

NOTES ON PARASITIC FUNGI IN WISCONSIN—I.

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J. J. DAVIS.

These notes are intended to be supplementary to "A provisional List of Parasitic Fungi in Wisconsin" published in Transactions of the Wisconsin Academy of Sciences, Arts and Letters. Vol. XVII, pt. 2, pp. 846-984.

*Plasmopara humuli* Miyabe & Takahashi. This was collected on wild *Humulus Lupulus* growing along the river bank at Racine in 1909-10 since which time the station has not been visited. The following notes of this fungus were made at Racine: Spots small, angular at first, limited by the veinlets, brown-red or purplish above, below of a darker green than the leaf, giving the "water soaked" appearance. The spots are surrounded by an indeterminate yellowish discoloration especially early in the season, less marked as the leaves become firmer, and finally assume the lethal brown with the death of the tissues included. Conidiphores hypophyllous, grey,  $175-325 \times 5-6\frac{1}{2}\mu$  with usually two lateral branches each of which is about equal in development to the terminal portion and 1-3 times branched, ultimate branchlets tapering, subacute; conidia fuliginous tinted, elliptical, somewhat acute at each end, furnished with an apical papilla of dehiscence,  $20-33 \times 12-17\mu$ , usually about  $26 \times 15\mu$ ; oospores scattered in the leaves; oogonia irregularly thickened, brown, subglobose,  $36-40\mu$  long, oöspores filling the oögonia  $30-33\mu$  long.

*Asterina plantaginis* Ellis. This is referred to *Mycosphaerella* by Theissen (*Ann. Mycol.* 10:2:196. (Apr. 1912).

*Asterina rubicola* Ell. & Evht. This is described by Theissen in the same communication (p. 195) but no new combination is proposed.

*Gnomoniella fimbriata* (Pers.) Sacc. This was inserted in the provisional list because of an immature specimen in the herbarium of the University of Wisconsin which is perhaps of this species. It was collected at Osceola by E. Sheldon in 1892.

*Phyllosticta destruens* Desm. In writing the provisional list I followed Ellis & Everhart (*North American Phyllostictas*, 40) in referring to this species specimens on *Prunus virginiana* and also on *Amelanchier*. The former has been described under the name *Phoma virginiana* Ell. & Hals. (*Journ. Mycol.* 4:8. (1888)) the latter as *Phyllosticta innumerabilis* Pk. (*Bull. Torr. Bot. Club.* 36:336 (1909)). Specimens on *Amelanchier* were distributed under the name *Phyllosticta destructens* Desm. in *Fungi Columbiani continued 1447*. I have seen no European specimens of *Ph. destruens* Desm. which is said to occur on *Celtis* as well as *Iranus* and to have epiphyllous pycnidia, but I infer that Mr. Ellis had good reason for using that name. Before the list was printed I removed *Amelanchier* as a host of *Phyllosticta destruens* Desm. with the intention of inserting *Ph. innumerabilis* Pk. an intention which I failed to carry out, so that *Amelanchier* as bearing the *Phyllosticta* appears only in the host index. Morphologically I see no distinction between the fungi on the two hosts.

In the provisional list of parasitic fungi in Wisconsin Patouillard is given as the author of the binominal *Protomyces andinus* as is done in the *Sylloge Fungorum*. An examination of Patouillard's paper however shows that it was published as *Protomyces andinus* Lagh. sp. nov. Lagerheim, not Spegazzini, collected the type material in Ecuador, not Chili.

*Phyllosticta mulgedii* Davis, a name that was proposed in the 4th supplementary list (No. 709), was omitted from the provisional list. The fungus has not been collected again and is probably one of the *Phomae* that have been described as occurring on the leaves of *Compositae*.

*Phyllosticta desmodii* Ell. & Evht. This was described (*Journ. Mycol.* 5: 146: 1889) from a single small collection in Walworth Co. Much better material has been collected at Madison on *Desmodium canescens*. The pycnidia are epiphyllous, brown, sub-spherical, 125–160 $\mu$  in diameter; sporules oblong, often somewhat

narrower in the middle, ends rounded, conspicuously 2-4 guttulate, 6-12x3 $\mu$ . The appearance of the sporules suggests that later they may become septate.

