Liastris aspera</i> Michx.	s
<i>Myriogenospora atramentosa</i> (Berk. & M.A. Curtis) Diehl	
<i>Sorghastrum nutans</i> (L.) Nash	sh
<i>Nematostoma occidentale</i> (Ell. & Everh.) Barr	
<i>Artemisia ludoviciana</i> Nutt.	l, s, sh
<i>Parodiella bedysari</i> (Schwein.) Hughes	
<i>Desmodium canadense</i> (L.) DC.	s
<i>Phaeoramularia fusimaculans</i> (Atk.) X. Liu & Guo	
<i>Dichanthelium oligosanthes</i> (Schultes) Gould var. <i>scribnerianum</i> (Nash) Gould	d, l, s, sh

Table 3. Continued.

Fungus Taxon	Prairie
<i>Phragmidium ivesiae</i> Syd. & P. Syd.	
<i>Potentilla recta</i> L.	l, s, sh
<i>Phragmidium rosae-arkansanae</i> Diet.	
<i>Rosa arkansana</i> Porter var. <i>suffulta</i> (Greene) Cockerell	l, s, sh
<i>Phragmidium speciosum</i> (Fr.) Cooke	
<i>Rosa arkansana</i> Porter var. <i>suffulta</i> (Greene) Cockerell	l, sh
<i>Phyllachora cynodontis</i> (Sacc.) Niessl.	
<i>Bouteloua curtipendula</i> (Michx.) Torr.	l, sh
<i>Phyllachora graminis</i> (Pers.:Fr.) Nitschke	
<i>Calamagrostis canadensis</i> (Michx.) Beauv.	sh
<i>Elymus canadensis</i> L.	sh
<i>Elymus virginicus</i> L.	l, sh
<i>Panicum virgatum</i> L.	l
<i>Phyllachora luteo-maculata</i> (Schwein.) Orton	
<i>Andropogon gerardii</i> Vitm.	d, l, s, sh
<i>Schizachyrium scoparium</i> (Michx.) Nash	l, s
<i>Sorghastrum nutans</i> (L.) Nash	l
<i>Phyllachora paspalicola</i> P. Henn.	
<i>Paspalum setaceum</i> Michx. var. <i>ciliatifolium</i> (Michx.) Vasey	l
<i>Phyllachora punctum</i> (Schwein.) Orton & F. Stevens	
<i>Dichanthelium oligoanthes</i> (Schultes) Gould var. <i>scribnerianum</i> (Nash) Gould	d, sh
<i>Phyllachora vulgata</i> Theiss. & Syd.	
<i>Muhlenbergia racemosa</i> (Michx.) BSP.	sh
<i>Muhlenbergia</i> sp.	l
<i>Sporobolus heterolepis</i> (A. Gray) A. Gray	sh
<i>Phyllosticta cacaliae</i> H.C. Greene	
<i>Silphium perfoliatum</i> L.	sh
<i>Solidago</i> sp.	l
<i>Phyllosticta ceanothi</i> L.E. Miles	
<i>Ceanothus herbaceus</i> Raf. var. <i>pubescens</i> (T. & G.) Shinnars	l, sh
<i>Phyllosticta desmodii</i> Ellis & Everh.	
<i>Desmodium canadense</i> (L.) DC.	d, s
<i>Phyllosticta fragaricola</i> Desm. & Rob.	
<i>Potentilla arguta</i> Pursh	s
<i>Phyllosticta heliopsidis</i> H.C. Greene	
<i>Helioopsis helianthoides</i> (L.) Sweet	s
<i>Phyllosticta monardae</i> Ell. & Barth.	
<i>Pycnanthemum virginianum</i> (L.) Dur. & Jackson	s, sh
<i>Phyllosticta solidaginis</i> Bres.	
<i>Solidago</i> sp.	d
<i>Phyllosticta wisconsinensis</i> H.C. Greene	
<i>Helianthus rigidus</i> (Cass.) Desf.	d, l, s, sh
<i>Phyllosticta</i> sp.	
<i>Asclepias incarnata</i> L.	s
<i>Fragaria virginiana</i> Duchesne	s
<i>Phytophthora infestans</i> (Mont.) de Bary f. sp. <i>thalictri</i> (Wils. & Davis) G. Waterhouse	
<i>Thalictrum dasycarpum</i> Fisch. & Ave-Lall.	s
<i>Placosphaeria haydenii</i> (Berk. & M.A. Curtis) Petr.	
<i>Aster azureus</i> Lindl.	sh
<i>Planistromella uniseptata</i> Ramsley	
<i>Yucca glauca</i> Nutt. ex Fraser	l
<i>Plasmopara halstedii</i> (Farl.) Berl. & DeToni in Sacc.	
<i>Ambrosia trifida</i> L.	sh
<i>Helianthus groseserratus</i> Martens	s
<i>Helianthus rigidus</i> (Cass.) Desf.	d, sh
<i>Ratibida pinnata</i> (Vent.) Barnh.	sh
<i>Plasmopara pygmaea</i> (Unger) Schrot.	
<i>Anemone canadensis</i> L.	l, s
<i>Pseudoseptoria everhartii</i> (Sacc. & Syd.) Sutton	
<i>Bouteloua curtipendula</i> (Michx.) Torr.	l, sh

Table 3. Continued.

Fungus Taxon	Prairie
<i>Puccinia andropogonis</i> Schwein.	
<i>Andropogon gerardii</i> Vitm.	d, l, s, sh
<i>Schizachyrium scoparium</i> (Michx.) Nash	d, l, s, sh
<i>Puccinia andropogonis</i> Schwein. var. <i>micropuncta</i> Arth.	
<i>Castilleja sessiliflora</i> Pursh	l
<i>Puccinia andropogonis</i> Schwein. var. <i>onobrychidis</i> Arth.	
<i>Baptisia bracteata</i> Muhl. x Ell. var. <i>glabrescens</i> (Larisey) Isely	d
<i>Baptisia lactea</i> (Raf.) Thieret	d
<i>Puccinia andropogonis</i> Schwein. var. <i>penstemonis</i> Arth.	
<i>Penstemon albidus</i> Nutt.	l
<i>Penstemon gracilis</i> Nutt.	l
<i>Penstemon grandiflorus</i> Nutt.	l
<i>Puccinia andropogonis</i> Schwein. var. <i>pustulata</i> Arth.	
<i>Comandra umbellata</i> (L.) Nutt.	l, sh
<i>Puccinia andropogonis</i> Schwein. var. <i>xanthoxylis</i> (Pk.) Arth.	
<i>Zanthoxylum americanum</i> Mill.	l
<i>Puccinia anemones-virginianae</i> Schwein.	
<i>Anemone canadensis</i> L.	s
<i>Anemone cylindrica</i> Gray	l
<i>Puccinia angustata</i> Pk.	
<i>Scirpus</i> sp.	s
<i>Puccinia canaliculata</i> (Schwein.) Lagerh.	
<i>Ambrosia trifida</i> L.	l
<i>Puccinia caricina</i> DC. var. <i>limosae</i> (P. Magn.) Jorst.	
<i>Lysimachia ciliata</i> L.	l
<i>Puccinia chloridis</i> Speg.	
<i>Asclepias syriaca</i> L.	l, s
<i>Asclepias tuberosa</i> L. spp. <i>interior</i> Woodson	s
<i>Asclepias verticillata</i> L.	l
<i>Bouteloua curtipendula</i> (Michx.) Torr.	l, sh
<i>Puccinia cnici-ooleracei</i> Pers.	
<i>Aster azureus</i> Lindl.	sh
<i>Aster lanceolatus</i> Willd.	sh
<i>Aster sagittifolius</i> Willd.	l
<i>Aster</i> sp.	s
<i>Puccinia convolvuli</i> Castagne	
<i>Convolvulus arvensis</i> L.	s, sh
<i>Puccinia cyperi</i> Arth.	
<i>Erigeron annuus</i> (L.) Pers.	l
<i>Puccinia dayi</i> G.W. Clinton	
<i>Lysimachia ciliata</i> L.	sh
<i>Puccinia dioicae</i> P. Magn.	
<i>Aster cordifolius</i> L.	l
<i>Calylophus serrulatus</i> (Nutt.) Raven	l
<i>Conyza canadensis</i> (L.) Cronq.	d
<i>Erigeron annuus</i> (L.) Pers.	l
<i>Erigeron strigosus</i> Muhl. ex Willd.	l, sh
<i>Oenothera biennis</i> L. ssp. <i>centralis</i> Munz	l
<i>Solidago canadensis</i> L.	l
<i>Puccinia ellisiana</i> Thuem.	
<i>Schizachyrium scoparium</i> (Michx.) Nash	l
<i>Puccinia emaculata</i> Schwein.	
<i>Euphorbia corollata</i> L.	sh
<i>Panicum virgatum</i> L.	l, sh
<i>Puccinia grindeliae</i> Pk.	
<i>Aster</i> sp.	s, sh
<i>Puccinia helianthi</i> Schwein.	
<i>Helianthus grosseserratus</i> Martens	d, s, sh
<i>Helianthus rigidus</i> (Cass.) Desf.	d, l

Table 3. Continued.

Fungus Taxon	Prairie
<i>Puccinia lobeliae</i> W. Gerard & Pk. <i>Lobelia siphilitica</i> L.	sh
<i>Puccinia menthae</i> Pers.:Pers. <i>Monarda fistulosa</i> L.	sh
<i>Pycnanthemum virginianum</i> (L.) Dur. & Jackson	s
<i>Puccinia minussensis</i> Thuem. <i>Lactuca canadensis</i> L.	l
<i>Puccinia plumbaria</i> Peck <i>Phlox pilosa</i> L.	l
<i>Puccinia polygoni-amphibii</i> Pers.:Pers. <i>Polygonum amphibium</i> L. var. <i>emersum</i> Michx.	s
<i>Puccinia pulsatillae</i> Kalchbr. <i>Pusatilla patens</i> (L.) P. Miller spp. <i>multifida</i> (Pritz.) Zamels	l
<i>Puccinia recondita</i> Rob. ex Desm. <i>Anemone canadaensis</i> L.	l
<i>Anemone virginiana</i> L.	l
<i>Delphinium virescens</i> Nutt.	l
<i>Elymus canadensis</i> L.	l
<i>Emymus virginicus</i> L.	l
<i>Puccinia schedonnardi</i> Kellerm. & Swingle <i>Muhlenbergia racemosa</i> (Michx.) BSP.	l, sh
<i>Muhlenbergia</i> sp.	l
<i>Sphaeralcea coccinea</i> (Nutt.) Rydb.	l
<i>Puccinia seymouriana</i> Arth. <i>Asclepias syriaca</i> L.	l, s
<i>Spartina pectinata</i> Lk	l
<i>Puccinia silphii</i> Schwein. <i>Silphium integrifolium</i> Michx.	l, sh
<i>Silphium laciniatum</i> L.	s
<i>Silphium perfoliatum</i> L.	sh
<i>Puccinia sparganioides</i> Ell. & Barth. <i>Spartina pectinata</i> Lk.	s
<i>Puccinia sporoboli</i> Arth. var. <i>robusta</i> Cumm. & H.C. Greene <i>Yucca glauca</i> Nutt. ex Fraser	l
<i>Puccinia sporoboli</i> Arth. var. <i>sporoboli</i> Cumm. <i>Calamovilfa longifolia</i> (Hook.) Scribner	l
<i>Sporobolus heterolepis</i> (A. Gray) A. Gray	sh
<i>Sporobolus</i> sp.	l
<i>Puccinia stipae</i> Arth. var. <i>stipae</i> Cumm. <i>Stipa comata</i> Trin. & Rupr.	l, s
<i>Stipa spartea</i> Trin.	l, s, sh
<i>Puccinia tripsaci</i> Dietel & Holw. <i>Ceanothus herbaceus</i> Raf. var. <i>pubescens</i> (T. & G.) Shinnors	l
<i>Puccinia vernoniae</i> Schwein. <i>Vernonia</i> sp.	l
<i>Puccinia vilfae</i> Arth. & Holw. <i>Sporobolus asper</i> (Michx.) Kunth	l
<i>Verbena stricta</i> Venten.	l
<i>Puccinia xanthii</i> Schwein. <i>Ambrosia trifida</i> L.	l
<i>Xanthium strumarium</i> L.	l
<i>Pyrenochaeta</i> sp. <i>Amorpha canescens</i> Pursh	s
<i>Pyricularia grisea</i> (Cke.) Sacc. <i>Leersia oryzoides</i> (L.) Sw.	s
<i>Ramularia desmodii</i> Cooke <i>Desmodium canadense</i> (L.) DC.	l

Table 3. Continued.

