

NOTES ON WISCONSIN PARASITIC FUNGI. XXVIII*

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The collections referred to in this series of notes were, unless indicated otherwise, made during the season of 1961. A considerable number of the fungus specimens cited were noted on phanerogamic specimens in the University of Wisconsin Herbarium and are designated (U. W. Phan.).

Undetermined powdery mildews have been noted on the following hosts, not previously reported as bearing any of these fungi in Wisconsin: *Eupatorium altissimum*. Dane Co., near Lodi, September 22, 1946. Coll. M. H. Ingraham (U. W. Phan.); *Ranunculus fascicularis*. Dane Co., near Cross Plains, May 23. A very early date for powdery mildews in this area; *Valeriana officinalis* (cult.). Sauk Co., Baraboo, July 15. Coll. K. C. Nelson. Very destructive on this host.

SPHAEROTHECA HUMULI (DC.) Burr. has been considered to be the powdery mildew infecting roses in Wisconsin. However, D. L. Coyier of the University of Wisconsin Plant Pathology Department, who has made an intensive study of the biology and control of rose powdery mildew, is unable to differentiate satisfactorily, on a morphological basis, between *S. humuli* and *S. pannosa* (Wallr.) Lev. The latter has been widely reported in Europe as the principal, if not the only, powdery mildew of roses there.

SPHAEROTHECA HUMULI (DC.) Burr., as the late J. J. Davis once pointed out, seems to produce cleistothecia on *Rubus* in Wisconsin only on *R. parviflorus* and *R. pubescens* (*triflorus*), and is common on the last-named only. Powdery mildews on other Wisconsin species of *Rubus*, although labeled *S. humuli*, have conidia only and their identification must be considered as tentative. In three successive years in June in the Madison School Forest near Verona, Dane Co., the writer has observed a massive development of powdery mildew amphigenously on leaves of *Rubus allegheniensis*, which commonly also bear the *Caeoma* stage of *Gymnoconia peckiana* which, in turn, is usually parasitized by *Tuberculina*. Most of the infected shoots are killed back, but on such as persist not even incipient development of cleistothecia has been noted in the course of periodic inspection of the host plants throughout the growing

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season and, in fact, by mid-July there is little evidence remaining of the earlier powdery mildew infection.

SCORIAS SPONGIOSA (Schw.) Fr. on *Pinus strobus* was collected in August at Roche a Cri State Park, Adams Co., by J. D. Rogers of the University of Wisconsin Plant Pathology Department. Rogers believes the fungus is mildly parasitic on this host, and it may be so, as it occurs on the green needles in very sharp and well-defined fashion, as opposed to the "messy" superficial development so often characteristic of sooty molds.

MYCOSPHAERELLA sp., believed to be probably connected with *Cylindrosporium interstitialis* Greene (Trans. Wis. Acad. Sci. Arts Lett. 42:79. 1953), developed on overwintered leaves of *Spartina pectinata*, collected at the type station of *C. interstitialis* in the University of Wisconsin Arboretum at Madison, April 13, and held in a moist chamber for two weeks. The host plants had been under observation late in the preceding fall, at which time they still showed traces of the *Cylindrosporium* infection, which has appeared regularly every year, plus extensive development of the immature perithecia in the same areas on the leaves. Mature perithecia are black, subglobose, ostiolate, intercostal and seriate in long rows, and are approx. 85–100 μ diam. Asci are hyaline, clavate, straight or curved, 40–45 x 9–11 μ , the ascospores subhyaline, uniseptate, subfusoid, 11–13 x 3.5–4 μ . This is plainly not *Sphaerella spartinae* Ell. & Ev., described as having elliptical perithecia, 100–112 x 170–190 μ . A further specimen collected in early September 1961 reinforces my impression that there is a connection, for here the *Cylindrosporium* is abundantly present and the presumptive perithecia, which contain many micronidia, are developing in direct association with it.

LEPTOSPHAERIA sp. which possibly developed parasitically occurs on oval, dark purplish-bordered ashen spots on *Schizachne purpurascens*, collected by J. J. Davis near Laona, Forest Co., July 13, 1915. The blackish, globose perithecia are epiphyllous and gregarious, approx. 150 μ diam. The asci are short-pedicellate and narrowly cylindrical, 65–70 x 8–9 μ . The greenish-olivaceous ascospores are about 25 x 5 μ and rather obscurely 5–7 septate.

NECTRIA CINNABARINA (Tode) Fr., with its accompanying *Tubercularia* stage, occurred in profusion on dead upper portions of otherwise still living stems of *Solanum dulcamara* at Madison, October 24, and may have been parasitic.

PHACIDIUM BALSAMEAE J. J. Davis (Trans. Wis. Acad. Sci. Arts Lett. 20:424. 1922) described on *Abies balsamea* from Vilas Co. has been studied by R. P. Korf, who states that the fungus belongs under *Sarcotrochila* Hoehn. of the Hemiphacidiceae.

PUCCINIASTRUM AMERICANUM (Farl.) Arth. II, III has been noted heavily infecting the fruits of cultivated red raspberries of the everbearing type in a specimen collected by G. C. Klingbiel in October at Westfield, Marquette Co.

MELAMPSORA (MEDUSAE Thum. ?) III was collected on *Populus nigra* var. *italica* at Madison, October 24. Oudemans reports *Melampsora* on Lombardy poplar in Europe and the U. S. D. A. Index of Plant Diseases lists *M. medusae* on the black poplar group in Massachusetts, Missouri and Pennsylvania.

Phyllostictae, undetermined as to species, have been collected on several hosts as follows: 1) On *Podophyllum peltatum* at Gov. Dodge State Park, Iowa Co., July 20. Pycnidia are on broad, distal reddish-brown dead areas of the leaf lobes, hypophyllous, clustered, black, globose, widely ostiolate, approx. 65–100 μ diam. with hyaline, rod-shaped microconidia, .6–1 x 3.5–5 μ . 2) On *Rubus allegheniensis*, near Verona, Dane Co. August 3. Spots are dull reddish-brown, often with a yellowish halo, wedge-shaped and involving the entire apical area of a leaflet, orbicular, or oval-elongate, approx. .7–1.5 cm. wide by up to 3 cm. long. Pycnidia very inconspicuous, scattered, pallid, visible only by transmitted light, subglobose, about 100–175 μ diam., the conidia hyaline, variable, from almost isodiametric to long-cylindric, 5–11 x 2–3.5 μ . Mostly on, but not confined to, small, 3-foliolate, axillary leaves produced near the tips of the fruiting canes. Except for the size of the pycnidia, 100–175 vs. 60–85 μ , this is quite similar to a fungus on *Rubus strigosus*, discussed in an earlier note (Trans. Wis. Acad. Sci. Arts Lett. 47:121. 1958). 3) On *Angelica atropurpurea* collected near Swan Lake, Pacific Twp., Columbia Co., July 18. This is definitely not *Phyllosticta angelicae* Sacc., a microconidial form mentioned in my Notes IX (Trans. Wis. Acad. Sci. Arts Lett. 38:240. 1946). In the current specimen the spots are rounded, sordid-brownish below but somewhat paler above, with narrow darker margins, about 1 cm. diam. The thin-walled, carneous, subglobose pycnidia are about 100 μ diam., hypophyllous and scattered, the conidia hyaline, broadly ellipsoid or short-cylindric, (3.5–)4–6(–7) μ . 4) On *Valeriana edulis* at the Faville Prairie Preserve near Lake Mills, Jefferson Co., September 20. In small amount on ashen to brownish orbicular spots about 1 cm. diam. Pycnidia are pallid-brownish, subglobose, approx. 100 μ diam., with a large ostiole about 15 μ diam. marked by a ring of darker cells. Conidia hyaline, often biguttulate, oblong, narrow-ellipsoid or subfusoid, approx. 4–6 x 2–3 μ . 5) On *Campanula rotundifolia* collected at Nelson Dewey State Park near Cassville, Grant Co., September 19, on dead current season's leaves and still green stems. Pycnidia black, globose, non-ostiolate, about 85–100 μ diam.,