*Phyllosticta cruenta* (Fr.) Kickx. The reference of this species to *Macrophoma* as proposed by Ferraris (*Ann. Mycol.* 10:3:288 (Jn. 1912)) would make a generic distinction between the two forms that were given as varieties in the provisional list because the globose sporules of *Ph. pallidior* Pk. are only about 10 $\mu$  in length, although they equal in content the longer and narrower sporules of the type of *Ph. discincta*.

*Ascochyta pisi* Lib. has been shown by R. E. Stone to be a conidial form of *Mycosphaerella pinodes* (Berk. & Blox.) Niessl (*Ann. Mycol.* 10:564 et seq. (Dec. 1912). Also R. E. Vaughan, *Phytopathology* 3:71 [1913].

*Actinonema rosae*, (Lib.) Fr. Diedicke calls this *Marssonina rosae* (Lib.) Trail (*Ann. Mycol.* 10:146 (Apr. 1912)). F. A. Wolf has developed the ascospore stage which he refers to the *Microthyriaceae* and makes the type of a new genus and calls it *Diplocarpon rosae* F. A. Wolf. (*Bot. Gaz.* 54, 231 (Sept. 1912)).

*Septoria nubilosa* Ell. & Evht. (Proc. Acad. Nat. Sci. Phil. 1891, p. 76) which was founded on Wisconsin material on *Helianthemum autumnale* has not been included in the Wisconsin lists because it is merely a form of *Septoria helenii* Ell. & Evht. in which the spots are not well developed. The type was collected on the north side of plants bearing typical *S. helenii* and was sent to the authors merely to show the variation.

*Septoria ribis* Desm. Some of the specimens that I have referred to this species are perhaps *S. grossulariae* var. *longispora* Ferraris (*Ann. Mycol.* 10:291). Typical *S. grossulariae* (Lib.) West. I have collected but once.

*Septoria saccharina* Ell. & Evht. Specimens from Price Co. bear sporules about 30x2 $\frac{1}{2}$  $\mu$ . The *Acer*-inhabiting fungi, having triseptate sporules borne in acervuli and varying in length from 20-70 $\mu$  and in width from 1 $\frac{1}{2}$ -5 $\mu$  seem to me to constitute a group the relation of the members of which can be determined by inoculation methods only. The form with short and thick sporules has been called *Ascochyta aceris* Lib. and later

*Phleospora aceris* (Lib.) Sacc. and with this have been included narrower spored forms but usually the latter have been referred to *Septoria*. Diedicke has recently referred the European forms with sporules  $3\mu$  or less in thickness to *Cylindrosporium*, recognizing three species. (*Ann. Mycol.* 10: 486 (Oct. 1912)). *Septoria saccharina* E. & E., however, while producing similar sporules develops pycnidia in definite arid spots but *Cylindrosporium saccharinum* Ell. & Ev. agrees with the form on *Acer rubrum* which was recorded in the "provisional list" under the name *Phleospora aceris* (Lib.) Sacc.

*Septoria musiva* Pk. The specimens of *Septoria* that have been collected on *Populus* in Wisconsin may be divided into groups as follows:

1. Spots subcircular to subangular, black becoming white and arid except the peripheral portion, 3–5 mm. in diameter; pycnidia epiphyllous, superficial-collapsing, hemispherical in section, about  $100\mu$  in diameter; sporules cylindrical, curved, obtuse, 3(2–4) septate,  $25\text{--}60 \times 2\text{--}3\mu$ . On *Populus balsamifera*.
  2. Similar to the above except that the central portion of the spot becomes alutaceous or cinereous instead of white and the pycnidia are more scattered and lie deeper. Also on *P. balsamifera*.
  3. Spots subcircular to angular, limited by the veinlets, at first brown, becoming grey by the loosening of the cuticle, 1–3 mm. in diameter, becoming confluent into larger areas,  $\frac{1}{2}$ –1 cm. in diameter; pycnidia innate, discharging on either surface but usually below, having a thin but distinct wall and a large opening,  $70\text{--}100\mu$  in diameter; sporules cylindrical, curved, obtuse, 3(2–4)–septate,  $25\text{--}65 \times 2\text{--}3\mu$ . On *Populus deltoides*.
  4. Spots roundish to irregular and angular, dark brown above becoming grey with age, light brown below, 2–5 mm. in diameter, often confluent; pycnidia hypophyllous, punctiform; sporules cylindrical, curved, obtuse, 3–5 septate,  $45\text{--}65 \times 3\mu$ . On *P. balsamifera*.
  5. Spots angular, blackish brown above, paler below, becoming lighter and mottled with age,  $\frac{1}{2}$ –1 cm. in diameter; pycnidia scattered, innate, thin walled; sporules filiform, narrowed to one end, 3–6 septate,  $40\text{--}70 \times 1\frac{1}{2}\text{--}2\frac{1}{2}\mu$ . On *Populus tremuloides*.
- In the provisional list all of these forms were included in *Septoria musiva* Pk., although group 5 may prove to be distinct, but

one can hardly decide that on morphological grounds without an abundance of material. I find this in Wisconsin only to the north and with few pycnidia. Much the best specimens that I have seen were collected at North Yakima, Wash. (Wis. Acad. Sci. Arts & Lett. 15:778).

In Farlow's Host Index, *Populus balsamifera* is given as a host of *Septoria salicina* Pk. I presume that this refers to what I have called group 1. This form looks quite distinct but it merges into group 2 and that again into group 3 in a way that makes it difficult to draw a line of separation, while the characters of the sporules are identical. *Septoria salicina* Pk. differs in its uniseptate sporules. Of *Septoria populi* Desm., which has uniseptate sporules, I have seen no American specimens. *Fungi Columbiani* 2873, issued under this name seems to be the same as 2872 which is labeled *Septoria musiva* Pk. On neither have I found a *Septoria*. I may mention that *F. Col.* 1587 on *Populus tremuloides* collected by J. B. Ellis at Newfield, N. J. and issued as *S. musiva* Pk. bears *Marssonina rhabdospora* (E. & E.) Magn. at least in the two copies which I have seen. *F. Col.* 3486 on *Populus balsamifera* collected at St. Johnsbury, Vt. by W. P. Carr and issued as *Septoria populi* Desm. is of the form with black bordered alutaceous spots that I have placed in group 2. *Pacific Slope Fungi* 1723 on *Populus Fremonti* collected in California by Copeland and issued by Baker as *Septoria populi* Desm. is somewhat intermediate between groups 2 and 3. *Fungi Columbiani* 1257 on *Populus angustifolia* collected at Golden, Colorado, by Bethel, and issued as *Septoria populi* Desm. has subcircular spots of a yellowish white or sordid white color with an irregular grey-brown border 2-4 mm. in diameter; the pycnidia are hypophyllous, broad and collapsing; the sporules continuous 23-35 x 3½-4µ. While this does not correspond with *S. populi* Desm. it is different from any *Septoria* on *Populus* that I have seen and judging from the single specimen may prove to be distinct. *Cylindrosporium oculatum* Ell. & Evht. on *Populus deltoides* (Put-in-Bay, Ohio) has hemispheric-superficial pycnidia and obtuse sporules 30-50 x 3µ becoming 3 or more septate. This forms circular grey to sordid spots about ½ cm. in diameter with a narrow dark border. I would include it in *Septoria musiva* Pk. as representing forms 1 and 2 on *Populus deltoides*. Specimens

on this host collected at Ithaca, N. Y., by Higgins (com. Bartholomew) bear both this and form 3 on the same leaves.

After this was written a collection was made from the examination of which the following characters were noted: spots angular-suborbicular, at first brown with a narrow darker margin, then grey and finally mottled with small angular cream colored areas, sometimes confluent, 2–3 mm. in diameter; pycnidia mostly hypophyllous and inconspicuous, 65–75 $\mu$  in diameter; sporules, hyaline, filiform, acute, 3–6 septate, 38–60 x 2½–3½ $\mu$ . On *Populus grandidentata*. Devils Lake, Wisconsin, Aug. 6, 1913.