Fungus Taxon	Prairie
<i>Ramularia lysimachiae</i> Thuem.	
<i>Lysimachia ciliata</i> L.	sh
<i>Ramularia simplex</i> Pass.	
<i>Anemone canadensis</i> L.	s
<i>Anemone cylindrica</i> Gray	l, sh
<i>Sclerotium rhizodes</i> Auersw.	
<i>Calamagrostis canadensis</i> (Michx.) Beauv.	s
<i>Seimatosporium rosae</i> Corda in Sturm	
<i>Rosa arkansana</i> Porter var. <i>suffulta</i> (Greene) Cockerell	s
<i>Septoria andropogonis</i> J.J. Davis	
<i>Andropogon gerardii</i> Vitm.	sh
<i>Septoria andropogonis</i> J.J. Davis var. <i>sporobolicola</i> R. Sprague	
<i>Sporobolus heterolepis</i> (A. Gray) A. Gray	sh
<i>Sporobolus</i> sp.	sh
<i>Septoria astragali</i> Roberge ex Desmaz.	
<i>Lathyrus venosus</i> Muhl. ex Willd.	s
<i>Septoria atropurpurea</i> Pk	
<i>Aster</i> sp.	s
<i>Solidago</i> sp.	sh
<i>Septoria calamagrostidis</i> (Lib.) Sacc.	
<i>Calamagrostis canadensis</i> (Michx.) Beauv.	s
<i>Septoria conspicua</i> Ell. & G. Martin in G. Martin	
<i>Lysimachia ciliata</i> L.	s
<i>Septoria coreopsidis</i> J.J. Davis	
<i>Coreopsis palmata</i> Nutt.	d, l, s, sh
<i>Septoria elymi</i> Ell. & Everh.	
<i>Elymus canadensis</i> L.	s
<i>Septoria gaurina</i> Ell. & Kellerm.	
<i>Gaura biennis</i> L.	sh
<i>Gaura parviflora</i> Dougl.	l
<i>Septoria grindeliae</i> Ell. & Barth.	
<i>Grindelia squarrosa</i> (Pursh) Dunal	l
<i>Septoria helianthi</i> Ell. & Kellerm.	
<i>Helianthus rigidus</i> (Cass.) Desf.	d, l
<i>Septoria heliopsidis</i> Ell. & Dearn.	
<i>Heliopsis helianthoides</i> (L.) Sweet	d, s, sh
<i>Septoria liatridis</i> Ell. & J.J. Davis	
<i>Liatris aspera</i> Michx.	s
<i>Liastris pycnostachya</i> Michx.	s
<i>Septoria littorea</i> Sacc.	
<i>Apocynum sibiricum</i> Jacq.	sh
<i>Septoria oenotherae</i> Westend.	
<i>Oenothera biennis</i> L. ssp. <i>centralis</i> Munz	s, sh
<i>Septoria punicea</i> J.J. Davis	
<i>Anemone canadensis</i> L.	s
<i>Anemone cylindrica</i> Gray	l, sh
<i>Septoria purpurascens</i> Ell. & G. Martin in G. Martin	
<i>Potentilla arguta</i> Pursh	sh
<i>Septoria quinqueseptata</i> Sprague	
<i>Koeleria macrantha</i> (Ledeb.) Schultes	l
<i>Septoria verbenae</i> Rob. in Desm.	
<i>Verbena stricta</i> Venten.	l
<i>Septoria ziziae</i> Ell. & Everh.	
<i>Zizia aurea</i> (L.) Koch	s
<i>Sphaceloma rosarum</i> (Pass.) Jenk.	
<i>Rosa arkansana</i> Porter var. <i>suffulta</i> (Greene) Cockerell	sh
<i>Sphacelotheca occidentalis</i> (Seym.) Clinton	
<i>Andropogon gerardii</i> Vitm.	d, l, s

Table 3. Continued.

Fungus Taxon	Prairie
<i>Sphaerellopsis filum</i> (Biv.-Bern.:Fr.) Sutton	
<i>Puccinia andropogonis</i> Schwein. uredia on <i>Andropogon gerardii</i> Vitm.	sh
<i>Puccinia andropogonis</i> Schwein. uredia on <i>Schizachyrium scoparium</i> (Michx.) Nash	sh
<i>Puccinia chloridis</i> Speg. uredia on <i>Bouteloua curtipendula</i> (Michx.) Torr.	l
<i>Puccinia stipae</i> Arth. var. <i>stipae</i> Cumm. uredia on <i>Stipa spartea</i> Trin.	s, sh
<i>Uromyces plumbarius</i> Pk. uredia on <i>Gaura biennis</i> L.	sh
<i>Sphaerotheca fuliginea</i> (Schlecht.:Fr.) Pollacci	
<i>Castilleja sessiliflora</i> Pursh	l
<i>Veronicastrum virginicum</i> (L.) Farl.	sh
<i>Stagonospora arenaria</i> (Sacc.) Sacc.	
<i>Elymus canadensis</i> L.	s
<i>Elymus virginicus</i> L.	sh
<i>Stagonospora avenae</i> (A.B. Frank) Bissett	
<i>Calamagrostis canadensis</i> (Michx.) Beauv.	s
<i>Elymus canadensis</i> L.	l, s
<i>Stagonospora baptisiae</i> (Ell. & Everh.) J.J. Davis	
<i>Baptisia lactea</i> (Raf.) Thieret	sh
<i>Stagonospora foliicola</i> (Bres.) Bubák	
<i>Phalaris arundinacea</i> L.	s
<i>Stagonospora simplicior</i> Sacc. & Briard	
<i>Andropogon gerardii</i> Vitm.	d, l, s, sh
<i>Dichanthelium oligosanthes</i> (Schultes) Gould var. <i>scribnerianum</i> (Nash) Gould	l, sh
<i>Schizachyrium scoparium</i> (Michx.) Nash	d, l, sh
<i>Sorghastrum nutans</i> (L.) Nash	d, l, s, sh
<i>Stipa comata</i> Trin. & Rupr.	l
<i>Stipa spartea</i> Trin.	l, sh
<i>Stagonospora spartinicola</i> Sprague	
<i>Spartina pectinata</i> Lk.	s
<i>Stagonospora thaspisii</i> (Ell. & Everh.) H.C. Greene	
<i>Zizia aurea</i> (L.) Koch	s, sh
<i>Stagonospora zonata</i> J.J. Davis	
<i>Asclepias syriaca</i> L.	s
<i>Asclepias tuberosa</i> L. ssp. <i>interior</i> Woodson	s, sh
<i>Stigmina concentrica</i> (Cooke & Ellis) Deighton	
<i>Yucca glauca</i> Nutt. ex Fraser	l
<i>Synchytrium decipiens</i> (Farl.) Farl.	
<i>Amphicarpaea bracteata</i> (L.) Fern.	s
<i>Tapbrina potentillae</i> (Farl.) Johans.	
<i>Potentilla arguta</i> Pursh	sh
<i>Potentilla</i> sp.	l
<i>Tilletia maclagnii</i> (Berk.) G.P. Clint.	
<i>Panicum virgatum</i> L.	s
<i>Tranzschelia anemones</i> (Pers.:Pers.) Nannf. in S. Lundell & Nannf.	
<i>Pusatilla patens</i> (L.) P. Miller spp. <i>multifida</i> (Pritz.) Zamels	l
<i>Urocystis agropyri</i> (Pruess.) Schröt.	
<i>Elymus canadensis</i> L.	s
<i>Uromyces acuminatus</i> Arth.	
<i>Lysimachia ciliata</i> L.	s
<i>Phlox pilosa</i> L.	s, sh
<i>Spartina pectinata</i> Lk.	s
<i>Uromyces coloradensis</i> Ell. & Everh.	
<i>Vicia americana</i> Muhl. ex Willd.	l
<i>Uromyces euphorbiae</i> Cooke & Pk. in Peck	
<i>Euphorbia dentata</i> Michx.	l
<i>Euphorbia maculata</i> L.	sh
<i>Uromyces fabae</i> (Grev.) Fuckel	
<i>Lathyrus venosus</i> Muhl. ex Willd.	s
<i>Uromyces gramminicola</i> Burr.	
<i>Panicum virgatum</i> L.	l

Table 3. Continued.

Fungus Taxon	Prairie
<i>Uromyces bedysari-paniculati</i> (Schwein.) Farl. in Ellis <i>Desmodium canadense</i> (L.) DC.	s
<i>Uromyces hordeinus</i> (Arth.) Barth. <i>Hordeum pusillum</i> Nutt.	l
<i>Uromyces lespedezae-procumbentis</i> (Schwein.) Curt. <i>Lespedeza capitata</i> Michx.	l
<i>Uromyces plumbarius</i> Pk. <i>Gaura biennis</i> L.	d, sh
<i>Oenothera biennis</i> L. ssp. <i>centralis</i> Munz	d
<i>Uromyces psoraleae</i> Pk. var. <i>argophyllae</i> (Seym.) Arth. <i>Pediomelum argophyllum</i> (Pursh) Grimes	s
<i>Uromyces silphii</i> Arth. <i>Silphium laciniatum</i> L.	l
<i>Silphium perfoliatum</i> L.	sh
<i>Uromyces sporoboli</i> Ell. & Everh. <i>Allium stellatum</i> Nutt. ex Ker-Gawl.	l
<i>Sporobolus cryptandrus</i> (Torr.) Gray	l
<i>Sporobolus neglectus</i> Nash	l
<i>Uropyxis amorphae</i> (M.A. Curtis) Schrot. <i>Amorpha canescens</i> Pursh	l, sh
<i>Uropyxis petalostemonis</i> (Farl.) DeToni <i>Dalea candida</i> Willd.	l
<i>Dalea purpurea</i> Vent.	l
<i>Ustilago hypodytes</i> (Schlect.) Fr. <i>Stipa spartea</i> Trin.	sh

host plants from the central prairie group (Tables 4 and 5). From the two sand prairies 78 fungi on 54 host plants were identified (Tables 6 and 7). The collections from the three prairie groups include 116 parasitic fungi and 52 host plant species that were not reported earlier by Tiffany et al. (1990).

Distribution of host plants is the basic factor reflected in the geographic distribution of parasitic fungi. Some of the host plant species that occurred in the Loess Hills were not present in the rest of the state, western Iowa being at the eastern edge of their distribution. For example, *Yucca glauca* was present throughout the Loess Hills and supported a group of parasitic fungi that occurred only on that host.

Environmental differences, even small ones such as shading can influence the successful colonization of host plants by plant parasitic fungi. In a study on the parasitism and development of *Rhynchosporium secalis* on *Hordeum leporinum* under tree shade and on adjacent open sites, 60.3% diseased plants were present in the tree shaded sites in contrast to 11.2% in prairies outside the tree canopy (Jabosz and Burdan 1988). Such factors may have a selective influence on the parasitic potential of the fungi and the host pathogen interaction.

Some plant species were observed to be severely diseased by a specific fungus in most years at particular prairies while the same parasite was sparsely developed at others. *Cylindrosporium eryngi* caused a leaf spot that was quite consistently destructive on *Eryngium yuccifolium* leaves at Kalsow Prairie State Preserve often resulting in dead leaves by the middle of summer. *C. eryngi* was present at other prairies where *E. yuccifolium* occurred but it did not develop in the disease severity encountered at Kalsow.

Only two fungi were present on all of the prairies reported in this study, *Puccinia andropogonis* and *Stagonospora simplicior*, both on *Andropogon gerardii* (big bluestem). *Phyllachora luteo-maculata*, also on *A. gerardii*, was collected consistently on nine of the prairies. It typically develops late in the growing season, thus could be easily missed if

the only information available was from earlier and mid-season collections. These three fungi were also collected on *A. gerardii* from all four northern Iowa prairies (Tiffany et al. 1990).

A heteraecious rust requiring two different hosts, *Puccinia andropogonis*, occurred on *A. gerardii* on all of the prairies included in this report. Uredial and telial spore pustules were developed on leaves of big bluestem mid-summer into fall, with the teliospores overwintering on host leaf debris. Spermogonial and aecial stages developed on the leaves of the other host of the life cycle in the spring or early summer, with clusters of cup-like spore producing structures developing on leaves of this host. Typically these leaf areas became necrotic and the leaves disintegrated, leaving no evidence of their presence by mid-summer. Thus, collecting efforts at different times throughout the season are necessary to document such heteraecious rusts.

The common alternate host for the spring-summer stage of *Puccinia andropogonis* is *Comandra umbellata*, but in the Loess Hills and other western prairies this rust stage also colonizes leaves of *Baptisia lactea*, *Baptisia bracteata* var. *glabrescens*, *Castilleja sessiliflora*, *Penstemon* spp. and *Zanthoxylum americanum*.

Four of the host plants, all in the Poaceae, each supported 11 species of parasitic fungi. These hosts, *Andropogon gerardii*, *Calamagrostis canadense*, *Panicum virgatum* and *Schizachyrium scoparium*, each were hosts for at least one rust and one smut plus a variety of leaf spot inducing fungi. One of the leaf spot fungi, *Stagonospora simplicior*, often developed large lesions that coalesced resulting in necrosis involving entire leaves of *A. gerardii*, *S. scoparium* and *S. nutans*.

Probably the most significant fungus encountered was *Sphacelotheca occidentalis*, kernel smut of big bluestem. This smut is systemic in the plants, invading all of the individual floral primordia of an inflorescence and replacing the normal seed with a mass of dark teliospores. Initially the spores develop in these local galls and are released as the enclosing tissues disintegrate. All of the inflorescences of a colonized big bluestem plant were diseased and emerged several

Table 4. Host index of parasitic fungi on plants of four central Iowa prairies. (a = Anderson Prairie, d = Doolittle Prairie, k = Kalsow Prairie, p = Pohl Prairie).