closely gregarious on both leaves and stems. Conidia are hyaline and rod-shaped, 4–6 x 1–2 μ . It seems possible this may be identical with *Phoma groenlandica* Allesch., described as occurring on dead stems of *C. rotundifolia* from Greenland, which has conidia ovoid-oblong or oblong, 5–6 x 1.5–3 μ . There seems no question that the Wisconsin specimen developed parasitically. 6) On *Aster sagittifolius* from Gibraltar Rock County Park, Columbia Co., August 7. The spots are small and purplish with ashen centers, the pycnidia epiphyllous, pallid, small, about 75 μ diam. Conidia are hyaline, broadly ellipsoid, 1.8–2 x 3.5–4 μ . Very similar to a *Phyllosticta* on *Aster novae-angliae* mentioned in my Notes XXIV (Trans. Wis. Acad. Sci. Arts Lett. 47:102. 1958). The latter, however had slightly larger conidia.

CONIOTHYRIUM sp., possibly parasitic, occurred on *Rubus occidentalis* near Cross Plains, Dane Co., June 17, 1960. The small, irregularly rounded or angled spots are often confluent in lines and are sordid whitish with narrow red, or reddish-brown, margins. The pycnidia are epiphyllous, sparingly scattered on the spots, dark brown, widely ostiolate, approx. 100–125 μ diam. The deep-greenish spores are broadly ellipsoid, 4–5 x 2.5–3 μ .

CONIOTHYRIUM sp., on the decolorized fruits and involucre bracts of *Cornus obliqua*, collected by R. Peters near Merrimac, Sauk Co., August 24, 1958, suggests a parasitic development. The black, globose pycnidia are almost superficial and are gregarious on the affected tissue. The olivaceous conidia are broadly ellipsoid, 4.5–6 x 3–4 μ . (U. W. Phan.)

ASTEROMA PADI Grev. is evidently common on *Prunus padus* in Europe. In Wisconsin a macroscopically similar and very conspicuous *Asteroma*-like fungus occurs commonly in the fall on leaves of *Prunus serotina*, but so far no fruiting has been noted, so identity remains speculative.

ASTEROMA TILIAE Rud., or what is taken to be that species, is quite common on *Tilia americana* in Wisconsin and elsewhere in North America. The fungus was originally described on a specimen on *Tilia europea* from Bavaria and since there was no fruiting in the type specimen it would seem to be of dubious validity. In American specimens the radiating fibrillae of a typical *Asteroma* are usually evident only in rather immature, early-season collections. Later, the lesions appear as large, fuscous, orbicular blotches which may or may not, still provide a suggestion of *Asteroma*, but which, in numerous North American specimens examined, have always shown characteristic pycnidia, usually discernible, however, only on the lower side of the leaf. The pycnidia are scattered to gregarious, rather thin-walled, pallid-brownish, apparently non-ostiolate, but

with the wall tending to be imperfectly formed at a point adjacent to the host epidermis. Pycnidia are very deeply seated, usually occupying most, or all, of the space from epidermis to epidermis. They are globose, subglobose, or somewhat flattened, approx. (70–)90–110 (–125) μ diam. The conidiophores are rather loosely ranked, vaguely bottle-shaped, hyaline structures, about 10–15 x 3–5 μ , which almost completely line the pycnidial cavity. The conidia are hyaline, short-cylindric or slightly curved and subballantoid, (3–)4–5 (–6) x (1.3–)1.5–2 μ . Occasional larger, hyaline, subfusoid conidia have been observed in a few mounts, but none have been seen in place within a pycnidium, so their origin is uncertain. Of six European specimens in the University of Wisconsin Cryptogamic Herbarium only one, on *Tilia platyphylla*, shows any fruiting. Here the pycnidia are from 125–150 μ diam., distinctly larger than in American specimens, and they are moreover rather plainly ostiole, while the conidia are smaller, approx. 4–4.5 (–5) x 1.2–1.5 (–1.8) μ . Thus, it is morphologically close to, but apparently not identical with, the fungus on *Tilia americana*. Clements and Shear indicate that a decisive key character in *Asteroma* is lack of an ostiole, but this is not specified in the generic description.

STAGONOSPORA sp. occurs on pallid areas of overwintered leaves of *Carex trichocarpa*, collected in the University of Wisconsin Arboretum at Madison, March 16, 1961. The scattered to subseriate, subglobose, black pycnidia are about 200–225 μ diam. and the hyaline, broadly subfusoid conidia mostly 2–3, occasionally 4-septate, 40–50 x (6.5–)7.5–8.5 μ . This infection had been noted in the fall of 1960, but at the time of inspection such pycnidia as were examined did not have the contents delimited, and the plants were marked for future reference. In the material as brought in from the field in the spring conidia were poorly defined, but after the leaves had been in a moist chamber for 48 hours very good conidial development was noted, with the septa clear and sharply defined.

SEPTORIA sp. occurs on the brownish tips of otherwise still living leaves of *Castilleja coccinea*, collected by M. F. Johnson near Bancroft, Portage Co., June 23. The gregarious pycnidia are thin-walled, grayish, inconspicuous, subglobose, small, about 50–70 μ diam. The hyaline spores appear continuous or rarely obscurely septate and are straight and somewhat larger at one end than at the other, 15–21 x 1–1.5 μ . I have found no report of any *Septoria* on this or other species of *Castilleja*.

COLLETOTRICHUM sp., which appears parasitic, is on leaves of *Apios tuberosa* collected near Juda, Green Co., August 12. The conspicuous spots are orbicular to somewhat angled, dull reddish-brown and mottled with lighter areas, approx. .5–1 cm. diam. The acervuli

are small, scattered to gregarious, amphigenous, loosely organized, with from a single seta to half a dozen or so in a cluster, where they are moderately divergent, tapered uniformly from base to pointed tip, slightly sinuous, but in overall appearance straight and rigid, uniform clear brown, not appreciably paler near tip, 1-2 septate, approx. 65-85 x 4.5-5 μ . The conidia are hyaline, cylindrical to subfusoid, contents granular, (10-)12-13 x 3-4.5 μ .