In this connection a still more recent (Aug. 21, 1914) collection on *Populus deltoides* is of interest. *Phyllosticta populina* Sacc. is said to occur in association with *Septoria populi* Desm. in Europe. Having made a collection of the former at Prescott the associated *Septoria* was examined with some interest. The spots are orbicular, cinereous with a narrow dark margin and resemble those of form 2 except in the grey color which in the older spots changes to white. On some of the leaves are small angular, confluent spots like those of typical *Septoria musiva* Pk. Of the first mount from this material it was noted "sporules mostly 18–22 x 2–3 $\mu$ , 1–2 septate with occasional longer ones up to 48 $\mu$  and 3–septate"; of another mount "30–45 x 2–3 $\mu$ , 2–3 septate". This seems to connect with the forms described above and suggests that there is a widely variable species of *Septoria* occurring on *Populus* in both America and Europe. *Septoria candida* (Fekl.?) Sacc. I have not seen, but the description indicates that it might readily fall in with the American forms.

*Cercospora geranii* Kell. & Sw. Of a specimen collected at Blue Mounds the following notes were made. Hyphae usually straight, slightly colored, often toothed, 25–75 x 6–7 $\mu$ ; conidia hyaline, cylindrical, usually more or less curved, obtuse, becoming pluriseptate, 100–165 x 4–5 $\mu$ .

*Cercospora subsanguinea* Ell. & Evht. is sometimes devoid of color and the obtuse conidia sometimes divide in the middle. It appears to be more nearly a *Ramularia*.

*Gloeosporium fragariae* (Lib.) Mont. My notes of the measurements of the sporules of the fungus referred to this species range from 12–24 x 4–5 $\mu$ . It was collected at Spooner.

*Gloeosporium ribis* (Lib.) Mont. & Desm. As it occurs in Wisconsin this usually has the characters of the forma *ribis nigri americana* Sacc. The sporules sometimes reach  $30\mu$  in length.

*Gloeosporium tremuloides* Ell. & Evht. 2nd suppl. list no. 526 was omitted from the provisional list because of the belief that the species was founded on imperfectly developed material of *Marssonina castagnei* (D. & M.) Magn. which occurs in atypical forms in Wisconsin. Oudemans proposed the variety *moniliferae* in which the acervuli are amphigenous although more abundant above. In Wisconsin they are often hypophyllous only and the sporules are often but  $12-15\mu$  long. *Marssonina brunnea* (E. & E.) has been omitted, being considered, perhaps erroneously, a form of *M. castagnei*.

*Ramularia plantaginis* Ell. & Mart. In the description of this species the spots are said to be minute. Specimens on *Plantago Rugelii* collected at Madison in September have spots up to 3 cm. in diameter. Conidia appear also on the calyces.

*Ramularia alismatis* Fautrey. This was reported in the third supplementary list under the name *Ascochyta alismatis* (Oud.) Trail. Dr. R. A. Harper has kindly compared Wisconsin material with the type of *Ascochyta alismatis* Ell. & Evht. in the Ellis herbarium and finds them to be the same. The very short undifferentiated conidia-bearing hyphae makes this an atypical *Ramularia*. It is not unlikely that *Septoria alismatis* Oud. is of the same character. The spots usually have a slight eminence in the center as if a pycnidium lay beneath. (See Diedicke, *Ann. Mycol.* 10:479).

*Ramularia uredinis* (Voss) Sacc. This is the fungus recorded in the supplementary and 3rd suppl. lists no. 330 under the name *Fusarium uredinum* E. & E. The tufts are sometimes pink or even testaceous. My measurements of the conidia, which are in branched chains, are from  $7-17 \times 3-4\mu$ .

*Ustilago osmundae* Pk. This has been collected on *Osmunda regalis* in Washburn and Burnett counties. I have not been able to follow the author of the species in his reference of it to *Mycostrynx*. (New York State Museum; Report of the Botanist 1911, p. 43). When the fungus is present each frond arising from the rhizome bears the smut or else is sterile.