Host Taxon	Prairie
Alismataceae	
<i>Alisma plantago-aquatica</i> L.	
<i>Ramularia alismatis</i> Fautrey	d
<i>Sagittaria latifolia</i> Willd.	
<i>Cercospora alismatis</i> Ellis & Holw.	d
Apiaceae	
<i>Cryptotaenia canadensis</i> (L.) DC.	
<i>Septoria cryptotaeniae</i> Ell. & Rau in G. Martin	a
<i>Eryngium yuccifolium</i> Michx.	
<i>Cylindrosporium eryngii</i> Ell. & Everh.	k
<i>Leptosphaeria</i> sp.	k
<i>Phyllosticta</i> sp.	k
<i>Sium suave</i> Walter	
<i>Septoria sii</i> Rob. ex Desm.	k
<i>Zizia aurea</i> (L.) W. Koch	
<i>Cercospora ziziae</i> Ell. & Everh.	d, k,
<i>Physoderma pluriannulatum</i> (Berk. & M.A. Curtis) Karling	k, p
<i>Septoria ziziae</i> Ell. & Everh.	a
<i>Stagonospora thaspii</i> (Ell. & Everh.) H.C. Greene	d
Apocynaceae	
<i>Apocynum sibiricum</i> Jacq.	
<i>Stagonospora apocyni</i> (Pk.) J.J. Davis	a, d, k
Asclepiadaceae	
<i>Asclepias incarnata</i> L.	
<i>Puccinia seymoriana</i> Arth.	d
<i>Stagonospora zonata</i> J.J. Davis	d
<i>Asclepias syriaca</i> L.	
<i>Cercospora clavata</i> (Gerard) Cooke	d, k
<i>Puccinia chloridis</i> Speg.	d
<i>Asclepias tuberosa</i> L. ssp. <i>interior</i> Woodson	
<i>Colletotrichum fusarioides</i> (Ell. & Kellm.) O'Gara	a, k
<i>Phyllosticta tuberosa</i> Ell. & G. Martin	k
<i>Puccinia chloridis</i> Speg.	d
<i>Stagonospora zonata</i> J.J. Davis	k
<i>Asclepias verticillata</i> L.	
<i>Puccinia chloridis</i> Speg.	p
Asteraceae	
<i>Ambrosia trifida</i> L.	
<i>Puccinia xanthii</i> Schwein.	p
<i>Artemisia ludoviciana</i> Nutt.	
<i>Nematostoma occidentale</i> (Ell. & Everh.) Barr	a, d, k, p
<i>Puccinia tanacetii</i> DC.	a
<i>Aster ericoides</i> L.	
<i>Ascochyta compositarum</i> J.J. Davis	k
<i>Coleosporium asterum</i> (Diet.) Syd. & P. Syd.	d
<i>Aster lanceolatus</i> Willd.	
<i>Ascochyta compositarum</i> J.J. Davis	a, d
<i>Placosphaeria haydenii</i> (Berk. & Curtis) Petr.	k
<i>Puccinia cnici-oleracei</i> Pers.	d
<i>Aster novae-angliae</i> L.	
<i>Coleosporium asterum</i> (Diet.) Syd. & P. Syd.	d
<i>Aster</i> sp.	
<i>Ascochyta compositarum</i> J.J. Davis	d
<i>Coleosporium asterum</i> (Diet.) Syd. & P. Syd.	a, d
<i>Puccinia grindelae</i> Pk.	d
<i>Septoria atropurpurea</i> Pk.	a

Table 4. Continued.

Host Taxon	Prairie
<i>Brickellia eupatorioides</i> (L.) Shiners	
<i>Pleospora scrophulariae</i> (Desm.) Höhn. var. <i>compositarum</i> (Earle) Wehm.	a
<i>Puccinia kubniae</i> Schwein.	a
<i>Septoria parvimaclans</i> H.C. Greene	a
<i>Coreopsis palmata</i> Nutt.	
<i>Septoria coreopsisidis</i> J.J. Davis	a
<i>Echinacea pallida</i> Nutt.	
<i>Septoria lepachydis</i> Ell. & Everh.	d
<i>Echinacea purpurea</i> (L.) Moench	
<i>Septoria lepachydis</i> Ell. & Everh.	p
<i>Erigeron annuus</i> (L.) Pers.	
<i>Puccinia dioicae</i> Magnus	p
<i>Euthamia graminifolia</i> (L.) Nutt. ex Cass.	
<i>Leptosphaeria</i> sp.	a
<i>Helenium autumnale</i> L.	
<i>Septoria</i> sp.	d
<i>Helianthus grosseserratus</i> Martens	
<i>Plasmopara halstedii</i> (Farl.) Berl. & DeToni	d
<i>Puccinia helianthi</i> Schwein.	a, d, k
<i>Septoria helianthi</i> Ell. & Kellm.	a
<i>Helianthus rigidus</i> (Cass.) Desf.	
<i>Leptosphaeria heliopsisidis</i> (Schwein.:Fr.) L. Holm	d
<i>Phyllosticta wisconsinensis</i> H.C. Greene	k
<i>Plasmopara halstedii</i> (Farl.) Berl. & DeToni	a
<i>Puccinia helianthi</i> Schwein.	a, k
<i>Septoria helianthi</i> Ell. & Kellm.	a, k
<i>Liatris aspera</i> Michx.	
<i>Septoria liatridis</i> Ell. & J.J. Davis	a, k
<i>Prenanthes racemosa</i> Michx.	
<i>Ascochyta compositarum</i> J.J. Davis	k
<i>Cercospora wisconsinensis</i> Chupp & Greene	k
<i>Ratibida pinnata</i> (Vent.) Barnh.	
<i>Entyloma compositarum</i> Farl.	a, d, k, p
<i>Rudbeckia subtomentosa</i> Pursh	
<i>Septoria rudbeckiae</i> Ell. & Halst.	d
<i>Silphium laciniatum</i> L.	
<i>Cercospora silphii</i> Ell. & Everh.	d, k
<i>Entyloma compositarum</i> Farl.	k
<i>Plasmopara halstedii</i> (Farl.) Berl. & DeToni	d
<i>Puccinia silphii</i> Schwein.	d, k
<i>Uromyces silphii</i> Arth.	d
<i>Silphium perfoliatum</i> L.	
<i>Colletotrichum dematium</i> (Pers.) Grove	a
<i>Septoria silphii</i> Ell. & Everh.	a
<i>Solidago canadensis</i> L.	
<i>Ascochyta compositarum</i> J.J. Davis	a
<i>Cercospora stomatica</i> Ellis & J.J. Davis	d
<i>Coleosporium asterum</i> (Diet.) Syd. & P. Syd.	k
<i>Phyllosticta</i> sp.	k
<i>Septoria virgaureae</i> (Lib.) Desmaz.	k
<i>Solidago missouriensis</i> Nutt.	
<i>Coleosporium asterum</i> (Diet.) Syd. & P. Syd.	k
<i>Ramularia serotina</i> Ell. & Everh.	k
<i>Septoria fumosa</i> Pk.	d
<i>Solidago rigida</i> L.	
<i>Cercospora virgaureae</i> (Thuem.) Allesch.	a, k
<i>Phyllosticta</i> sp.	k
<i>Septoria fumosa</i> Pk.	k

Table 4. Continued.

Host Taxon	Prairie
<i>Solidago</i> sp.	
<i>Cercospora virgaurea</i> (Thuem.) Allesch.	a
<i>Coleosporium asterum</i> (Diet.) Syd. & P. Syd.	a
<i>Colletotrichum dematium</i> (Pers.) Grove	a
<i>Vernonia fasciculata</i> Michx.	
<i>Coleosporium vernoniae</i> Berl. & M.A. Curtis	d
Brassicaceae	
<i>Arabis hirsuta</i> (L.) Scop.	
<i>Peronospora parasitica</i> (Pers.:Fr.) Fr.	d
Cyperaceae	
<i>Carex lacustris</i> Willd.	
<i>Puccinia caricina</i> DC.	k
<i>Stagonospora albescens</i> J.J. Davis	k
<i>Scripus atrovirens</i> Willd.	
<i>Puccinia angustata</i> Pk.	k
<i>Scirpus</i> sp.	
<i>Puccinia angustata</i> Pk.	a
Fabaceae	
<i>Amorpha canescens</i> Pursh	
<i>Uropyxis amorphae</i> (Curt.) Schrot.	a, d, k, p
<i>Amphicarpaea bracteata</i> (L.) Fern.	
<i>Synchytrium decipiens</i> (Farl.) Farl.	k
<i>Baptisia bracteata</i> Muhl. ex Ell. var. <i>glabrescens</i> (Larisey) Isely	k
<i>Cercospora velutina</i> Ell. & Everh.	k
<i>Baptisia lactea</i> (Raf.) Thieret	
<i>Stagonospora baptisiae</i> (Ell. & Everh.) J.J. Davis	k
<i>Dalea purpurea</i> Vent.	
<i>Uropyxis petalostemonis</i> (Farl.) DeToni	k
<i>Desmodium canadense</i> (L.) DC.	
<i>Cercospora desmodiicola</i> Atk.	a, k
<i>Gloeosporidiella desmodii</i> (H.C. Greene) Arx	k
<i>Microsphaera diffusa</i> Cke. & Pk.	a
<i>Parodiella bedysari</i> (Schwein.) Hughes	k
<i>Phyllosticta desmodii</i> Ell. & Everh.	a
<i>Ramularia desmodii</i> Cke.	d, k
<i>Uromyces bedysari-paniculati</i> (Schwein.) Farl. in Ellis	a, k
<i>Lathyrus venosus</i> Muhl. ex Willd.	
<i>Cercospora lathyrina</i> Ell. & Everh.	a
<i>Mycosphaerella pinodes</i> (Berk. & Bloxam) Vesterg.	a, k
<i>Uromyces fabae</i> (Grev.) Fuckel	a, k
<i>Lespedeza capitata</i> Michx.	
<i>Cercospora latens</i> Ell. & Everh.	k
<i>Uromyces lespedezae-procumbentis</i> (Schwein.) Curtis	k
<i>Pedionelum argophyllum</i> (Pursh) Grimes	
<i>Colletotrichum psoraleae</i> (Pk.) Arx	a
<i>Uromyces psoraleae</i> Pk. var. <i>argophyllae</i> (Seym.) Arth.	a
<i>Vicia americana</i> Muhl. ex Willd.	
<i>Uromyces coloradensis</i> Ell. & Everh.	a
Gentianaceae	
<i>Gentiana andrewsii</i> Griseb.	
<i>Asteromella andrewsii</i> Petr. in J.J. Davis	a, d, k
Iridaceae	
<i>Iris shrevei</i> Small	
<i>Asteroma venulosum</i> (Wallr.) Fuckel	d
<i>Mycosphaerella macrospora</i> (Kleb.) Jorst.	d, k

Table 4. Continued.

Host Taxon	Prairie
Juncaceae	
<i>Juncus dudleyi</i> Wieg.	
<i>Cintractia junci</i> (Schwein.) Trel.	d
Lamiaceae	
<i>Monarda fistulosa</i> L.	
<i>Erysiphe cicboracearum</i> DC.	a, p
<i>Puccinia menthae</i> Pers.:Pers.	p
<i>Synchytrium bolwayi</i> Farl.	P
<i>Pycnanthemum virginianum</i> (L.) Dur. & Jackson	
<i>Cercospora pycnanthemati</i> Atk.	a
<i>Phyllosticta monardae</i> Ell. & Barth.	d
<i>Puccinia menthae</i> Pers.:Pers.	d, k
<i>Synchytrium cellulare</i> J.J. Davis	d
<i>Stachys tenuifolia</i> Willd.	
<i>Phyllosticta palustris</i> Ell. & Dearn.	k
Poaceae	
<i>Andropogon gerardii</i> Vitm.	
<i>Ascochyta brachypodii</i> (Syd.) Sprague & A.G. Johnson	a
<i>Colletotrichum caudatum</i> (Sacc.) Pk.	d, k
<i>Phyllachora luteo-maculata</i> (Schwein.) Orton	a, d, k, p
<i>Puccinia andropogonis</i> Schwein.	a, d, k, p
<i>Septoria andropogonis</i> J.J. Davis	a, k
<i>Sphaelotheca occidentalis</i> (Seym.) Clinton	a, k
<i>Stagonospora simplicior</i> Sacc. & Briard	a, d, k, p
<i>Uromyces andropogonis</i> Tracy	a
<i>Bouteloua curtipendula</i> (Michx.) Torr.	
<i>Phyllachora cynodontis</i> (Sacc.) Weisss.	a
<i>Calamagrostis canadensis</i> (Michx.) Beauv.	
<i>Ascochyta</i> sp.	k
<i>Colletotrichum caudatum</i> (Sacc.) Pk.	a
<i>Hyalothyridium calamagrostidis</i> Greene	a, k
<i>Mycosphaerella</i> sp.	a
<i>Phaeoseptoria calamagrostidis</i> Sprague	k
<i>Phyllachora graminis</i> (Pers.:Fr.) Nits.	a, d, k
<i>Puccinia coronata</i> Corda	a
<i>Sclerotium rhizodes</i> Auers.	a, d
<i>Septoria calamagrostidis</i> (Lib.) Sacc.	d
<i>Stagonospora arenaria</i> (Sacc.) Sacc.	k
<i>Stagonospora avenae</i> (A.B. Frank) Bissett	k
<i>Ustilago striiformis</i> (Westend.) Niessl.	d
<i>Dichanthelium oligosanthes</i> (Schultes) Gould var. <i>scribnerianum</i> (Nash) Gould	
<i>Phaeoramularia fusimaculans</i> (Atk.) X. Liu & Guo	a, k
<i>Septoria tandilensis</i> Speg.	a
<i>Elymus canadensis</i> L.	
<i>Ascochyta sorghi</i> Sacc.	k
<i>Phyllachora graminis</i> (Pers.:Fr.) Nits	a, d, k
<i>Puccinia coronata</i> Corda	a, d
<i>Puccinia recondita</i> Rob. ex Desm.	d
<i>Septoria elymi</i> Ell. & Everh.	d, k
<i>Urocystis agropyri</i> (Pruess.) J. Schrot.	d
<i>Ustilago striiformis</i> (Westend.) Niessl.	d
<i>Hordeum jubatum</i> L.	
<i>Puccinia recondita</i> Rob. ex Desm.	d
<i>Leersia oryzoides</i> (L.) Sw.	
<i>Pyricularia grisea</i> (Cooke) Sacc.	d
<i>Muhlenbergia cuspidata</i> (Torrey) Rydb.	
<i>Phyllachora vulgata</i> Theiss. & Syd.	a

Table 4. Continued.