CYLINDROSPORIUM RUBI Ell. & Morg. was abundantly present on fruiting canes of dead and dying *Rubus* (cult. red raspberry) collected July 27 near Mt. Horeb, Dane Co. In section the acervuli are subepidermal and deeply seated in the corky layer. Whether the fungus was primary is somewhat doubtful, as the dry, cold, open winter of 1960-61 was very hard on many cultivated woody plants, and the plants in question were on a high, exposed site.

BOTRYTIS sp., possibly parasitic, was present in heavy development on terminal portions of leaves of *Hyacinthus orientalis* (cult.) near Cross Plains, Dane Co., June 9. It does not appear to be the same species often found on tulips in this region.

HELMINTHOSPORIUM sp. occurs on small, oval, grayish-brown spots on leaves of *Agrostis alba* collected near LaValle, Sauk Co., July 8. On heavily infected leaves the spots merge, with die-back of the entire leaf. The cylindrical or subcylindrical conidia are pallid grayish-brown, with hilum recessed, 55-75 x 11.5-13.5 μ , 4-6, mostly 5 septate, with little or no constriction at the septa. The conidiophores are dark brown below, from almost straight to somewhat tortuous, 2-3 times geniculate near the paler tip, about 140-215 x 7-8 μ , 4-7 septate, arising scattered individually, not in tufts. The spores seem similar in general characters to those described for *Helminthosporium gramineum* Rabh., but that species has the phores definitely tufted. Obviously not *H. sativum* Pamm., King & Bakke.

CERCOSPORA sp. occurred on leaves of *Salix adenophylla* (cult.) collected in the University of Wisconsin Arboretum at Madison, September 3. There are usually one to two or three spots per leaf. The spots are small, 1-2 mm. diam., with narrow dark borders and somewhat sunken whitish centers. The conidiophores are amphigenous, but mostly epiphyllous, in dense but spreading fascicles which are gregarious and mostly about 25-30 μ diam. at the base, but without any definite stroma. Viewed individually by transmitted light the conidiophores are pale olivaceous, non-septate, or rarely 1-septate, spreading and often tortuous and markedly geniculate near the tip, approx. 40-75 x 3.5-4.5 μ , many per fascicle. The better developed conidia are narrowly obclavate below, long-tapering toward the apex, truncate at base, hyaline, indistinctly multi-

septate, up to $100 \times 4.5 \mu$. Others are merely obclavate, approx. $25\text{--}35 \mu$ long, with the tips somewhat obtuse, truncate at base and about 3-septate. This does not correspond with either of the two species that Chupp mentions as occurring on *Salix* in his monographic treatment of *Cercospora*. These are *C. salicina* Ell. & Ev. and *C. salicis* Chupp & Greene, the latter based on a collection on *Salix alba* from Madison. The host plants were moved from the Lake Michigan shore in Manitowoc Co., and it is hoped it will be possible to visit this area to ascertain whether the fungus is naturally present there.

CERCOSPORA sp. has been noted on a phanerogamic specimen of *Primula mistissinica* Michx. var. *noveboracensis* Fern., collected by N. C. Fassett near Somerset, St. Croix Co., June 2, 1935. The numerous spots are sordid brownish and rounded and the infected leaves have been mostly killed back. The conidiophores are in small fasciclose from small stromata, olivaceous-brown, straight, approx. $12\text{--}25 \times 3\text{--}3.5 \mu$. Conidia few remaining, those seen subhyaline, slender-obclavate, truncate at base, approx. $35\text{--}45 \times 2.5\text{--}3 \mu$, 2-3 septate. Chupp mentions only *C. primulae* Fautr. as described on *Primula*, and he considers it to be a species of *Ramularia*, which this specimen certainly cannot be.

CERCOSPORA sp. occurs on *Valeriana edulis* collected September 20 at the Faville Prairie Preserve near Lake Mills, Jefferson Co. The sharply defined spots are rounded or oval with ashen-brown centers and dark brown borders, small, mostly about 2-3 mm. diam., and usually only one or two per leaf. The epiphyllous conidiophores are olivaceous-brown below, somewhat paler above, widely spreading in clusters of approx. 5-15 from a small, compact, dark brown, substomatal stroma. The phores are decidedly geniculate and somewhat tortuous, about 5-7 septate, $95\text{--}140 \times 4\text{--}5 \mu$. The conidia are hyaline, ranging from slender-obclavate and long-tapering to almost acicular, moderately curved, obscurely multiseptate, rounded at the base, with a noticeable scar, approx. $75\text{--}110 \times 3\text{--}4 \mu$. Most of the conidia had fallen away and only half a dozen were measured, but these seemed characteristic. Chupp, in his monographic treatment of the *Cercosporae*, does not list any species on *Valeriana*.

Leaves of *Rhus copallina*, in plantings in the University of Wisconsin Arboretum at Madison, September 30, 1960, were infected by a sporodochium-producing fungus, so far undetermined, but well-marked and evidently strongly parasitic (Plate III, Fig. 6). The lesions are large, approx. 1-4 cm. diam., orbicular, or irregularly elongate and marginal, light brownish or sordid brownish above and usually subzonate with a narrow dark margin, the adjacent leaf areas often bright red. On the underside of the leaf the

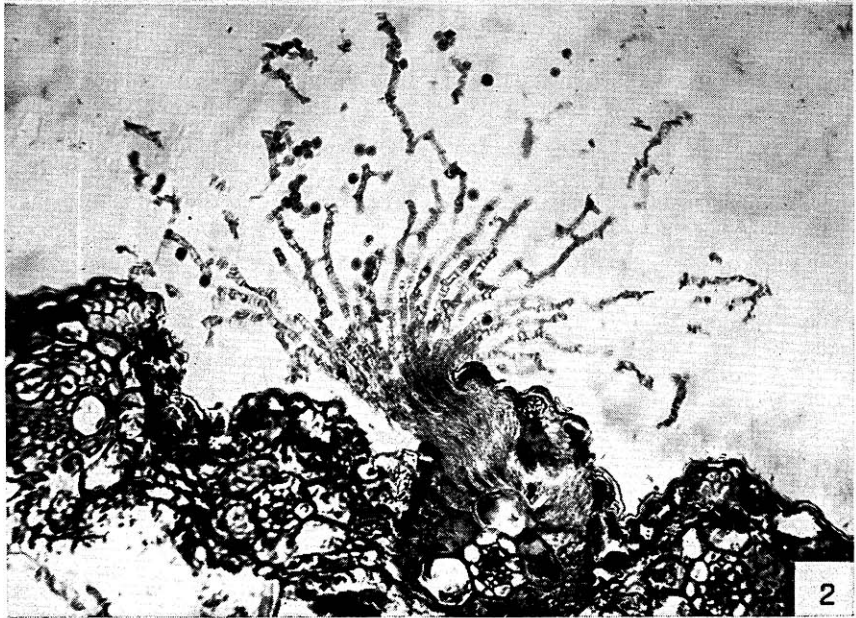
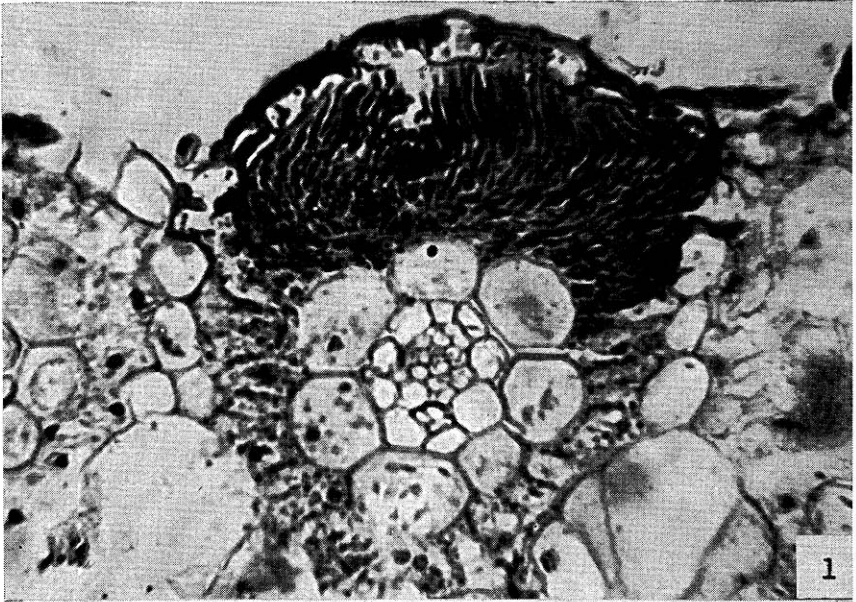