*Ustilago lorentziana* Thuem. which occurs at Madison on *Hordeum jubatum* and which was recorded in the 4th supplementary list seems to have been omitted from the provisional list.

*Entyloma linariae* Schroet. var. *veronicae* Wint. The newly formed spores of this smut were found to germinate readily in May but to gradually lose the power as the season progressed as had been found to be the case with *E. floerkeae* Holw. (2nd suppl. list, No. 487). The promycelial spores are usually two (1-4) in number, 15-20 x 3 $\mu$ .

Material wintered outdoors (May to May) germinated the following spring in the same manner.

#### ADDITIONAL HOSTS.

*Synchytrium aureum* Schroet.

In September, 1912, this was found at Millston, Jackson county on *Lycopus virginicus*, *Lysimachia terrestris* and leaves of blackberries that I have referred to *Rubus hispidus* and *Rubus villosus*. The infection was sufficient to indicate that each of these plants are normal hosts of the organism in that locality, *Rubus villosus* being least affected. No success attended special efforts to find other hosts. In 1913 it was collected at Athelstane, Marinette Co., on *Rubus hispidus* but on no other host. In 1892 *Synchytrium* occurred rather abundantly in a bit of woodland near Berryville on *Viola pubescens* and *Geum canadense* and during the same season it was collected at Somers, but a few miles distant, on *Ranunculus recurvatus*. The infection of the latter was limited and I have not seen it since on this host. It was collected again at Berryville in 1894 soon after which the station was cleared and put under cultivation. In 1902 a collection on *Viola pubescens* was made at the Somers station. In 1907 considerable infection of the same host was observed at a station intermediate between the other two and during the same season very limited infection of *Prenanthes alba* at this station and of *Pedicularis canadensis* near Racine was observed. The infection of the two latter hosts appeared to be accidental and temporary, the organism failing to get a permanent foothold. At Millston some of the affected leaves of *Lycopus* bore considerable hypertrophies often surrounded by purple discoloration but usually there was little dis-



tortion of the hosts, even when the sori were numerous and aggregated, the pressure being into the mesophyll which was sometimes torn from the epidermis in the area surrounding the gall.

The common factors which make for susceptibility in these various hosts are not apparent to me.

*Septoria astericola* Ell. & Evht. on *Aster puniceus*. In the specimen on this host the spots become lead color with a dark border. The largest spots are 1 cm. long. The pycnidia are epiphyllous, about  $80\mu$  in diameter and the sporules  $23-33 \times 1\mu$ . Collected at Lake Mills, Oct. 19, 1912.

*Gloeosporium saccharinum*, Ell. & Evht. Specimens on *Acer spicatum* collected at Spooner have circular spots of a pale olive color with a darker border; the largest sporules are  $7 \times 3\mu$ . The fungus often develops on subcircular spots of a tan color on *Acer Saccharum*.

*Cercospora caricina* Ell. & Dearn. My notes of a specimen on *Cyperus filiculmis* collected at Madison, Aug. 12, 1912, are as follows: Hyphae 3-8 in a tuft, brown, somewhat nodulose, often denticulate at the apex,  $50-80 \times 3-4\mu$ ; conidia hyaline, obclavate-cylindrical, straight or curved, becoming pluriseptate,  $65-100 \times 3-4\mu$ . On bracts and culms, spreading from above downward. *Cercospora caricina* Ell. & Dearn. is described as having hyphae  $15-25 \times 3-3\frac{1}{2}\mu$  and conidia  $34-73 \times 3\mu$ , but I have specimens on *Carex* in which the hyphae and conidia equal those noted on *Cyperus*. *Cyperus Houghtonii* which was tentatively given as a host in the 4th suppl. list should not have been omitted from the provisional list.

*Cercospora ceanothi* Kell. & Swingle. On *Ceanothus americanus*. Madison. In one of the collections on this host the fungus is particularly well developed, the conidiophores being  $20-45 \times 4-5\mu$  and the attenuate conidia  $80-150 \times 4-6\mu$ . A collection made in the same locality two weeks later agrees with the description of *Cercospora fuliginosa*, E. & E. the conidia being darker, cylindrical and 30-80 long. It is probable, therefore, that the descriptions of *C. ceanothi* Kell. & Swingle and *C. fuliginosa* Ell. & Evht. were drawn from different states of the same fungus. The former is the prior name and the latter is antedated by *C. fuliginosa* Ell. & Kell. on *Diospyros* (1887) for which reason *C. MacClatchieana* Sacc. & Syd. was substituted.