Host Taxon	Prairie
<i>Muhlenbergia racemosa</i> (Michx.) BSP.	
<i>Phyllachora vulgata</i> Theiss. & Syd.	k
<i>Panicum virgatum</i> L.	
<i>Colletotrichum caudatum</i> (Sacc.) Pk.	d, k
<i>Colletotrichum graminicola</i> (Ces.) G.W. Wils.	a, d, k, p
<i>Elsinoë panicis</i> Tiffany & Mathre	d, k
<i>Ophiosphaerella berpotricha</i> (Fr.:Fr.) J.C. Walker	k
<i>Phyllachora graminis</i> (Pers.:Fr.) Nits.	k
<i>Pseudoseptoria donacis</i> (Pass.) Sutton	k
<i>Puccinia emaculata</i> Schwein.	p
<i>Tilletia maclaganii</i> (Ber.) G.P. Clinton	k
<i>Uromyces graminicola</i> Burr.	a, k
<i>Phalaris arundinacea</i> L.	
<i>Claviceps purpurea</i> (Fr.:Fr.) Tul.	a
<i>Stagonospora foliicola</i> (Bres.) Bubák	a, d, k
<i>Ustilago striiformis</i> (Westend.) Niessl.	d
<i>Schizachyrium scoparium</i> (Michx.) Nash	
<i>Colletotrichum caudatum</i> (Sacc.) Pk.	k
<i>Dinemasporium strigosum</i> (Pers.:Fr.) Sacc.	k
<i>Phyllachora luteo-maculata</i> (Schwein.) Orton	p
<i>Puccinia andropogonis</i> Schwein.	d, k
<i>Stagonospora simplicior</i> Sacc. & Briard	a, k
<i>Sorghastrum nutans</i> (L.) Nash	
<i>Colletotrichum caudatum</i> (Sacc.) Pk.	k
<i>Stagonospora simplicior</i> Sacc. & Briard	k, p
<i>Spartina pectinata</i> Link	
<i>Puccinia sparganioides</i> Ell. & Barth.	k
<i>Uromyces acuminatus</i> Arth.	a, d, k
<i>Sporobolus asper</i> (Michx.) Kunth	
<i>Ascochyta sorghi</i> Sacc.	a
<i>Dinemasporium strigosum</i> (Pers.:Fr.) Sacc.	a
<i>Puccinia vilfae</i> A. & H.	d
<i>Sporobolus heterolepis</i> (A. Gray) A. Gray	
<i>Colletotrichum caudatum</i> (Sacc.) Pk.	d, k
<i>Colletotrichum graminicola</i> (Ces.) G.W. Wils.	k
<i>Pseudoseptoria donacis</i> (Pass.) Sutton	k
<i>Sporobolus</i> sp.	
<i>Coleroa sporoboli</i> (H.C. Green) Barr	a, k
<i>Stipa spartea</i> Trin.	
<i>Colletotrichum caudatum</i> (Sacc.) Pk.	p
<i>Puccinia stipae</i> Arth.	p
<i>Ustilago hypodytes</i> (Schlecht.) Fr.	p
Polemoniaceae	
<i>Phlox pilosa</i> L.	
<i>Cercospora amphacodes</i> Ell. & Holw.	a, d, k
<i>Septoria phlogis</i> Sacc. & Speg.	k
<i>Uromyces acuminatus</i> Arth. var. <i>polemonii</i> (Arth.) J.J. Davis	d, k
Polygonaceae	
<i>Polygonum amphibium</i> L. var. <i>emersum</i> Michx.	
<i>Puccinia polygoni-amphibii</i> Pers.:Pers.	a, k
Primulaceae	
<i>Lysimachia ciliata</i> L.	
<i>Mycosphaerella</i> sp.	d
<i>Phyllosticta steironematis</i> Dearn. & House	a
<i>Puccinia dayi</i> G.W. Clinton	d
<i>Septoria conspicua</i> Ell. & G. Martin in Martin	a, d, k
<i>Uromyces acuminatus</i> Arth.	a
<i>Lysimachia quadriflora</i> Sims	
<i>Phyllosticta steironematis</i> Dearn. & House	k
<i>Septoria conspicua</i> Ell. & Martin	d

Table 4. Continued.

Host Taxon	Prairie
Ranunculaceae	
<i>Anemone canadensis</i> L.	
<i>Plasmopara pygmaea</i> (Unger) J. Schrot.	a, d
<i>Puccinia anemones-virginianae</i> Schwein.	a
<i>Ramularia simplex</i> Pass.	a, d, k
<i>Septoria punicea</i> J.J. Davis	a, d, k
<i>Anemone cylindrica</i> Gray	
<i>Puccinia anemones-virginianae</i> Schwein.	a, k
<i>Ramularia simplex</i> Pass.	p
<i>Septoria punicea</i> J.J. Davis	a, k
<i>Thalictrum dasycarpum</i> Fisch. & Ave-Lall.	
<i>Cylindrosporium thalictri</i> (Ell. & Everh.) J.J. Davis	d
<i>Entyloma thalictri</i> Schrot.	a
<i>Erysiphe polygoni</i> DC.	d
<i>Phomopsis</i> sp.	a
<i>Puccinia recondita</i> Rob. ex Desm.	d
Rhamnaceae	
<i>Ceanothus americanus</i> L. var. <i>pitcheri</i> T. & G.	
<i>Cercospora ceanothi</i> Kellm. & Swingle	k
Rosaceae	
<i>Agrimonia striata</i> Michx.	
<i>Pucciniastrum agrimoniae</i> (Diet.) Tranz.	k
<i>Fragaria virginiana</i> Duchesne	
<i>Diplocarpon earlianum</i> (Ell. & Everh.) F.A. Wolf	d, k
<i>Potentilla arguta</i> Pursch	
<i>Marssonina fragariae</i> (Lib.) Kleb.	k
<i>Taphrina potentillae</i> (Farl.) Johans.	d
<i>Potentilla paradoxa</i> Nutt. ex T. & G.	
<i>Phragmidium ivesiae</i> Syd. & P. Syd.	p
<i>Potentilla simplex</i> Michx.	
<i>Phragmidium ivesiae</i> Syd. & P. Syd.	d
<i>Potentilla</i> sp.	
<i>Septoria purpurascens</i> Ell. & G. Martin	a
<i>Rosa arkansana</i> Porter var. <i>suffulta</i> (Greene) Cockerell	
<i>Cercospora rosicola</i> Pass.	a, d
<i>Discosia artocreas</i> (Tode:Fr.) Fr.	a, k
<i>Gnomonia setacea</i> (Pers.:Fr.) Ces. & DeNot.	a, d
<i>Marssonina rosae</i> (Lib.) Diet.	d, k
<i>Phragmidium rosae-arkansanae</i> Diet.	a, d, k, p
<i>Phragmidium speciosum</i> (Fr.) Cke.	d, k
Rubiaceae	
<i>Galium boreale</i> L.	
<i>Leptotrichia repanda</i> (Fr.) Karst.	a
<i>Melasmia galii</i> Ell & Everh.	a
<i>Septoria cruciatae</i> Rob. ex Desm.	a
<i>Galium obtusum</i> Bigel.	
<i>Leptotrichia repanda</i> (Fr.) Karst.	d
<i>Septoria cruciatae</i> Rob. ex Desm.	d
Santalaceae	
<i>Comandra umbellata</i> (L.) Nutt.	
<i>Puccinia andropogonis</i> Schwein. var. <i>pustulata</i> (Curt.) Arth.	a, d, k, p
Saxifragaceae	
<i>Heuchera richardsonii</i> R. Br.	
<i>Cercospora heucherae</i> Ell. & G. Martin	a, p
Scrophulariaceae	
<i>Veronicastrum virginicum</i> (L.) Farwell	
<i>Cercospora leptandrae</i> J.J. Davis	k
Verbenaceae	
<i>Verbena hastata</i> L.	
<i>Septoria verbenae</i> Rob. in Desm.	d

Table 5. Fungus index of parasitic fungi on plants of four central Iowa prairies. (a = Anderson Prairie, d = Doolittle Prairie, k = Kalsow Prairie, p = Pohl Prairie).

Fungus Taxon	Prairie
<i>Ascochyta brachypodii</i> (Syd.) Sprague & A.G. Johnson	
<i>Andropogon gerardii</i> Vitm.	a
<i>Ascochyta compositarum</i> J.J. Davis	
<i>Aster ericoides</i> L.	k
<i>Aster lanceolatus</i> Willd.	a, d
<i>Aster</i> sp.	d
<i>Prenanthes racemosa</i> Michx.	k
<i>Solidago canadensis</i> L.	a
<i>Ascochyta sorghi</i> Sacc.	
<i>Elymus canadensis</i> L.	k
<i>Sporobolus asper</i> (Michx.) Kunth	a
<i>Ascochyta</i> sp.	
<i>Calamagrostis canadensis</i> (Michx.) Beauv.	k
<i>Asteroma venulosum</i> (Wallr.) Fuckel	
<i>Iris shrevei</i> Small	d
<i>Asteromella andrewsii</i> Petr. in J.J. Davis	
<i>Gentiana andrewsii</i> Griseb.	a, d, k
<i>Cercospora alismatis</i> Ellis & Holw.	
<i>Sagittaria latifolia</i> Willd.	d
<i>Cercospora ceanothi</i> Kellm. & Swingle	
<i>Ceanothus americanus</i> L. var. <i>pitcheri</i> T. & G.	k
<i>Cercospora clavata</i> (Gerard) Cooke	
<i>Asclepias syriaca</i> L.	d, k
<i>Cercospora desmodiicola</i> Atk.	
<i>Desmodium canadense</i> (L.) DC.	a, k
<i>Cercospora heucherae</i> Ell. & G. Martin	
<i>Heuchera richardsonii</i> R. Br.	a, p
<i>Cercospora latens</i> Ell. & Everh.	
<i>Lespedeza capitata</i> Michx.	k
<i>Cercospora lathyrina</i> Ell. & Everh.	
<i>Lathyrus venosus</i> Muhl. ex Willd.	a
<i>Cercospora leptandrae</i> J.J. Davis	
<i>Veronicastrum virginicum</i> (L.) Farwell	k
<i>Cercospora omphacodes</i> Ell. & Holw.	
<i>Phlox pilosa</i> L.	a, d, k
<i>Cercospora rosicola</i> Pass.	
<i>Rosa arkansana</i> Porter var. <i>suffulta</i> (Greene) Cockerell	a, d
<i>Cercospora silphii</i> Ell. & Everh.	
<i>Silphium laciniatum</i> L.	d, k
<i>Cercospora stomatica</i> Ellis & J.J. Davis	
<i>Solidago canadensis</i> L.	d
<i>Cercospora velutina</i> Ell. & Everh.	
<i>Baptisia bracteata</i> Muhl. ex Ell. var. <i>glabrescens</i> (Larisey) Isely	k
<i>Cercospora wisconsinensis</i> Chupp & Greene	
<i>Prenanthes racemosa</i> Michx.	k
<i>Cercospora ziziae</i> Ell. & Everh.	
<i>Zizia aurea</i> (L.) W. Koch	d, k
<i>Cercosporiella pycnanthemum</i> Atk.	
<i>Pycnanthemum virginianum</i> (L.) Dur. & Jackson	a
<i>Cercosporiella virgaureae</i> (Thuem.) Allesch.	
<i>Solidago rigida</i> L.	a, k
<i>Solidago</i> sp.	a
<i>Cintractia junci</i> (Schw.) Trel.	
<i>Juncus dudleyi</i> Wieg.	d
<i>Claviceps purpurea</i> (Fr.:Fr.) Tul.	
<i>Phalaris arundinacea</i> L.	a

Table 5. Continued.