PLATE I

EXPLANATION OF FIGURES

Botrytis uredinicola Peck

FIGURE 1. Infection well advanced, but host epidermis still unruptured. The cells surrounding the vein sheath are filled with the hyphae of the parasite. Section 10 μ thick. \times 410.

FIGURE 2. Mature fungus, showing spreading, anastomosing conidiophores, with conidia. Section 10 μ thick. \times 235.

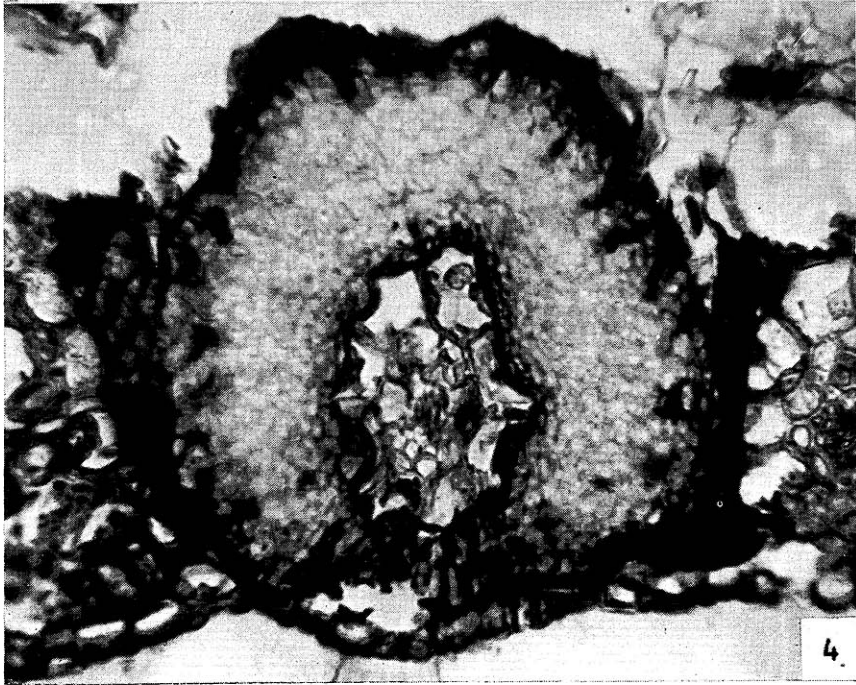
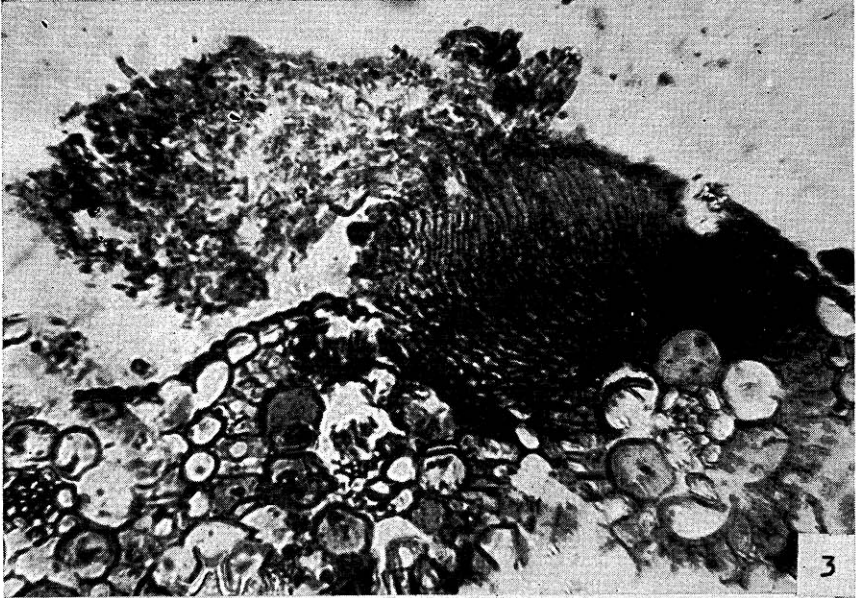


PLATE II

EXPLANATION OF FIGURES

Botrytis uredinicola Peck

FIGURE 3. Late season collection, showing breakdown of conidiophores and sclerotization of the mycelium around the veins. Section $15\ \mu$ thick. $\times 335$.

FIGURE 4. Overwintering stage, with vein completely enveloped and the sheath crushed. The pseudoparenchymatous inner cells are filled with granular material. Section $10\ \mu$ thick. $\times 425$.