## ADDITIONAL SPECIES.

*Leptosphaeria folliculata* Ell. & Evht. var. OXYSPORA n. var. On *Carex gracillima*. Price Co. Sept. 9, 1911. Differs from the type in the somewhat narrower asci (ca.  $50 \times 8 \mu$ ) and especially in the triseptate acute ascospores (ca.  $15 \times 3 \mu$ ). On the comparatively narrow leaves of this host the perithecia are borne on dead apical areas at the bases of which there is often evidence of primary spotting and confluence. I am indebted to Dr. R. A. Harper for comparison of this with the type in the Ellis herbarium at the New York Botanical Garden. It is not unlikely that sufficient material would connect these forms with *L. caricicola* Fautr. and *L. caricina* Schroet.

*Phyllosticta livida* Ell. & Evht. On *Quercus macrocarpa*, Millston, Jackson Co. In these specimens the pycnidia are hypophyllous. If they really represent this species the fungus has a wide distribution in the U. S. previous collections being reported from California and Florida.

PHYLLOSTICTA LIATRIDIS n. sp. Spots round, white or sordid, arid, 1–2 mm. in diameter, usually surrounded by a broad black border; pycnidia epiphyllous, prominent, black, about  $65 \mu$ ; sporules hyaline, oblong, 2–4 nucleolate, about  $10 \times 4 \mu$ . On *Liatris spicata*, Gaslyn, Burnett Co. Aug. 1, 1911. This can hardly be *Phoma minutissima* Cke. as that species is described.

DIPLODIA UVULARIAE n. sp. Spots oval to orbicular, white, thin and arid, usually with a ferruginous border, 8–15 $\times$ 5–10mm.; pycnidia mostly epiphyllous, scattered, black, globose, 100–150 $\mu$ ; sporules elliptical to ovate, brown, uniseptate, 12–20 $\times$ 6–7 $\mu$ . On *Uvularia (Oakesia) sessilifolia* Spooner, Aug. 15, 1911 (type) and Gaslyn. What is probably imperfect material of this species has been collected at Blue Mounds on *Uvularia grandiflora*. It is not unlikely that *North Am. Fungi* 2153 issued under the nomen nudum *Phyllosticta uvulariae* Galloway is of this character. (See 4th suppl. list under No. 359.) Macroscopically this fungus suggests *Phyllosticta cruenta* (Fr.) Kx. Occasional biseptate sporules occur as is to be expected.

*Stagonospora intermixta* (Cke.) Sacc. Price Co., Oct. 9, 1911. On leaves of *Cinna arundinacea*. I have not seen an

authentic specimen of this species. The specimens which I have referred here have depressed-globose pycnidia 40–60 $\mu$  in diameter with a round apical pore which is surrounded by a thick black ring. The long-fusoid sporules are 7-septate, 40–60x 3 $\frac{1}{2}$ –5 $\mu$ .

*SEPTORIA ANDROPOGONIS*, n. sp. Causing narrow elongated areas of a reddish-yellow color sometimes becoming sordid; pycnidia epiphyllous, subseriate or scattered, dark brown, depressed globose, little prominent, 75–100 $\mu$ ; sporules hyaline, straight or slightly curved, more acute at one end, becoming 2–4 septate, 30–50x2–3 $\mu$ . On leaves of *Andropogon furcatus*, Gaslyn, Burnett Co. July 31, 1911.

*SEPTORIA POLITA* n. sp. Pycnidia scattered, globose, innate, black, ostiolate, 65–100 $\mu$ ; sporules hyaline, straight or somewhat curved, truncate to obtusely rounded at each end, becoming 3–5 septate, 35–50x2 $\frac{1}{2}$ –3 $\mu$ . On *Carex sp. indet. (stellulata?)* Gaslyn, Wisconsin, Aug. 4, 1911. This attacks the distal portion of the very narrow leaves of the host which becomes sere. The sporules have a very smooth or polished appearance and are not at all constricted at the septa.