Fungus Taxon	Prairie
<i>Coleosporium asterum</i> (Diet.) Syd. & P. Syd.	
<i>Aster ericoides</i> L.	d
<i>Aster novae-angliae</i> L.	d
<i>Aster</i> sp.	a, d
<i>Solidago canadensis</i> L.	k
<i>Solidago missouriensis</i> Nutt.	k
<i>Solidago</i> sp.	a
<i>Coleosporium vernoniae</i> Berl. & M.A. Curtis in Berk.	
<i>Vernonia fasciculata</i> Michx.	d
<i>Coleroa sporoboli</i> (H.C. Greene) Barr	
<i>Sporobolus</i> sp.	a, k
<i>Colletotrichum caudatum</i> (Sacc.) Pk.	
<i>Andropogon gerardii</i> Vitm.	d, k
<i>Calamagrostis canadensis</i> (Michx.) Beauv.	a
<i>Panicum virgatum</i> L.	d, k
<i>Schizachyrium scoparium</i> (Michx.) Nash	k
<i>Sorghastrum nutans</i> (L.) Nash	k
<i>Sporobolus heterolepis</i> (A. Gray) A. Gray	d, k
<i>Stipa spartea</i> Trin.	p
<i>Colletotrichum dematium</i> (Pers.) Grove	
<i>Silphium perfoliatum</i> L.	a
<i>Solidago</i> sp.	a
<i>Colletotrichum fusarioides</i> (Ell. & Kellm.) O'Gara	
<i>Asclepias tuberosa</i> L. ssp. <i>interior</i> Woodson	a, k
<i>Colletotrichum graminicola</i> (Ces.) G.W. Wils.	
<i>Panicum virgatum</i> L.	a, d, k, p
<i>Sporobolus heterolepis</i> (A. Gray) A. Gray	k
<i>Colletotrichum psoraleae</i> (Pk.) Arx	
<i>Pediomelum argophyllum</i> (Pursh) Grimes	a
<i>Cylindrosporium eryngii</i> Ell. & Kellerm.	
<i>Eryngium yuccifolium</i> Michx.	k
<i>Cylindrosporium thalictri</i> (Ell. & Everh.) J.J. Davis	
<i>Thalictrum dasycarpum</i> Fisch. & Ave-Lall.	d
<i>Dinemasporium strigosum</i> (Pers.:Fr.) Sacc	
<i>Schizachyrium scoparium</i> (Michx.) Nash	k
<i>Sporobolus asper</i> (Michx.) Kunth	a
<i>Diplocarpon earlianum</i> (Ell. & Everh.) F.A. Wolf	
<i>Fragaria virginiana</i> Duchesne	d, k
<i>Discosia artocreas</i> (Tode:Fr.) Fr.	
<i>Rosa arkansana</i> Porter var. <i>suffulta</i> (Greene) Cockerell	a, k
<i>Elsinoë panici</i> Tiff. & Mathre	
<i>Panicum virgatum</i> L.	d, k
<i>Entyloma compositarum</i> Farl.	
<i>Ratibida pinnata</i> (Vent.) Barnh.	a, d, k, p
<i>Silphium laciniatum</i> L.	k
<i>Entyloma thalictri</i> Schrot.	
<i>Thalictrum dasycarpum</i> Fisch. & Ave-Lall.	a
<i>Erysiphe cichoracearum</i> DC.	
<i>Monarda fistulosa</i> L.	a, p
<i>Erysiphe polygoni</i> DC.	
<i>Thalictrum dasycarpum</i> Fisch. & Ave-Lall.	d
<i>Gloeosporidiella desmodii</i> (H.C. Greene) Arx	
<i>Desmodium canadense</i> (L.) DC.	k
<i>Gnomonia setacea</i> (Pers.:Fr.) Ces. & DeNot.	
<i>Rosa arkansana</i> Porter var. <i>suffulta</i> (Greene) Cockerell	a, d
<i>Hyalothyridium calamagrostidis</i> Greene	
<i>Calamagrostis canadensis</i> (Michx.) Beauv.	a, k
<i>Leptosphaeria heliopsidis</i> (Schwein.:Fr.) L. Holm	
<i>Helianthus rigidus</i> (Cass.) Desf.	d

Table 5. Continued.

Fungus Taxon	Prairie
<i>Leptosphaeria</i> sp.	
<i>Eryngium yuccifolium</i> Michx.	k
<i>Euthamia graminifolia</i> (L.) Nutt. ex Cass.	a
<i>Leptotrichila repanda</i> (Fr.) Karst.	
<i>Galium boreale</i> L.	a
<i>Galium obtusum</i> Bigel.	d
<i>Marssonina fragariae</i> (Lib.) Kleb.	
<i>Potentilla arguta</i> Pursh	k
<i>Marssonina rosae</i> (Lib.) Diet.	
<i>Rosa arkansana</i> Porter var. <i>suffulta</i> (Greene) Cockerell	d, k
<i>Melasmia galii</i> Ell. & Everh.	
<i>Galium boreale</i> L.	a
<i>Microsphaera diffusa</i> Cke. & Pk.	
<i>Desmodium canadense</i> (L.) DC.	a
<i>Mycosphaerella macrospora</i> (Kleb.) Jrst.	
<i>Iris shrevei</i> Small	d, k
<i>Mycosphaerella pinodes</i> (Berk. & Bloxam) Vestergr.	
<i>Lathyrus venosus</i> Muhl. ex Willd.	a, k
<i>Mycosphaerella</i> sp.	
<i>Calamagrostis canadensis</i> (Michx.) Beauv.	a
<i>Lysimachia ciliata</i> L.	d
<i>Nematostoma occidentale</i> (Ell. & Everh.) Barr	
<i>Artemisia ludoviciana</i> Nutt.	a, d, k, p
<i>Ophiosphaerella herpotricha</i> (Fr.:Fr.) J.C. Walker	
<i>Panicum virgatum</i> L.	k
<i>Parodiella bedysari</i> (Schwein.) Hughes	
<i>Desmodium canadense</i> (L.) DC.	k
<i>Peronospora parasitica</i> (Pers.:Fr.) Fr.	
<i>Arabis hirsuta</i> (L.) Scop.	d
<i>Phaeoramularia fusimaculans</i> (Atk.) X. Liu & Guo	
<i>Dichanthelium oligosanthes</i> (Schultes) Gould var. <i>scriberianum</i> (Nash) Gould	a, k
<i>Phaeoseptoria calamagrostidis</i> Sprague	
<i>Calamagrostis canadensis</i> (Michx.) Beauv.	k
<i>Phomopsis</i> sp.	
<i>Thalictrum dasycarpum</i> Fisch. & Ave-Lall.	a
<i>Phragmidium ivesiae</i> Syd. & P. Syd.	
<i>Potentilla paradoxa</i> Nutt. ex T. & G.	p
<i>Potentilla simplex</i> Michx.	d
<i>Phragmidium rosae-arkansanae</i> Diet.	
<i>Rosa arkansana</i> Porter var. <i>suffulta</i> (Greene) Cockerell	a, d, k, p
<i>Phragmidium speciosum</i> (Fr.) Cke.	
<i>Rosa arkansana</i> Porter var. <i>suffulta</i> (Greene) Cockerell	d, k
<i>Phyllachora cynodontis</i> (Sacc.) Neissl.	
<i>Bouteloua curtipendula</i> (Michx.) Torrey	a
<i>Phyllachora graminis</i> (Pers.:Fr.) Nits.	
<i>Calamagrostis canadensis</i> (Michx.) Beauv.	a, d, k
<i>Elymus canadensis</i> L.	a, d, k
<i>Panicum virgatum</i> L.	k
<i>Phyllachora luteo-maculata</i> (Schwein.) Orton	
<i>Andropogon gerardii</i> Vitm.	a, d, k, p
<i>Schizachyrium scoparium</i> (Michx.) Nash	p
<i>Phyllachora vulgata</i> Theiss. & Syd.	
<i>Muhlenbergia cuspidata</i> (Torrey) Rydb.	a
<i>Muhlenbergia racemosa</i> (Michx.) BSP.	k
<i>Phyllosticta desmodii</i> Ell. & Everh.	
<i>Desmodium canadense</i> (L.) DC.	a
<i>Phyllosticta monardae</i> Ell. & Barth.	
<i>Pycnanthemum virginianum</i> (L.) Dur. & Jackson	d

Table 5. Continued.

Fungus Taxon	Prairie
<i>Phyllosticta palustris</i> Ell. & Dearn.	
<i>Stachys tenuifolia</i> Willd.	k
<i>Phyllosticta steironematis</i> Dearn. & House	
<i>Lysimachia ciliata</i> L.	a
<i>Lysimachia quadriflora</i> Sims	k
<i>Phyllosticta tuberosa</i> Ell. & G. Martin	
<i>Asclepias tuberosa</i> L. ssp. <i>interior</i> Woodson	k
<i>Phyllosticta wisconsinensis</i> H.C. Greene	
<i>Helianthus rigidus</i> (Cass.) Desf.	k
<i>Phyllosticta</i> sp.	
<i>Eryngium yuccifolium</i> Michx.	k
<i>Solidago canadensis</i> L.	k
<i>Solidago rigida</i> L.	k
<i>Physoderma pluriannulatum</i> (Berk. & M.A. Curtis) Karling	
<i>Zizia aurea</i> (L.) W. Koch	k, p
<i>Placosphaeria baydenii</i> (Berk. & Curtis) Petr.	
<i>Aster lanceolatus</i> Willd.	k
<i>Plasmopara halstedii</i> (Farl.) Berl. & DeToni	
<i>Helianthus grosseserratus</i> Martens	d
<i>Helianthus rigidus</i> (Cass.) Desf.	a
<i>Silphium laciniatum</i> L.	d
<i>Plasmopara pygmaea</i> (Unger) J. Schrot.	
<i>Anemone canadensis</i> L.	a, d
<i>Pleospora scrophulariae</i> (Desm.) Höh. var. <i>compositarum</i> (Earle) Wehm.	
<i>Brickellia eupatorioides</i> (L.) Shinnery	a
<i>Pseudoseptoria donacis</i> (Pass.) Sutton	
<i>Panicum virgatum</i> L.	k
<i>Sporobolus heterolepis</i> (A. Gray) A. Gray	k
<i>Puccinia andropogonis</i> Schwein.	
<i>Andropogon gerardii</i> Vitm.	a, d, k, p
<i>Schizachyrium scoparium</i> (Michx.) Nash	d, k
<i>Puccinia andropogonis</i> Schwein. var. <i>pustulata</i> (Curt.) Arth.	
<i>Comandra umbellata</i> (L.) Nutt.	a, d, k, p
<i>Puccinia anemones-virginianae</i> Schwein.	
<i>Anemone canadensis</i> L.	a
<i>Anemone cylindrica</i> Gray	a, k
<i>Puccinia angustata</i> Pk.	
<i>Scirpus atrovirens</i> Willd.	k
<i>Scirpus</i> sp.	a
<i>Puccinia caricina</i> DC.	
<i>Carex lacustris</i> Willd.	k
<i>Puccinia chloridis</i> Speg.	
<i>Asclepias syriaca</i> L.	d
<i>Asclepias tuberosa</i> L. ssp. <i>interior</i> Woodson	d
<i>Asclepias verticillata</i> L.	p
<i>Puccinia cnici-oleracei</i> Pers.	
<i>Aster lanceolatus</i> Willd.	d
<i>Puccinia coronata</i> Corda	
<i>Calamagrostis canadensis</i> (Michx.) Beauv.	a
<i>Elymus canadensis</i> L.	a, d
<i>Puccinia dayi</i> G.W. Clinton	
<i>Lysimachia ciliata</i> L.	d
<i>Puccinia dioicae</i> Magnus	
<i>Erigeron annuus</i> (L.) Pers.	p
<i>Puccinia emaculata</i> Schwein.	
<i>Panicum virgatum</i> L.	p
<i>Puccinia grindeliae</i> Pk.	
<i>Aster</i> sp.	d

Table 5. Continued.

Fungus Taxon	Prairie
<i>Puccinia helianthi</i> Schwein.	
<i>Helianthus grosseserratus</i> Martens	a, d, k
<i>Helianthus rigidus</i> (Cass.) Desf.	a, k
<i>Puccinia kubniae</i> Schwein.	
<i>Brickellia eupatorioides</i> (L.) Shinnery	a
<i>Puccinia menthae</i> Pers.:Pers.	
<i>Monarda fistulosa</i> L.	p
<i>Pycnanthemum virginianum</i> (L.) Dur. & Jackson	d, k
<i>Puccinia polygoni-amphibii</i> Pers.:Pers.	
<i>Polygonum amphibium</i> L. var. <i>emersum</i> Michx.	a, k
<i>Puccinia recondita</i> Rob. ex Desm.	
<i>Elymus canadensis</i> L.	d
<i>Hordeum jubatum</i> L.	d
<i>Thalictrum dasycarpum</i> Fisch. & Ave-Lall.	d
<i>Puccinia seymoriana</i> Arth.	
<i>Asclepias incarnata</i> L.	d
<i>Puccinia silphii</i> Schwein.	
<i>Silphium laciniatum</i> L.	d, k
<i>Puccinia sparganioides</i> Ell. & Barth.	
<i>Spartina pectinata</i> Link	k
<i>Puccinia stipae</i> Arth.	
<i>Stipa spartea</i> Trin.	p
<i>Puccinia tanacetii</i> DC.	
<i>Artemisia ludoviciana</i> Nutt.	a
<i>Puccinia vilfae</i> A. & H.	
<i>Sporobolus asper</i> (Michx.) Kunth	d
<i>Puccinia xanthii</i> Schwein.	
<i>Ambrosia trifida</i> L.	p
<i>Pucciniastrum agrimoniae</i> (Dietel) Tranz.	
<i>Agrimonia striata</i> Michx.	k
<i>Pyricularia grisea</i> (Cooke) Sacc.	
<i>Leersia oryzoides</i> (L.) Sw.	d
<i>Ramularia alismatis</i> Fautrey	
<i>Alisma plantago-aquatica</i> L.	d
<i>Ramularia desmodii</i> Cke.	
<i>Desmodium canadense</i> (L.) DC.	d, k
<i>Ramularia serotina</i> Ell. & Everh.	
<i>Solidago missouriensis</i> Nutt.	k
<i>Ramularia simplex</i> Pass.	
<i>Anemone canadensis</i> L.	a, d, k
<i>Anemone cylindrica</i> Gray	p
<i>Sclerotium rhizodes</i> Auers.	
<i>Calamagrostis canadensis</i> (Michx.) Beauv.	a, d
<i>Septoria andropogonis</i> J.J. Davis	
<i>Andropogon gerardii</i> Vitm.	a, k
<i>Septoria atropurpurea</i> Pk.	
<i>Aster</i> sp.	a
<i>Septoria calamagrostidis</i> (Lib.) Sacc.	
<i>Calamagrostis canadensis</i> (Michx.) Beauv.	d
<i>Septoria conspicua</i> Ell. & G. Martin in G. Martin	
<i>Lysimachia ciliata</i> L.	a, d, k
<i>Lysimachia quadriflora</i> Sims	d
<i>Septoria coreopsidis</i> J.J. Davis	
<i>Coreopsis palmata</i> Nutt.	a
<i>Septoria cruciatae</i> Rob. ex Desm.	
<i>Galium boreale</i> L.	a
<i>Galium obtusum</i> Bigel.	d
<i>Septoria cryptotaeniae</i> Ell. & Rau. in G. Martin	
<i>Cryptotaenia canadensis</i> (L.) DC.	a

Table 5. Continued.