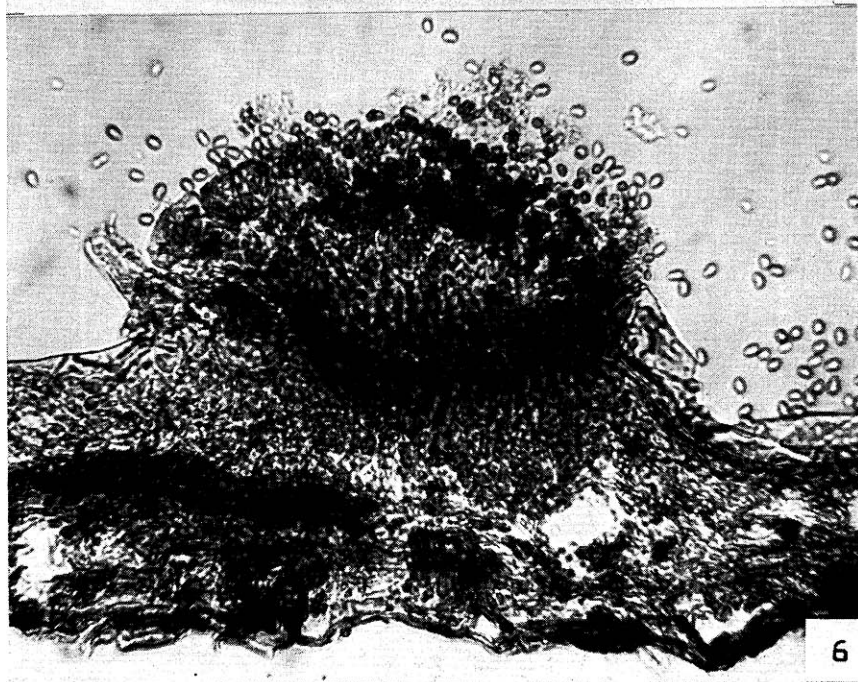
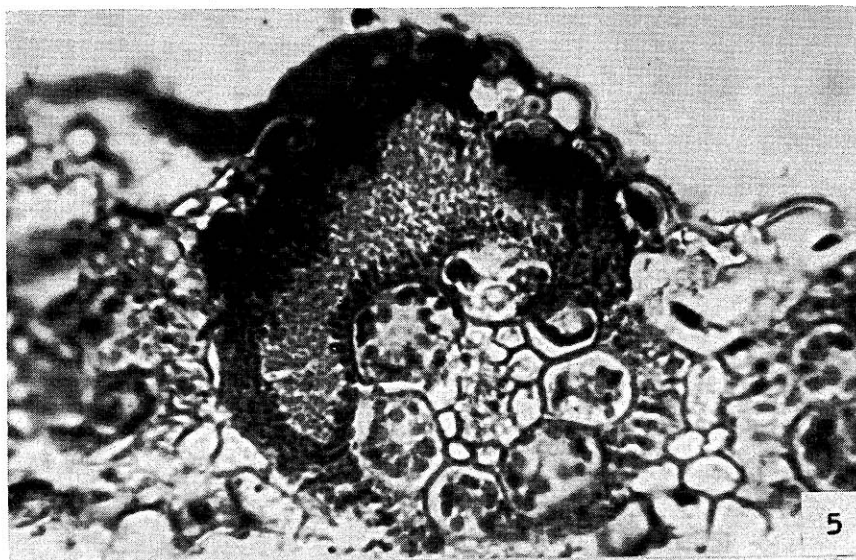


PLATE III

EXPLANATION OF FIGURES

FIGURE 5. *Botrytis uredinicola*. Microconidial stage. The microconidia are escaping in a cirrus, above and to the left. Section 10 μ thick. \times 420.

FIGURE 6. Habit photo of free-hand section, in mounting fluid, of sporoductium-forming fungus on *Rhus copallina*. \times 315.

lesions are uniformly fuscous, immarginate and not zonate. The sporodochia are amphigenous, but more conspicuous and noticeable when epiphyllous, scattered to gregarious, rounded above and pulvinate, dull blackish, subcuticular and intraepidermal, or perhaps in some cases subepidermal in origin, elevated, but variable and sometimes wider than high. Thus, one sporodochium was approx. 180 μ high by 250 μ wide, while another was 230 μ high by 190 μ wide. There are many where the overall dimensions are less, but the measurements given seem representative. The conidiophores are in such a compact, non-separable, deep-brownish mass as to make individual description impractical. The conidia are brownish-olivaceous, smooth, broadly ellipsoid, or rarely subfusoid, (3-) 3.5-4 (-4.5) x (4.5-)5-6(-7) μ , very numerous, but appearing non-catenulate.

SCLEROTIOMYCES COLCHICUS Woronichin, the photosynthesis-retarding sooty mold mentioned in several previous notes has been collected at Gov. Dodge State Park, Iowa Co., September 19, on the following additional plant leaf substrates: *Corylus americana*, *Ranunculus septentrionalis*, *Geum canadense*, *Acer saccharum*, *Viola* sp. and *Phryma leptostachya*.

Sanguinaria canadensis, collected near Poynette, Columbia Co., June 7, 1960, bears numerous small, rounded to short-oblong, dark-bordered, ashen-brown spots on the still-green leaves. Present on the spots are *Phyllostictas*, a well-defined *Ascochyta*, a *Septoria*, an immature *Ascomycete*, a *Coniothyrium*, and probably others. Since the first three mentioned usually, if not always, are associated with parasitism, it seems possible but scarcely demonstrable that one or more were acting so in this instance. Winter described *Phyllosticta sanguinariae* on this host from Missouri, and one of the *Phyllostictae* mentioned has conidia in the size range specified by Winter.

ADDITIONAL HOSTS

The following hosts have not been previously recorded as bearing the fungi mentioned in Wisconsin.

PERONOSPORA PARASITICA (Pers.) Fr. on *Arabis shortii*. Rock Co., near Avon, May 26, 1947. Coll. J. Wickham. (U. W. Phan.)

SZYGYTES MEGALOCARPUS Ehrenb. ex Fr. (*Sporodinia grandis* Link) on *Lactarius trivialis*. Vilas Co., August 1910. On *Boletus felleus*. Sauk Co., Devils Lake, October 6, 1906. Both coll. R. A. Harper.

ERYSIPHE GRAMINIS DC. on *Poa nemoralis*. Fond du Lac Co., near Oakfield, July 4, 1932. Coll. N. C. Fassett (U. W. Phan.)

HYPOMYCES CHRYSOSPERMUS Tul. on *Boletus sphaerosporus*. Dane Co., Madison, October 1900. Coll. R. A. Harper.

Puccinia RECONDITA Rob. ex Desm. I on *Anemone riparia*. Rock Co., near Beloit, June 8, 1932. Coll. B. Anthoney. (U. W. Phan.)

Puccinia DIOICAE P. Magn. ii, III on overwintered leaves of *Carex debilis*. Juneau Co., Rocky Arbor Roadside Park, June 8, 1958. Coll. T. G. Hartley (U. W. Phan.). On *Carex cristatella*. Dane Co., Madison, July 16. Host det. J. H. Zimmerman.

Puccinia VIOLAE (Schum.) DC. I on *Viola adunca*. Washburn Co., near Spooner, June 18, 1897. (U. W. Phan.). II, III on *Viola sororia*. Lincoln Co., Schley Twp., August 23, 1955. Coll. F. C. Seymour (U. W. Phan.)

Gymnosporangium JUVENESCENS Kern I on *Amelanchier amabilis* Wieg. (*A. grandiflora* Wieg.) (cult.) Dane Co., Madison, June 26.

Melampsora MEDUSAE Thum. II on *Populus balsamifera* (cult.). Dane Co., Madison, September 7. On leaves of rooted cuttings from a mature tree in the University of Wisconsin Arboretum. There has been a question as to the actual occurrence of *M. medusae* on balsam poplar in Wisconsin. Fungi Columbiani 3915, collected at Madison in 1910 on this host, was issued as *M. medusae*, but by later workers was somewhat tentatively placed under *M. occidentalis* Jacks., principally on the basis of spore size (Amer. Midl. Nat. 48: 39. 1952). In the present specimen the urediospores are well within the size range of *M. medusae* and show the extensive smooth areas on the wall, characteristic of the species.