*SEPTORIA CARPINEA* (Schw.?) n. comb. Spots subcircular to angular, numerous, reddish brown becoming sordid in the center, somewhat paler below, 1–5 mm. in diameter; pycnidia epiphyllous, few, scattered, prominent, black, globose, ostiolate, about 65 $\mu$ ; sporules hyaline, usually curved, frequently arcuate, pluriguttulate, 25–40x2–3 $\mu$ . On *Carpinus caroliniana*, Gaslyn, Wisconsin, Aug. 8, 1911. It seems quite possible that this is the fungus called *Xyloma* by Schweinitz and *Depazea* by Fries.

*Septoria Polymniae* Ell. & Evht. The specimens on *Polymnia canadensis*, collected near Somers in 1903, which I hesitatingly refer to this species show suborbicular spots  $\frac{1}{2}$ –1 cm. in diameter which become brown above, darker toward the margin. The pycnidia correspond with those of this species. My notes of the size of the sporules read 40–45x1 $\frac{1}{2}$ –2 $\mu$ .

*SACIDIUM MICROSPERMUM* (Pk.) n. comb. (*Septoria microsperma* Pk.) On fallen leaf of *Betula alba papyrifera*. Butternut, Oct. 8, 1911. Hypophyllous on indefinite brown areas which show a tendency to extend along the veins; basidia and

sporules in a discoid layer 100–150 $\mu$  broad which is covered by a chitinous, punctulate clypeus which becomes irregularly fissured; sporules straight or allantoid, 6–10 x  $\frac{3}{4}$ –1 $\frac{1}{2}$  $\mu$ . *North American Fungi* 674 on *Betula lenta*, collected by Nuttall in West Virginia, shows faded leaves with circular green areas. The pyrenidia, however, are by no means confined to the green spots. In the West Virginia specimens also the sporules are smaller than in the type as described. I assume that it represents it in its *Sacidium* structure. Perhaps this is not distinct from *Leptothyrium betulae* Fckl.

(This has since been collected on the same host at Wausaukee.)

A *Gloeosporium* which has appeared in the greenhouse of the botanical department at Madison on the leaves of *Dendrobium moschatum* causes orbicular arid spots about 1 cm. in diameter with a dark purple border and elevated margin. The acervuli are brown, scattered, mostly epiphyllous; the sporules oblong to ovate-oblong, obtuse at both ends, biguttulate, 10–15x4 $\mu$ . Probably this is *Gloeosporium cinctum* B. & C. and perhaps also *Gl. pallidum* Karst. & Har. The studies of Shear and Wood, however indicate that it is a conidial condition of *Glomerella cingulata* (Stonem.) S. & V. S. (U. S. Dept. of Agr., B. P. I., Bull. 252).

*COLLETOTRICHUM HELIANTHI* n. sp. Spots definite, orbicular, olivaceous with a cinereous center and a black margin, paler below, often confluent, 3–5 mm. in diameter; acervuli very prominent, one or few on a spot, 50–65 $\mu$  broad, surrounded by black rigid bristles 80–150x3–5 $\mu$  which taper from base to apex; sporules hyaline, fusiform to arcuate, nucleolate, acute at each end, 25–35x2 $\frac{1}{2}$ –3 $\frac{1}{2}$  $\mu$ . On *Helianthus* sp. *indet.* Madison, Wisconsin, July 7, 1907. This is allied to *C. solitarium* Ell. & Barth. from which it differs in the larger bristles and sporules. I found the specimen in the herbarium of the University of Wisconsin with the name of the collector not given.