Fungus Taxon	Prairie
<i>Septoria elymi</i> Ell. & Everh. <i>Elymus canadensis</i> L.	d, k
<i>Septoria fumosa</i> Pk. <i>Solidago missouriensis</i> Nutt.	d
<i>Solidago rigida</i> L.	k
<i>Septoria belianthi</i> Ell. & Kellm. <i>Helianthus grosseserratus</i> Martens	a
<i>Helianthus rigidus</i> (Cass.) Desf.	a, k
<i>Septoria lepachydis</i> Ell. & Everh. <i>Echinacea pallida</i> Nutt.	d
<i>Echinacea purpurea</i> (L.) Moench.	p
<i>Septoria liatridis</i> Ell. & J.J. Davis <i>Liatris aspera</i> Michx.	a, k
<i>Septoria parvimaculans</i> H.C. Greene <i>Brickellia eupatorioides</i> (L.) Shinnery	a
<i>Septoria phlogis</i> Sacc. & Speg. <i>Phlox pilosa</i> L.	k
<i>Septoria punicea</i> J.J. Davis <i>Anemone canadensis</i> L.	a, d, k
<i>Anemone cylindrica</i> Gray	a, k
<i>Septoria purpurascens</i> Ell. & G. Martin <i>Potentilla</i> sp.	a
<i>Septoria rudbeckiae</i> Ell. & Halst. <i>Rudbeckia subtomentosa</i> Pursh	d
<i>Septoria sii</i> Rob. ex Desm. <i>Sium suave</i> Walter	k
<i>Septoria silphii</i> Ell. & Everh. <i>Silphium perfoliatum</i> L.	a
<i>Septoria tandilensis</i> Speg. <i>Dichanthelium oligosanthes</i> (Schultes) Gould var. <i>scribmerianum</i> (Nash) Gould	a
<i>Septoria verbenae</i> Rob. in Desm. <i>Verbena hastata</i> L.	d
<i>Septoria virgaureae</i> (Lib.) Desmaz. <i>Solidago canadensis</i> L.	k
<i>Septoria ziziae</i> Ell. & Everh. <i>Zizia aurea</i> (L.) W. Koch	a
<i>Septoria</i> sp. <i>Helenium autumnale</i> L.	d
<i>Sphacelotheca occidentalis</i> (Seym.) Clinton <i>Andropogon gerardii</i> Vitm.	a, k
<i>Stagonospora albescens</i> J.J. Davis <i>Carex lacustris</i> Willd.	k
<i>Stagonospora apocyni</i> (Pk.) J.J. Davis <i>Apocynum sibiricum</i> Jacq.	a, d, k
<i>Stagonospora arenaria</i> (Sacc.) Sacc. <i>Calamagrostis canadensis</i> (Michx.) Beauv.	k
<i>Stagonospora avenae</i> (A.B. Frank) Bissett <i>Calamagrostis canadensis</i> (Michx.) Beauv.	k
<i>Stagonospora baptisiae</i> (Ell. & Everh.) J.J. Davis <i>Baptisia lactea</i> (Raf.) Thieret	k
<i>Stagonospora foliicola</i> (Bres.) Bubák <i>Phalaris arundinacea</i> L.	a, d, k
<i>Stagonospora simplicior</i> Sacc. & Briard <i>Andropogon gerardii</i> Vitm.	a, d, k, p
<i>Schizachyrium scoparium</i> (Michx.) Nash	a, k
<i>Sorghastrum nutans</i> (L.) Nash	k, p
<i>Stagonospora thaspisii</i> (Ell. & Everh.) H.C. Greene <i>Zizia aurea</i> (L.) W. Koch	d
<i>Stagonospora zonata</i> J.J. Davis <i>Asclepias incarnata</i> L.	d
<i>Asclepias tuberosa</i> L. ssp. <i>interior</i> Woodson	k

Table 5. Continued.

Fungus Taxon	Prairie
<i>Synchytrium cellulare</i> J.J. Davis	
<i>Pycnanthemum virginianum</i> (L.) Dur. & Jackson	d
<i>Synchytrium decipiens</i> (Farl.) Farl.	
<i>Amphicarpaea bracteata</i> (L.) Fern.	k
<i>Synchytrium holwayi</i> Farl.	
<i>Monarda fistulosa</i> L.	p
<i>Taphrina potentillae</i> (Farl.) Johans.	
<i>Potentilla arguta</i> Pursh	d
<i>Tilletia maclaganii</i> (Berk.) G.P. Clinton	
<i>Panicum virgatum</i> L.	k
<i>Urocystis agropyri</i> (Pruess.) J. Schröt.	
<i>Elymus canadensis</i> L.	d
<i>Uromyces acuminatus</i> Arth.	
<i>Lysimachia ciliata</i> L.	a
<i>Spartina pectinata</i> Link	a, d, k
<i>Uromyces acuminatus</i> Arth. var. <i>polemonii</i> (Arth.) J.J. Davis	
<i>Phlox pilosa</i> L.	d, k
<i>Uromyces andropogonis</i> Tracy	
<i>Andropogon gerardii</i> Vitm.	a
<i>Uromyces coloradensis</i> Ell. & Everh.	
<i>Vicia americana</i> Muhl. ex Willd.	a
<i>Uromyces fabae</i> (Grev.) Fuckel	
<i>Lathyrus venosus</i> Muhl. ex Willd.	a, k
<i>Uromyces graminicola</i> Burr.	
<i>Panicum virgatum</i> L.	a, k
<i>Uromyces bedysari-paniculati</i> (Schwein.) Farl. in Ellis	
<i>Desmodium canadense</i> (L.) DC.	a, k
<i>Uromyces lespedezae-procumbentis</i> (Schwein.) Curt.	
<i>Lespedeza capitata</i> Michx.	k
<i>Uromyces psoraleae</i> Pk. var. <i>argophyllae</i> (Seym.) Arth.	
<i>Pediomelum argophyllum</i> (Pursh) Grimes	a
<i>Uromyces silphii</i> Arth.	
<i>Silphium laciniatum</i> L.	d
<i>Uropyxis amorphae</i> (Curt.) Schrot.	
<i>Amorpha canescens</i> Pursh	a, d, k, p
<i>Uropyxis petalostemonis</i> (Farl.) DeToni	
<i>Dalea purpurea</i> Vent.	k
<i>Ustilago hypodytes</i> (Schlecht.) Fr.	
<i>Stipa spartea</i> Trin.	p
<i>Ustilago striiformis</i> (Westend.) Niessl.	
<i>Calamagrostis canadensis</i> (Michx.) Beauv.	d
<i>Elymus canadensis</i> L.	d
<i>Phalaris arundinacea</i> L.	d

weeks before adjacent healthy plants flower. In subsequent years the inflorescences were shorter, eventually reduced to ones only several inches in height. Such plants did not survive and did not produce seed, potentially resulting in a severe reduction in the big bluestem population.

Sphaelotheca occidentalis was first reported in Iowa in the summer of 1978 at Cayler Prairie State Preserve and Freda Haffner Kettlehole State Preserve, both in Dickinson County (Tiffany et al. 1990). At that time the smut fungus was well established at these sites. Kernel smut of big bluestem had been reported in Nebraska by Dunleavy (1956). The fungus seems to be seed borne as diseased plants are not uncommon on prairie restoration sites planted with Nebraska seed. Some restored site plants do not develop galls on all the floral primordia, nor are they as stunted as are the plants observed in native Iowa prairies. The impact of this smut has been most

evident at Cayler Prairie where a majority of the plants have disappeared in large sections of the prairie. Fortunately, not all of the big bluestem plants are susceptible, and normal seed production should produce more resistant plants over time at Cayler Prairie. The fungus persists at Freda Haffner Kettlehole State Preserve but not with significant impact. The fungus survey report of four northern Iowa prairies (Tiffany et al. 1990) included *S. occidentalis* at Cayler Prairie and Freda Haffner Kettlehole State Preserves, but it was not present at Stinson Prairie or at Ada Hayden Prairie State Preserves. During this survey a few diseased plants were found at Anderson Prairie State Preserve in 1987 but the fungus had not had an impact on the big bluestem population there. A single collection of *S. occidentalis* was made at Cedar Hills Prairie State Preserve in 1987 with no subsequent collections.

Kernel smut occurred in extensive areas of diseased plants on Kal-

Table 6. Host index of parasitic fungi on plants of two Iowa sand prairies. (c = Cedar Hills Sand Prairie, m = Marietta Sand Prairie).

Host Taxon	Prairie
Asclepiadaceae	
<i>Asclepias incarnata</i> L.	
<i>Cercospora clavata</i> (W. Gerard) Cooke	c
Asteraceae	
<i>Ambrosia trifida</i> L.	
<i>Erysiphe cichoracearum</i> DC.	c
<i>Artemisia ludoviciana</i> Nutt.	
<i>Nematostoma occidentale</i> (Ell. & Everh.) Barr	c, m
<i>Puccinia atrofusca</i> (Dudl. & Thomp.) Holw.	c
<i>Aster ericoides</i> L.	
<i>Coleosporium asterum</i> (Diet.) Syd. & P. Syd.	c
<i>Erysiphe cichoracearum</i> DC.	c
<i>Aster puniceus</i> L.	
<i>Coleosporium asterum</i> (Deit.) Syd. & P. Syd.	m
<i>Aster umbellatus</i> Miller	
<i>Phyllosticta</i> sp.	c
<i>Aster</i> sp.	
<i>Ampelomyces quisqualis</i> Ces.:Schlecht. on <i>Erysiphe cichoracearum</i> DC.	m
<i>Ascochyta compositarum</i> J.J. Davis	c
<i>Coleosporium asterum</i> (Diet.) Syd. & P. Syd.	c
<i>Erysiphe cichoracearum</i> DC.	m
<i>Puccinia cnici-oleracei</i> Pers.	m
<i>Bidens vulgata</i> Greene	
<i>Septocylindrium concomitans</i> (Ell. & Holw.) Halst. in Seym. & Earle	m
<i>Cirsium</i> sp.	
<i>Erysiphe cichoracearum</i> DC.	m
<i>Erigeron strigosus</i> Muhl. ex Willd.	
<i>Puccinia cyperi</i> Arth.	m
<i>Euthamia graminifolia</i> (L.) Nutt. ex Cass.	
<i>Ascochyta</i> sp.	m
<i>Rhynchospora solidaginis</i> Schwein.	c
<i>Helianthus grosseserratus</i> G. Martens	
<i>Erysiphe cichoracearum</i> DC.	c, m
<i>Puccinia helianthi</i> Schwein.	c, m
<i>Helianthus rigidus</i> (Cass.) Desf.	
<i>Erysiphe cichoracearum</i> DC.	c, m
<i>Leptosphaeria heliopsisidis</i> (Schwein.:Fr.) L. Holm	m
<i>Puccinia helianthi</i> Schwein.	c
<i>Sphaerophoma brecklei</i> Petr.	m
<i>Liatris aspera</i> Michx.	
<i>Septoria liatridis</i> Ell. & J.J. Davis	c
<i>Prenanthes racemosa</i> Michx.	
<i>Cercospora prenanthis</i> Ell. & Kellerm.	c
<i>Ratibida pinnata</i> (Vent.) Barnh.	
<i>Entyloma compositarum</i> Farl.	m
<i>Rudbeckia subtomentosa</i> Pursh	
<i>Septoria rudbeckiae</i> Ell. & Halst.	m
<i>Solidago canadensis</i> L.	
<i>Coleosporium asterum</i> (Diet.) Syd. & P. Syd.	m
<i>Solidago</i> sp.	
<i>Coleosporium asterum</i> (Diet.) Syd. & P. Syd.	c
<i>Leptosphaeria</i> sp.	c
<i>Sphaerellopsis filum</i> (Biv.-Bern.:Fr.) Sutton on uredia of <i>Coleosporium asterum</i>	c
Cyperaceae	
<i>Scirpus atrovirens</i> Willd.	
<i>Puccinia angustata</i> Pk.	c
<i>Scirpus cyperinus</i> (L.) Kunth	
<i>Puccinia angustata</i> Pk.	m

Table 6. Continued.