Oecronartium MUSCICOLA (P. ex Fr.) Fitzp. on *Climacium dendroides*. Douglas Co., Brule, July 19, 1897. On *Hymnum cupressiforme*. Bayfield Co., between Herbster and Port Wing, July 8, 1897. On *Thuidium microphyllum*. Bayfield Co., Mason, July 6, 1896. All coll. L. S. Cheney. Hosts det. R. I. Evans.

Ceratobasidium ANCEPS (Bres. & Syd.) Jacks. on *Ranunculus abortivus*. Sauk Co., near LaValle, July 8.

Nyctalis ASTEROPHORA Fr. on *Russula adusta*. Dane Co., Madison, August 1, 1903. Coll. R. H. Denniston. On *Russula sordida*. Same station, August 5, 1903. Coll. R. A. Harper.

Phyllosticta PHASEOLINA Sacc. on *Strophostyles leiosperma*. Waushara Co., near Hancock, September 14, 1957. Coll. M. Spalding. (U. W. Phan.)

Phyllosticta MINUTISSIMA Ell. & Ev. on *Acer spicatum*. Sauk Co., Parfrey's Glen, Town of Merrimac, September 16, 1959.

Phyllosticta VIOLAE Desm. on *Viola selkirkii*. Clark Co. near Stanley, June 5, 1948. Coll. M. Bergseng. (U. W. Phan.)

Phyllosticta DECIDUA Ell. & Kell. on *Myosotis scorpioides*. Ozaukee Co., Thiensville, June 20, 1925. Coll. S. C. Wadmond. (U. W. Phan.)

PHOMOPSIS HIERACII H. C. Greene on *Hieracium aurantiacum*. Columbia Co., Gibraltar Rock County Park, August 7. Scolecospores were not observed in mounts made from this specimen, but in all other respects it is identical with the type on *Hieracium longipilum*.

CONIOTHYRIUM FUEKELII Sacc. on *Rubus allegheniensis*. Dane Co., near Verona, August 3. Appearing parasitic and similar to material collected many years ago on *Rubus pubescens* at Madison.

ASCOCHYTA EQUISETI (Desm.) Grove on *Equisetum fluviatile*. Sawyer Co., near Barker Lake, Draper Twp., September 1, 1959. Coll. D. Ugent. On a specimen in the University of Wisconsin Herbarium. Many of the acervuli show a microconidial, rather than the *Ascochyta* stage. The writer (*Amer. Midl. Nat.* 44:639. 1950) also made this combination, overlooking the fact that Grove had done so some years previously.

ASCOCHYTA GRAMINICOLA Sacc. (*A. sorghi* Sacc.) on *Poa palustris*. Dane Co., Madison, July 14. Very heavy infection on the lower leaves, which were entirely killed back. On *Muhlenbergia mexicana* (L.) Trin. Dane Co., Madison, September 8. An earlier report on *Muhlenbergia "foliosa"* probably referred to *M. mexicana*, but this cannot be ascertained from the herbarium specimen.

ASCOCHYTA ASCLEPIADIS Ell. & Ev. on *Asclepias syriaca*. Iowa Co., Gov. Dodge State Park, July 20.

ASCOCHYTA COMPOSITARUM J. J. Davis on *Aster lateriflorus*. Dane Co., near Verona, August 3.

SEPTORIA MISSISSIPPIENSIS R. Sprague on *Muhlenbergia mexicana* (L.) Trin. Columbia Co., near Wyocena, July 18. Host determinations of *Muhlenbergia* are based on the treatment in Fassett's "Grasses of Wisconsin".

SEPTORIA SALICINIA Pack on *Salix serissima*. Dane Co., Madison, September 3. An examination of various specimens of *S. salicina* in the Wisconsin Herbarium indicates no great violence would be done if this species were transferred to *Cylindrosporium*.

SEPTORIA LUDWIGIAE Cooke on *Ludwigia polycarpa*. Milwaukee Co., Milwaukee, August 1884. Coll. E. E. Hasse. On a phanerogamic specimen in the Herbarium of the Milwaukee Public Museum.

SEPTORIA OENOTHERAE West on *Oenothera strigosa*, Dane Co., Madison, August 1, 1907. Coll. J. R. Heddle. Host det. D. Ugent. On *Oenothera caespitosa*. Madison, August 23. On a planting in the University of Wisconsin Arboretum.

SEPTORIA CORNICOLA Desm. var. AMPLA H. C. Greene on *Cornus rugosa* (cult.). Dane Co., Madison, October 4.

SEPTORIA DODECATEONIS J. J. Davis on *Dodecatheon amethystinum* Fassett. Crawford Co., Prairie du Chien, June 2, 1928. Coll. N. C. Fassett. This is the type specimen of the host, which consists of two plants mounted on one sheet, only one of which, however, bears the *Septoria*.

SEPTORIA HELIANTHI Ell. & Kell. on *Helianthus giganteus*. Buffalo Co., near Mondovi, August 25, 1956. Coll. H. H. Iltis. (U. W. Phan.)

SEPTORIA HIERACICOLA Dearn. & House on *Hieracium scabrum*. Iowa Co., Tower Hill State Park, October 5. On *H. florentinum*. Forest Co., near Cavour, August 27, 1958. Coll. K. S. Snell. (U. W. Phan.)

SELENOPHOMA BROMIGENA (Sacc.) Spr. & Johns. on *Bromus latiglumis*. Sauk Co., near Leland, July 12, 1942. (U. W. Phan.). R. Sprague reports a collection of *S. bromigena* on *Bromus purgans* from Iron Co. near Hurley, August 1959, but the presence of *B. purgans* in this part of Wisconsin seems questionable.

HAINESIA LYTHRI (Desm.) Hoehn. on *Oenothera caespitosa*. Dane Co., University of Wisconsin Arboretum, Madison, August 23.

CRYPTOCLINE BETULARUM (Ell. & Mart.) v. Arx (*Gloeosporium betularum* E. & M.) on *Betula lenta* (cult.). Dane Co., Madison, July 26.

GLOEOSPORIDIELLA VARIABILE (Laub.) v. Arx (*Gloeosporium variabile* Laub.) on *Ribes missouriense*. Lafayette Co., Ipswich, August 15. This was found on cultivated *Ribes alpinum* in Wisconsin in 1960. It seems worth noting that in all five collections of this species in the University of Wisconsin Cryptogamic Herbarium the fruiting is uniformly hypophyllous, in contrast to the normally epiphyllous *Gloeosporium ribis*.

COLLETOTRICHUM GRAMINICOLA (Ces.) Wils. on *Elymus villosus*. Columbia Co., Gibraltar Rock County Park, August 7. On *Paspalum stramineum*. Crawford Co., Prairie du Chien, September 15, 1940. Coll. N. C. Fassett. (U. W. Phan.)

COLLETOTRICHUM VIOLAE-ROTUNDIFOLIAE (Sacc.) House on *Viola affinis*. Outagamie Co., near Freedom, August 16, 1948. Coll. F. C. Seymour. (U. W. Phan.). On *V. septentrionalis*. Vernon Co., near Viroqua, June 2, 1929. Coll. H. P. Hansen. (U. W. Phan.)

SPHACELOMA MURRAYAE Jenkins & Grodsinsky on *Salix petiolaris*. Jefferson Co., Faville Prairie Preserve near Lake Mills, September 20.

MARSSONINA KRIEGERIANA (Bres.) Magn. on *Salix serissima*. Shawano Co., Shawano, September 1, 1921; also Door Co., Fish Creek, September 27, 1919. Both specimens were collected by J. J. Davis as occurring on *Salix lucida*, but later redetermined, no doubt

correctly, as *S. serissima*, and heretofore overlooked in the Wisconsin lists.

DIPLOCLADIUM MINUS Bon, on *Polystictus pergamenus*. Dane Co., Madison, May 2. Although Clements & Shear in their "Genera of Fungi" list *Diplocladium* as a saprophyte, specimens seen by the writer strongly suggest otherwise, so the fungus is recorded as at least a questionable parasite.

RAMULARIA AEQUIVOCA (Ces.) Sacc. on *Ranunculus sceleratus*. Dodge Co., near Reeseville, May 17, 1931. Coll. J. W. Rhodes. (U. W. Phan.)

CERCOSPORA BETICOLA Sacc. on *Chenopodium botrys*. Grant Co., near Wyalusing, September 1, 1957. Coll. H. H. Iltis and P. Salamun. (U. W. Phan.)

CERCOSPORA DUBIA (Riess.) Wint. on *Chenopodium berlandieri* var. *zschackei*. St. Croix Co., near Hudson, September 12, 1956. Coll. C. W. Lemke. (U. W. Phan.)

CERCOSPORA VIOLAE Sacc. on *Viola rostrata*. Sheboygan Co., near Ada, August 9, 1959. Coll. H. H. Iltis. (U. W. Phan.). On *V. adunca*. Vilas Co., near Boulder Junction, August 17, 1956. Coll. J. T. Curtis. (U. W. Phan.).

CERCOSPORA GRANULIFORMIS Ell. & Holw. on *Viola novae-angliae*. Lincoln Co., Pine River Dells, August 18, 1952. Coll. F. C. Seymour. (U. W. Phan.)

ADDITIONAL SPECIES

The fungi mentioned here have not been previously reported as occurring in the state of Wisconsin.

CELIDIUM PULVINATUM Rehm in Rabh. on *Lecanora* sp. Lafayette Co., near Belmont, July 20, 1960. Coll. K. G. Foote. Det. J. W. Thomson.

PYRENIELLA LECANORI Keissler on *Lecanora* sp. Grant Co., across Wisconsin River from Bridgeport, July 24, 1960. Coll. K. G. Foote. Det. J. W. Thomson.

NORRLINIA PELTIGERICOLA (Nyl.) Theiss. & Syd. on *Bacidia* sp. Richland Co., near Yuba, July 27, 1960. Coll. K. G. Foote. The large, many celled, muriform ascospores are up to about 70 x 30 μ , mostly two, but occasionally three per ascus. A rarely seen and apparently little-known species.

HYPOCREA SULPHUREA (Schw.) Sacc. on *Exidia glandulosa*. Iowa Co., Blue Mounds, November 1904. Coll. R. A. Harper.

ORBILIA EPIPORA (Nyl.) Karst. on *Fomes fomentarius*. Sauk Co., Devils Lake, July 2, 1904. Probably parasitic. Coll. R. A. Harper.

TAPHRINA DEARNESSII Jenkins on *Acer rubrum*. Douglas Co., near Solon Springs, June 12. Coll. Mrs. R. McMinn; Barron Co., June 10. Coll. W. Klanderman. Both specimens comm. E. K. Wade. The disease was said to be quite severe in Barron Co.

Microthyrium rubicolum sp. nov.

Fructificationibus nigris, orbibus, applanatis, superficialibus, gregariis, ca. 225–450 μ diam., plerumque 350 μ ; scutellis compositis cellis nigris, muris crassis, isodiametris vel oblongatis vel irregularibus, fissilibus irregulariter; aparaphysatis; ascis subhyalinis, formis variabilibus, subsphaericis vel clavatis late vel clavatis tantum, 20–40 x 11–17 μ , crassitudinibus muris variabilibus; ascosporis subhyalinis, subcylindraceis, uniseptatis, constrictis leniter, 12–14 x 3.5–4.5 μ .

Fruiting bodies black, rounded, applanate, superficial, gregarious, approx. 225–450 μ diam., mostly about 350 μ ; scutellum composed of black, thick-walled isodiametric to oblong or irregularly shaped cells, splitting irregularly at maturity of ascoma; aparaphysate; asci subhyaline, variable in shape from subspherical to broadly obclavate, or merely clavate, 20–40 x 11–17 μ , ascus wall usually moderately to much thicker in one region than in remainder of wall; ascospores subhyaline, subcylindric, uniseptate, slightly constricted at septum, 12–14 x 3.5–4.5 μ .

On still green, early-season fruiting canes of *Rubus allegheniensis*. Madison School Forest near Verona, Dane County, Wisconsin, U. S. A., June 22, 1961.

One of the cells of the ascospore is slightly wider and more obtuse than the other. Arrangement of spores in the ascus is variable, depending on the shape of the particular ascus. This fungus bears little similarity to *Microthyrium rubi* Niessl which has fruiting bodies about 100 μ diam., and asci 48–50 x 7–8 μ .

RHIZOSPHAERA ABIETIS Mangin & Hariot on *Abies balsamea*. Vilas Co., near Eagle River, May 4. Coll. R. F. Patton. Described in the Bull. Soc. Mycol. France 23: 54–61. 1907 as a new genus and species. Shortly thereafter Maublanc made the new combination *Rhizosphaera pini* (Cda.) Maub., asserting that *Coniothyrium pini* Cda. is identical with *R. abietis*. As *R. pini* the fungus is reported, in the U. S. D. A. Index of Plant Diseases, as occurring on *Abies fraseri* in North Carolina, but there seems to be no previous record on *A. balsamea*.

Phomopsis thalictri sp. nov.

Maculis conspicuis, sordido-cinereis vel obscuro-brunneis, orbicularibus vel cuneatis vel elongatis, marginibus fuscioribus, angustis, ca. .5–1.5 cm. diam.; pycnidiiis epiphyllis, sparsis vel gregariis,

nigris, applanatis vel subglobosis, ca. 150–215 μ diam., ostiolatis latis; A-conidiis subfusoidis, hyalinis, saepe biguttulosis, 9–16 x (2.5–)3.5–4.5 μ , B-conidiis curvis laxe, hyalinis, attenuatis, ca. 18–35 x 1–1.5 μ , raro latior.

Spots conspicuous, sordid ashen to dull brown, orbicular, wedge-shaped, or elongate, with narrow darker margin, approx. .5–1.5 cm. diam.; ostioles wide, delimited by a conspicuous ring of blackish, thick-walled cells; A-type conidia subfusoid, hyaline, often biguttulate, 9–16 x (2.5–)3.5–4.5 μ , B-type conidia laxly curved, hyaline, tapered, about 18–35 x 1–1.5 μ , or rarely a little wider.