Host Taxon	Prairie
Equisetaceae	
<i>Equisetum laevigatum</i> A. Br.	
<i>Mycosphaerella</i> sp.	m
Euphorbiaceae	
<i>Euphorbia corollata</i> L.	
<i>Puccinia emaculata</i> Schwein.	c
<i>Euphorbia dentata</i> Michx.	
<i>Fusicladium fasciculatum</i> Cooke & Ellis	c
<i>Uromyces euphorbiae</i> Cke. & Pk. in Peck	c
Fabaceae	
<i>Baptisia lactea</i> (Raf.) Thieret	
<i>Stagonospora baptisiae</i> (Ell. & Everh.) J.J. Davis	c
<i>Desmodium canadense</i> (L.) DC.	
<i>Microsphaera diffusa</i> Cooke & Pk.	c
<i>Uromyces bedysari-paniculati</i> (Schwein.) Farl. in Ellis	c
<i>Lespedeza capitata</i> Michx.	
<i>Cercospora latens</i> Ellis & Everh.	m
<i>Phyllachora lespedezae</i> (Schwein.) Cooke	c
<i>Uromyces lespedezae-procumbentis</i> (Schwein.) M.A. Curt.	c
Gentianaceae	
<i>Gentiana andrewsii</i> Griseb.	
<i>Asteromella andrewsii</i> Petr. in J.J. Davis	c, m
<i>Mycosphaerella andrewsii</i> (Sacc.) J.J. Davis	m
Iridaceae	
<i>Iris shrevei</i> Small	
<i>Cercoseptoria iridis</i> (Ell. & Halst.) H.C. Greene	c
Lamiaceae	
<i>Monarda fistulosa</i> L.	
<i>Erysiphe cichoracearum</i> DC.	c, m
<i>Puccinia menthae</i> Pers.:Pers.	c, m
<i>Pycnanthemum virginianum</i> (L.) Dur. & Jackson	
<i>Puccinia menthae</i> Pers.:Pers.	c, m
<i>Sphaerellopsis filum</i> (Biv.-Bern.:Fr.) Sutton on uredia of <i>Puccinia menthae</i>	c, m
Poaceae	
<i>Andropogon gerardii</i> Vitm.	
<i>Ascochyta brachypodii</i> (Syd.) Sprague & A.G. Johnson	c, m
<i>Colletotrichum caudatum</i> (Sacc.) Pk.	m
<i>Phyllachora luteo-maculata</i> (Schwein.) Orton	c
<i>Puccinia andropogonis</i> Schwein.	c, m
<i>Stagonospora simplicior</i> Sacc. & Briard	c, m
<i>Calamagrostis canadensis</i> (Michx.) Beauv.	
<i>Dilophospora alopecuri</i> (Fr.:Fr.) Fr.	c
<i>Mycosphaerella</i> sp.	c
<i>Phyllachora graminis</i> (Pers.:Fr.) Nitschke.	c, m
<i>Dichanthelium linearifolium</i> (Scribner) Gould	
<i>Phyllachora punctum</i> (Schwein.) Orton & F. Stevens	c
<i>Stagonospora simplicior</i> Sacc. & Briard	c
<i>Eragrostis</i> sp.	
<i>Colletotrichum graminicola</i> (Ces.) G.W. Wils.	c
<i>Pyrenophora</i> sp.	c
<i>Panicum virgatum</i> L.	
<i>Colletotrichum graminicola</i> (Ces.) G.W. Wils.	c, m
<i>Elsinoë panici</i> Tiff. & Mathre	c, m
<i>Puccinia emaculata</i> Schwein.	c, m
<i>Sphaerellopsis filum</i> (Biv.-Bern.:Fr.) Sutton on uredia of <i>Puccinia emaculata</i>	c

Table 6. Continued.

Host Taxon	Prairie
<i>Paspalum setaceum</i> Michx. var. <i>ciliatifolium</i> (Michx.) Vasey	
<i>Phyllachora paspalicola</i> Henn.	c, m
<i>Puccinia coronata</i> Corda	m
<i>Schizachyrium scoparium</i> (Michx.) Nash	
<i>Ascochyta brachypodii</i> (Syd.) Sprague & A.G. Johnson	c
<i>Colletotrichum</i> sp.	c
<i>Leptostromella andropogonis</i> Dearn. & House	c
<i>Puccinia andropogonis</i> Schwein.	c
<i>Stagonospora simplicior</i> Sacc. & Briard	c
<i>Sorghastrum nutans</i> (L.) Nash	
<i>Colletotrichum caudatum</i> (Sacc.) Pk.	c, m
<i>Colletotrichum graminicola</i> (Ces.) G.W. Wils.	m
<i>Phyllosticta</i> sp.	m
<i>Puccinia virgata</i> Ell. & Everh.	c
<i>Stagonospora simplicior</i> Sacc. & Briard	c, m
<i>Sporobolus</i> sp.	
<i>Colletotrichum graminicola</i> (Ces.) G.W. Wils.	c
<i>Stipa spartea</i> Trin.	
<i>Cercosporidium graminis</i> (Fuckel) Deighton	m
<i>Urobendersonia stipae</i> H.C. Greene	c
<i>Ustilago hypodytes</i> (Schlect.) Fr.	c
Polemoniaceae	
<i>Phlox maculata</i> L.	
<i>Septoria phlogis</i> Sacc. & Speg.	c
<i>Phlox pilosa</i> L.	
<i>Cercospora omphacodes</i> Ell. & Holw.	c
Polygonaceae	
<i>Polygonum amphibium</i> L. var. <i>emersum</i> Michx.	
<i>Puccinia polygoni-amphibii</i> Pers.:Pers.	c
Primulaceae	
<i>Lysimachia ciliata</i> L.	
<i>Puccinia dayi</i> G.W. Clinton	m
<i>Septoria conspicua</i> Ell. & G. Martin in G. Martin	m
Ranunculaceae	
<i>Anemone canadensis</i> L.	
<i>Puccinia anemones-virginianae</i> Schwein.	c
<i>Anemone cylindrica</i> A. Gray	
<i>Puccinia anemones-virginianae</i> Schwein.	c
<i>Pulsatilla patens</i> (L.) P.M. Miller spp. <i>multifida</i> (Pritz.) Zamels	
<i>Puccinia pulsatillae</i> Kalchbr.	c
<i>Thalictrum dasycarpum</i> Fisch. & Ave-Lall.	
<i>Entyloma thalictri</i> J. Schrot. in Cohn	m
<i>Erysiphe polygoni</i> DC.	m
<i>Puccinia recondita</i> Rob. ex Desm.	m
Rosaceae	
<i>Fragaria virginiana</i> Duchesne	
<i>Cercospora vexans</i> Massal.	c, m
<i>Diplocarpon earlianum</i> (Ell. & Everh.) F.A. Wolf	c
<i>Potentilla arguta</i> Pursh	
<i>Septoria purpurascens</i> Ell. & G. Martin in G. Martin	c
<i>Potentilla recta</i> L.	
<i>Marssonina fragariae</i> (Lib.) Kleb.	c
<i>Phragmidium ivesiae</i> Syd. & P. Syd.	c
<i>Septoria purpurascens</i> Ell. & G. Martin in G. Martin	c
<i>Taphrina potentillae</i> (Farl.) Johans.	c

Table 6. Continued.

Host Taxon	Prairie
<i>Potentilla simplex</i> Michx.	
<i>Cercospora</i> sp.	m
<i>Frommeella duchesneae</i> (Arth.) Yohem, Cummins & R. L. Gilbertson	c
<i>Phragmidium ivesiae</i> Syd. & P. Syd.	c, m
<i>Sphaerellopsis filum</i> (Biv.-Bern.:Fr.) Sutton on uredia of <i>Phragmidium ivesiae</i>	c
<i>Rosa arkansana</i> Porter var. <i>suffulta</i> (Greene) Cockerell	
<i>Cercospora rosicola</i> Pass.	c, m
<i>Phragmidium rosae-arkansanae</i> Diet.	c
<i>Phragmidium speciosum</i> (Fr.) Cooke	m
<i>Rubus flagellaris</i> Willd.	
<i>Kuehneola uredinis</i> (Link) Arth.	c
<i>Mycosphaerella rubi</i> Roark	c
<i>Septoria rubi</i> Westend.	c
Santalaceae	
<i>Comandra umbellata</i> (L.) Nutt.	
<i>Puccinia andropogonis</i> Schwein. var. <i>pustulata</i> (Curt.) Arth.	c, m
Scrophulariaceae	
<i>Veronicastrum virginicum</i> (L.) Farw.	
<i>Cercospora leptandrae</i> J.J. Davis	c
<i>Mycosphaerella</i> sp.	c
<i>Phoma exigua</i> Desm.	c
Verbenaceae	
<i>Verbena hastata</i> L.	
<i>Septoria verbenae</i> Rob. in Desm.	c, m
<i>Verbena stricta</i> Venten.	
<i>Erysiphe cichoracearum</i> DC.	m
<i>Septoria verbenae</i> Rob. in Desm.	m

sow Prairie State Preserve in Pocahontas County in 1990. It has persisted there but has not developed with the impact at Caylor Prairie. Diseased big bluestem plants were first observed at both sites of Steel Prairie State Preserve in 1990. It has been common in some years since then and has persisted in significant numbers. The first collection of the smut at Five Ridge Prairie State Preserve in Plymouth County was in 1993. It has persisted there and had increased in occurrence at one site. In 1996, kernel smut was found in one small area at Stinson Prairie State Preserve in Kossuth County. It has persisted there, but has been limited to that site.

Sheeder Prairie State Preserve had not become a site for *S. occidentalis* on big bluestem even though there is an extensive development of kernel smut each year on a planted prairie at Springbrook State Park only a few miles from Sheeder. Such a situation presents an optimum opportunity for dissemination by air-borne spores, but such a distribution has not occurred. Monitoring will be continued on these sites and on other prairie preserves that are peripheral to the known distribution of *S. occidentalis*.

The only fungus observed that colonized a young developing grass inflorescence to completely modify it was *Ustilago hypodytes*, a smut fungus which converts the inflorescence of *Stipa spartea* into a long white gall that breaks up releasing the dark dusty spore mass. All evidence of the presence of the fungus is soon lost. *U. hypodytes* was present on *S. spartea* at the Ames High (Pohl) Prairie State Preserve, at Cedar Hills Sand Prairie State Preserve, and at Sheeder Prairie State Preserve.

An interesting different group of smut fungi are the leaf inhabiting white smuts, species of *Entyloma*. These smuts develop rather vaguely delimited cream to white spots in leaves. Thick walled di-

lutely pigmented spores develop in the leaf mesophyll tissue and are released when the leaves die and disintegrate. *E. compositorum* was common on leaves of *Ratibida pinnata* on eight of the prairies but is rather inconspicuous and easily overlooked. Other species of *Entyloma* parasitize leaves of other host species in the Asteraceae, again forming vague lesions that are difficult to recognize.

A rare ascomycetous fungus, *Myriogenospora atramentosa*, has systemic mycelium in diseased *Sorghastrum nutans* plants that develops in the young inflorescences causing them to abort. The fungus then develops a stroma in which perithecia containing asci and ascospores are formed (Luttrell and Bacon 1977). *Myriogenospora* (White, Jr. and Glenn 1994) is a member of a unique assemblage of fungi that are parasitic on inflorescences of host plants or develop in individual florets of grasses, such as *Claviceps purpurea* which causes ergot on a number of grass hosts. *Myriogenospora atramentosa* was collected only once from Sheeder Prairie. The only other encounter with *Myriogenospora atramentosa* was a young collection several years ago on *Sorghastrum nutans* at Freda Haffner Kettlehole Prairie Preserve. The modified inflorescence soon weathers away and evidence of presence of the fungus is lost or easily overlooked.

An obscure, but quite common, interesting ascomycete occurs on the leaves and stems of *Artemisia ludoviciana*. *Nematostoma occidentalis* produces ascocarps among the numerous leaf hairs and gives a gray appearance to the total plant. The ascocarps have appendages on the upper part, somewhat resembling those of a powdery mildew. If host plants are extensively colonized, the diseased plants are distinctively stunted. *N. occidentalis* was found on all of the prairies where the host plant occurred.

The leaf and stem parasitic ascomycete *Parodiella bedysari* on *Des-*

Table 7. Fungus index of parasitic fungi on plants of two Iowa sand prairies. (c = Cedar Hills Sand Prairie, m = Marietta Sand Prairie).

Fungus Taxon	Prairie
<i>Ampelomyces quisqualis</i> Cs.:Schlecht.	
<i>Erysiphe cichoracearum</i> DC. on <i>Aster</i> sp.	m
<i>Ascochyta brachypodii</i> (Syd.) Sprague & A.G. Johnson	
<i>Andropogon gerardii</i> Vitm.	c, m
<i>Schizachyrium scoparium</i> (Michx.) Nash	c
<i>Ascochyta compositarum</i> J.J. Davis	
<i>Aster</i> sp.	c
<i>Ascochyta</i> sp.	
<i>Euthamia graminifolia</i> (L.) Nutt. ex Cass.	m
<i>Asteromella andrewsii</i> Petr. in J.J. Davis	
<i>Gentiana andrewsii</i> Griseb.	c, m
<i>Cercoseptoria iridis</i> (Ell. & Halst.) H.C. Greene	
<i>Iris sbovei</i> Small	c
<i>Cercospora clavata</i> (W. Gerard) Cooke	
<i>Asclepias incarnata</i> L.	c
<i>Cercospora latens</i> Ellis & Everh.	
<i>Lespedeza capitata</i> Michx.	m
<i>Cercospora leptandrae</i> J.J. Davis	
<i>Veronicastrum virginicum</i> (L.) Farl.	c
<i>Cercospora omphacodes</i> Ell. & Holw.	
<i>Phlox pilosa</i> L.	c
<i>Cercospora prenanthis</i> Ell. & Kellerm.	
<i>Prenanthes racemosa</i> Michx.	c
<i>Cercospora rosicola</i> Pass.	
<i>Rosa arkansana</i> Porter var. <i>suffulta</i> (Greene) Cockerell	c, m
<i>Cercospora vexans</i> Massal.	
<i>Fragaria virginiana</i> Duchesne	c, m
<i>Cercospora</i> sp.	
<i>Potentilla simplex</i> Michx.	m
<i>Cercosporidium graminis</i> (Fuckel) Deighton	
<i>Stipa spartea</i> Trin.	m
<i>Coleosporium asterum</i> (Diet.) Syd. & P. Syd.	
<i>Aster ericoides</i> L.	c
<i>Aster puniceus</i> L.	m
<i>Aster</i> sp.	c
<i>Solidago canadensis</i> L.	m
<i>Solidago</i> sp.	c
<i>Colletotrichum caudatum</i> (Sacc.) Pk.	
<i>Andropogon gerardii</i> Vitm.	m
<i>Sorghastrum nutans</i> (L.) Nash	c, m
<i>Colletotrichum graminicola</i> (Ces.) G.W. Wils.	
<i>Eragrostis</i> sp.	c
<i>Panicum virgatum</i> L.	c, m
<i>Sorghastrum nutans</i> (L.) Nash	m
<i>Sporobolus</i> sp.	c
<i>Colletotrichum</i> sp.	
<i>Schizachyrium scoparium</i> (Michx.) Nash	c
<i>Dilophospora alopecuri</i> (Fr.:Fr.) Fr.	
<i>Calamagrostis canadensis</i> (Michx.) Beauv.	c
<i>Diplocarpon earlianum</i> (Ell. & Everh.) F.A. Wolf	
<i>Fragaria virginiana</i> Duchesne	c
<i>Elsinoë panici</i> Tiff. & Mathre	
<i>Panicum virgatum</i> L.	c, m
<i>Entyloma compositarum</i> Farl.	
<i>Ratibida pinnata</i> (Vent.) Barnh.	m
<i>Entyloma thalictri</i> J. Schrot. in Cohn	
<i>Thalictrum dasycarpum</i> Fisch. & Ave-Lall.	m

Table 7. Continued.