On living leaflets (rarely on petioles) of *Thalictrum dasycarpum*. University of Wisconsin Arboretum, Madison, Dane County Wisconsin, U. S. A., August 21, 1961.

The plants bearing this leaf parasite appeared otherwise healthy, but among them and adjacent to them, were current season's plants of *T. dasycarpum* which were completely dead and brown. On their stems and on the branches of the inflorescence are numerous applanate, black pycnidia very similar in appearance to those described on the leaves. However, so far as is shown by examination of a number of them, these pycnidia contain only very numerous scoleospores which are produced on closely ranked, flask-shaped conidiophores, and are quite similar in size and appearance to the B-spores described above. While it seems possible there is a connection with *Phomopsis thalictri*, it cannot be regarded as demonstrated, since no intergradation between the two has been observed. Specimens of the fungus on stems have been filed in the University of Wisconsin Cryptogamic Herbarium as *Rhabdospora* sp. for the time being.

***Septoria chaenorrhini* sp. nov.**

Maculis nullis; pycnidiis subepidermidibus, amphigenis, nigris, globosis, gregariis prope vel confertis, ostioliis indistinctis, muris tenuioribus supra, parvis, ca. 45–75 μ diam.; conidiis gracilibus, hyalinis, continuis, rectis fere vel curvis leniter, raro curvis admodum, (15–) 18–28 x (1.2–) 1.5–2 μ .

Spots none, pycnidia subepidermal, amphigenous, black, globose, closely gregarious to crowded, no distinct ostiole, the wall thinner above, small, approx. 45–75 μ diam.; conidia slender, hyaline, continuous, from almost straight to slightly curved, or rarely strongly curved, (15–) 18–28 x (1.2–) 1.5–2 μ .

On the leaves and inflorescence of *Chaenorrhinum minus* (*Linaria minor*). On Milwaukee R. R. right-of-way one mile east of Juda, Green County, Wisconsin, U. S. A., August 12, 1961.

S. chaenorrhini does not correspond to species of *Septoria* described on *Linaria* from the Old World, and is very different from *Septoria linariae* H. C. Greene (Trans. Wis. Acad. Sci. Arxa Lett. 35:130. 1944) which occurs on *Linaria canadensis* in Wisconsin.

COLLETOTRICHUM VIOLAE-TRICOLORIS R. E. Smith on *Viola tricolor* (cult.). Waupaca Co. near Ogdensburg, September 16, 1960. Coll. L. Hansen. On green stems.

Colletotrichum helianthi J. J. Davis var. **macromaculans** var. nov.

Maculis orbicularibus, marginibus flavo-brunneis, latis aliquanto, centris fusco-brunneis magnis conspicuisque, definitis, 1–2.5 cm. diam.; acervulis amphigenis, sparsis; setis 65–100 x 3.5–4.5 μ , 1–3 septatis; conidiis sublunatis vel falcatis, 18–23 x 2.5–3.5 μ .

Spots orbicular, with rather wide yellowish-brown margins and sooty-brown centers, large and conspicuous, sharply defined, 1–2.5 cm. diam., acervuli amphigenous, scattered but numerous; setae 65–100 x 3.5–4.5 μ , 1–3 septate; conidia sublunate or falcate, 18–23 x 2.5–3.5 μ .

On living leaves of *Helianthus strumosus*. Gibraltar Rock County Park, Columbia County, Wisconsin, U. S. A., August 7, 1961.

This is not sufficiently different from *C. helianthi* to warrant description as a new species, but it does seem to be of varietal rank and has been collected once earlier at the same station in 1952 (Amer. Midl. Nat. 50:503. 1953). In *C. helianthi* the spots, while likewise sharply delimited, are not ordinarily over 3–5 mm. diam. and the acervuli are strictly epiphyllous. *C. helianthi*, aside from the spots it produces, is larger and coarser than var. *macromaculans*, with the setae 80–150 x 3–5 μ , the conidia 25–35 x 2.5–3.5 μ , and often, but not always, somewhat fusoid in shape.

MYCOGONE ROSEA Link on *Cortinarius* sp. Dane Co., Madison, October 10. Coll. M. Hemphill.

BOTRYTIS UREDINICOLA Peck occurred in considerable profusion on leaves of *Panicum virgatum* in the University of Wisconsin Arboretum at Madison in the summer of 1960. This fungus is sadly misnamed, inasmuch as it does not appear to belong in *Botrytis*, as that genus is generally understood, and is not parasitic on a rust, or necessarily even associated with one. Careful examination of ample specimens of the Fungi Columbiani series, Nos. 2907 and 4607, both labeled as indicating the fungus to be on or associated with *Uromyces graminicola* Burr., shows no trace of rust, but excellent development of the "*Botrytis*". No. 2907 is presumably type material. Most of the Wisconsin collections likewise bear no rust, although some leaves do have sori of *Puccinia panici* Diet. which is very common on *P. virgatum* in Wisconsin. The fungus is amphigenous, but mostly on the adaxial leaf surface. It is obviously a

strong parasite and sections show it to be very deep-seated in the xeric leaves. The fructification tends to be elongate, probably a response to the spatial situation resulting from the prominent, closely parallel veins. As fall progressed it was noted that the fruiting structures were becoming black and sclerotized, suggesting the development of an overwintering condition and possible formation of a perfect stage. In an attempt to learn some details of the life history of this interesting fungus material, ranging from that of young, new infections to that obviously old and strongly sclerotic, was fixed, imbedded, sectioned and stained. As the accompanying photographs show, from a very early stage, preceding rupture of the epidermis, the fungus is in close contact with the sheath of a host vein and, as development proceeds, in most cases tends to completely envelop the sheath and ultimately to crush the sheath cells. With increasing sclerotization the compacted, isodiametric, but still hyaline inner cells of the fructification display a markedly granular content. In some instances, however, as illustrated in Plate III, Fig. 5, less completely sclerotized overwintering bodies are filled with small, hyaline, rod-shaped microconidia (spermogonial cells?). In the latter part of March 1961 a collection of naturally overwintered leaves bearing the sclerotic structures developed the previous fall was collected in the field. On microscopic examination there was no evidence of an incipient perfect stage, other than the microconidia just mentioned, but some of the leaves were placed in a moist chamber at room temperature to see whether further development could be stimulated. After about two weeks the characteristic snow-white conidiophores and conidia of *B. uredinicola* were produced from the overwintering structures. The spring was abnormally dry and cold, but on June 16 the fungus was observed in the field in full development on overwintered leaves. Thus, it is evident that the fungus may, and perhaps regularly does, overwinter without subsequent formation of a perfect stage. Early in July abundant infection of the new 1961 leaves was noted, completing the cycle. Dr. Roderick Sprague has studied this material and considers that it is very close to, but perhaps not identical with, *Sporotrichum peribebuyense* Speg. which occurs in North America on species of *Setaria* and which Sprague has discussed in his "Diseases of Cereals and Grasses in North America".