Fungus Taxon	Prairie
<i>Erysiphe cichoracearum</i> DC.	
<i>Ambrosia trifida</i> L.	c
<i>Aster ericoides</i> L.	c
<i>Aster</i> sp.	m
<i>Cirsium</i> sp.	m
<i>Helianthus groseserratus</i> G. Martens	c, m
<i>Helianthus rigidus</i> (Cass.) Desf.	c, m
<i>Monarda fistulosa</i> L.	c, m
<i>Verbena stricta</i> Vent.	m
<i>Erysiphe polygoni</i> DC.	
<i>Thalictrum dasycarpum</i> Fisch. & Ave-Lall.	m
<i>Frommeella duchesneae</i> (Arth.) Yohem, Cummins & R.L. Gilbertson	
<i>Potentilla simplex</i> Michx.	c
<i>Fusicladium fasciculatum</i> Cooke & Ellis	
<i>Euphorbia dentata</i> Michx.	c
<i>Kuehneola uredinis</i> (Link) Arth.	
<i>Rubus flagellaris</i> Willd.	c
<i>Leptosphaeria heliopsisidis</i> (Schwein.:Fr.) L. Holm	
<i>Helianthus rigidus</i> (Cass.) Desf.	m
<i>Leptosphaeria</i> sp.	
<i>Solidago</i> sp.	c
<i>Leptostromella andropogonis</i> Dearn. & House	
<i>Schizachyrium scoparium</i> (Michx.) Nash	c
<i>Marssonina fragariae</i> (Lib.) Kleb.	
<i>Potentilla recta</i> L.	c
<i>Microsphaera diffusa</i> Cooke & Pk.	
<i>Desmodium canadense</i> (L.) DC.	c
<i>Mycosphaerella andrewsii</i> (Sacc.) J.J. Davis	
<i>Gentiana andrewsii</i> Griseb.	m
<i>Mycosphaerella rubi</i> Roark	
<i>Rubus flagellaris</i> Willd.	c
<i>Mycosphaerella</i> sp.	
<i>Calamagrostis canadensis</i> (Michx.) Beauv.	c
<i>Equisetum laevigatum</i> A. Br.	m
<i>Veronicastrum virginicum</i> (L.) Farw.	c
<i>Nematostoma occidentalis</i> (Ell. & Everh.) Barr	
<i>Artemisia ludoviciana</i> Nutt.	c, m
<i>Pboma exigua</i> Desm.	
<i>Veronicastrum virginicum</i> (L.) Farw.	c
<i>Phragmidium ivesiae</i> Syd. & P. Syd.	
<i>Potentilla recta</i> L.	c
<i>Potentilla simplex</i> Michx.	c, m
<i>Phragmidium rosae-arkansanae</i> Diet.	
<i>Rosa arkansana</i> Porter var. <i>suffulta</i> (Greene) Cockerell	c
<i>Phragmidium speciosum</i> (Fr.) Cooke	
<i>Rosa arkansana</i> Porter var. <i>suffulta</i> (Greene) Cockerell	m
<i>Phyllachora graminis</i> (Pers.:Fr.) Nitschke	
<i>Calamagrostis canadensis</i> (Michx.) Beauv.	c, m
<i>Phyllachora lespedezae</i> (Schwein.) Cooke	
<i>Lespedeza capitata</i> Michx.	c
<i>Phyllachora luteo-maculata</i> (Schwein.) Orton	
<i>Andropogon gerardii</i> Vitm.	c
<i>Phyllachora paspalicola</i> Henn.	
<i>Paspalum setaceum</i> Michx. var. <i>ciliatifolium</i> (Michx.) Vasey	c, m
<i>Phyllachora punctum</i> (Schw.) Orton & F. Stevens	
<i>Dichanthelium linearifolium</i> (Scribner) Gould	c
<i>Phyllosticta</i> sp.	
<i>Aster umbellatus</i> Miller	c
<i>Sorghastrum nutans</i> (L.) Nash	m

Table 7. Continued.

Fungus Taxon	Prairie
<i>Puccinia andropogonis</i> Schwein.	
<i>Andropogon gerardii</i> Vitm.	c, m
<i>Schizachyrium scoparium</i> (Michx.) Nash	c
<i>Puccinia andropogonis</i> Schwein. var. <i>pustulata</i> (Curt.) Arth.	
<i>Comandra umbellata</i> (L.) Nutt.	c, m
<i>Puccinia anemones-virginianae</i> Schwein.	
<i>Anemone canadensis</i> L.	c
<i>Anemone cylindrica</i> A. Gray	c
<i>Puccinia angustata</i> Pk.	
<i>Scirpus atrovirens</i> Willd.	c
<i>Scirpus cyperinus</i> (L.) Kunth	
<i>Puccinia atrofusca</i> (Dudl. & Thomp.) Holw.	
<i>Artemisia ludoviciana</i> Nutt.	c
<i>Puccinia cnici-oleracei</i> Pers.	
<i>Aster</i> sp.	m
<i>Puccinia coronata</i> Corda	
<i>Paspalum setaceum</i> Michx. var. <i>ciliatifolium</i> (Michx.) Vasey	m
<i>Puccinia cyperi</i> Arth.	
<i>Erigeron strigosus</i> Muhl. ex Willd.	m
<i>Puccinia dayi</i> G.W. Clinton	
<i>Lysimachia ciliata</i> L.	m
<i>Puccinia emaculata</i> Schwein.	
<i>Euphorbia corollata</i> L.	c
<i>Panicum virgatum</i> L.	c, m
<i>Puccinia helianthi</i> Schwein.	
<i>Helianthus grosseserratus</i> G. Martens	c, m
<i>Helianthus ridigus</i> (Cess.) Desf.	c
<i>Puccinia menthae</i> Pers.:Pers.	
<i>Monarda fistulosa</i> L.	c, m
<i>Pycnanthemum virginianum</i> (L.) Dur. & Jackson	c, m
<i>Puccinia polygoni-amphibii</i> Pers.:Pers.	
<i>Polygonum amphibium</i> L. var. <i>emersum</i> Michx.	c
<i>Puccinia pulsatillae</i> Kalchbr.	
<i>Pulsatilla patens</i> (L.) P. Miller spp. <i>multifida</i> (Pritz.) Zamels	c
<i>Puccinia recondita</i> Rob. ex Desm.	
<i>Thalictrum dasycarpum</i> Fisch. & Ave-Lall.	m
<i>Puccinia tanacetii</i> D.C.	
<i>Artemisia ludoviciana</i> Nutt.	c
<i>Puccinia virgata</i> Ell. & Everh.	
<i>Sorghastrum nutans</i> (L.) Nash	c
<i>Pyrenophora</i> sp.	
<i>Eragrostis</i> sp.	c
<i>Rhizisma solidaginis</i> Schwein.	
<i>Euthamia graminifolia</i> (L.) Nutt. ex Cass.	c
<i>Septocylindrium concomitans</i> (Ell. & Holw.) Halst. in Seym. & Earle	
<i>Bidens vulgata</i> Greene	m
<i>Septoria conspicua</i> Ell. & G. Martin in Martin	
<i>Lysimachia ciliata</i> L.	m
<i>Septoria liatridis</i> Ell. & J.J. Davis	
<i>Liatris aspera</i> Michx.	c
<i>Septoria phlogis</i> Sacc. & Speg.	
<i>Phlox maculata</i> L.	c
<i>Septoria purpurascens</i> Ell. & G. Martin in G. Martin	
<i>Potentilla arguta</i> Pursh	c
<i>Potentilla recta</i> L.	c
<i>Septoria rubi</i> Westend.	
<i>Rubus flagellaris</i> Willd.	c
<i>Septoria rudbeckiae</i> Ell. & Halst.	
<i>Rudbeckia subtomentosa</i> Pursh	m

Table 7. Continued.

Fungus Taxon	Prairie
<i>Septoria verbenae</i> Rob. in Desm.	
<i>Verbena hastata</i> L.	c, m
<i>Verbena stricta</i> Vent.	m
<i>Sphaerellopsis filum</i> (Biv.-Bern.:Fr.) Sutton	
<i>Coleosporium asterum</i> (Diet.) Syd. & P. Syd. uredia on <i>Solidago</i> sp.	c
<i>Phragmidium ivesiae</i> Syd. & P. Syd. uredia on <i>Potentilla simplex</i> Michx.	c
<i>Puccinia emaculata</i> Schwein. uredia on <i>Panicum virgatum</i> L.	c
<i>Puccinia menthae</i> Pers.:Pers. uredia on <i>Pycnanthemum virginianum</i> (L.) Dur. & Jack.	c, m
<i>Sphaerophoma brencklei</i> Petr.	
<i>Helianthus rigidus</i> (Cass.) Desf.	m
<i>Stagonospora baptisiae</i> (Ell. & Everh.) J.J. Davis	
<i>Baptisia lactea</i> (Raf.) Thieret	c
<i>Stagonospora simplicior</i> Sacc. & Briard	
<i>Andropogon gerardii</i> Vitm.	c, m
<i>Dichanthelium linearifolium</i> (Scribner) Gould	c
<i>Schizachyrium scoparium</i> (Michx.) Nash	c
<i>Sorghastrum nutans</i> (L.) Nash	c, m
<i>Tapbrina potentillae</i> (Farl.) Johans.	
<i>Potentilla recta</i> L.	c
<i>Urohendersonia stipae</i> H.C. Greene	
<i>Stipa spartea</i> Trin.	c
<i>Uromyces euphorbiae</i> Cke. & Pk. in Peck	
<i>Euphorbia corollata</i> L.	c
<i>Uromyces hedysari-paniculati</i> (Schwein.) Farl. in Ellis	
<i>Desmodium canadense</i> (L.) DC.	c
<i>Uromyces lespedezae-procumbentis</i> (Schwein.) M.A. Curtis	
<i>Lespedeza capitata</i> Michx.	c
<i>Ustilago hypodytes</i> (Schlect.) Fr.	
<i>Stipa spartea</i> Trin.	c

modium canadense was reported earlier from Stinson Prairie (Tiffany et al. 1990) and from Decorah, Ames, and Estherville (Gilman and Archer 1929) in the 1880s. It was found to be consistently common at Kalsow Prairie State Preserve and at Steele Prairie State Preserve, particularly in the swales and lower areas of these prairies in the same habitat in which it had been observed at Stinson Prairie State Preserve earlier. Black mycelium and ascocarps may completely cover the leaves and stems, often resulted in greatly stunted plants (Hughes 1958). It does not occur in the upland areas of these prairies even though *D. canadense* may be quite common.

Populations of *Panicum virgatum* were often host to the ascomycetous foliar pathogen *Elsinoë panici*, initially named from Iowa material (Tiffany and Mathre 1961). Black stromatic areas on the leaves coalesce severely limiting the photosynthetic area of the leaves. There is a wide range of susceptibility in host populations to this pathogenic fungus. Development on susceptible hosts will result in extensive leaf loss and might eliminate these host populations. *E. panici* is widespread in Iowa on native switchgrass (Gabel and Tiffany 1987), but does not develop to any extent on a commercial variety of switchgrass (Gravert and Munkvold 2002) in Iowa.

An introduced fungus, *Beniowskia sphaeroidea*, was found on a planting of a commercial variety of switchgrass in a wildlife area in Monona County in 1994. The fungus has been eliminated from this site when it was plowed to plant corn. The only previous report of occurrence was also in a planted stand of *P. virgatum* at the Iowa Lakeside Laboratory in Dickinson County in 1993. The fungus develops white cottony tufts on either side of leaves and is quite conspicuous. Heavily diseased leaves become chlorotic and die. This fun-

gus has persisted on this planting site but has not spread to switchgrass in an adjacent native prairie area.

Plant parasites play a significant role in the dynamic changes that are constantly developing in the prairie ecosystem. Special patterns of both hosts and parasites are influenced and modified by fluctuations in the environment (Burdon 1992). Within a given host species population host responses may vary from highly susceptible to resistant. If only susceptible genotypes are present, both the host plant and the parasitic fungus may be eventually eliminated from a prairie. Even for fungi with air-borne spores, distance between prairie remnants may make it unlikely that reestablishment of the fungus will occur.

Some fungi may have a broad distribution pattern but still are uncommon or even rare. These may have very specific nutritional or environmental requirements and can survive only in niches which provide the particular combination of components. A small prairie remnant may not provide the diversity of local sites required to allow development of the parasitic fungus. Even if susceptible hosts are present, enough fungus propagules, usually spores, must be available to establish the parasite. Assuming that a fungal spore lands on a susceptible host, spore germination, penetration and colonization of the host and production of spores must occur if the fungus is to be successful. Although air-borne spores are the usual units of dispersal fungal spores may be dependent on rain splash or on animal or insect dispersal. Given a patchy distribution of host plants, annual and perennial, some fungi may have been disrupted in distribution since the breaking of the prairie for cultivation.

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