*Ovularia asperifolii* Sacc., var. *LAPPULAE* n. var. Spots sub-orbicular, dark brown,  $\frac{1}{2}$ –1 cm; conidiophores hypophyllous, scattered or in tufts of 2–4, hyaline, often toothed, usually 16–20x3–4 $\mu$ ; conidia in chains which are sometimes branched, hyaline, 6–18x3–4 $\mu$ ; the lower conidia are cylindrical, acute at each end, 12–18x3–3 $\frac{1}{2}$  $\mu$ , the upper fusoid, 6–12x3–3 $\frac{1}{2}$  $\mu$ . Much

longer hyphae (ca.  $50\mu$ ) have been observed bearing conidia singly and laterally. On *Lappula virginiana*. Somers, Racine and Blue Mounds. While this fungus causes conspicuous spotting of the leaves the conidia are inconspicuous and evanescent. I have had it under observation for a number of years expecting at some time to secure specimens with a more profuse development of conidia. A specimen collected at Blue Mounds, July 13, 1912, is taken as the type. A more recent collection made at Potosi bears conidia up to  $30\mu$  in length. The Wisconsin fungus seems to be closely allied to var. *symphyti-tuberosi*, Allesch. (*Hedwigia*, 1894, p. 73.) These specimens differ from *Hermodendron farinosum* Bon. as figured (Bot. Zeit., t. VIII, fig. 9) in the longer and narrower conidia and the absence of the two guttulae in the lower members of the chain.

During August and September, 1912, there was collected at Madison on leaves of *Ribes americanum* a fungus of which the following notes were made: "Spots angular, limited by the veinlets, often confluent into irregular areas, brown, 2-5 mm. in diameter; conidiophores hypophyllous in scattered tufts, closely fasciculate from a prominent sclerotoid base, hyaline, often toothed,  $30-65 \times 2-3\mu$ ; conidia terminal and lateral, hyaline, cylindrical, abruptly acute or rounded at each end, occasionally with a median septum,  $20-50 \times 3-4\mu$ . The tufts usually have more or less of a pink tinge. Large fasciculi have a marked stilboid appearance." Leaves bearing the fungus were wintered out of doors and the following May were found to bear heads of conidia up to  $250\mu$  or more in diameter of a vinous purple color with the conidiophores compacted into blackish stipes *usque*  $150\mu$  high each springing from the summit of a plectenchymatous pseudopycnidium. The conidia borne on these heads were hyaline, catenulate, fusoid, continuous,  $10-18 \times 3-4\mu$ . With these were fasciculi, snow white to purplish, of the mucedine type and occasional broader ones more tubercularioid in appearance.

Accepting the coremium structure as the climax development of this fungus I have labeled the specimens GRAPHIOTHECIUM VINOSUM n. sp. and as it appears to be at least a facultative parasite have given it a place in this list.

*Ramularia calthae* Lindr. Specimens having the following characters have been referred to this species. Spots small,

angular, immarginate, limited by the veinlets, becoming confluent, brown, more abundant near the margin of the leaf; conidiophores epiphyllous, tufted from a stromatoid base, erect, simple, hyaline,  $15-30 \times 1\frac{1}{2}-2\mu$ ; conidia similar, sometimes catenulate  $12-24 \times 1-1\frac{1}{2}\mu$ . On *Caltha palustris*. Gaslyn, Burnett Co., Aug. 30, 1911.

*CERCOSPORELLA EXILIS* n. sp. Spots round to angular, limited by the veinlets, often confluent, brown, 2-5 mm.; conidiophores in small loose tufts which are effused over the lower surface of the spots, hyaline, continuous, usually subulate, nearly straight, seldom branched,  $10-20 \times 2\frac{1}{2}-3\frac{1}{2}\mu$ ; conidia cylindrical, straight, hyaline, continuous or obscurely septate,  $20-40 \times 1-2\mu$ . On *Phryma Leptostachya*. Madison, Blue Mounds and Devils Lake, August and September.

*Cladosporium paeoniae* Pass. On *Paeonia* (cult.) Madison. Pending an investigation of the diseases of paeonies in the United States, which I am informed, is to be made, I use this name provisionally.

*Cladosporium gloeosporioides* Atk. On *Hypericum virginicum*. Grand Rapids (Peltier) and Madison. This forms definite alutaceous spots on the leaves. When, however, the host plants are in a thick overshadowing growth of *Carices* and other taller plants the hyphae are borne on indefinite discolored areas. Frequently all gradations may be seen on a single host; on the upper leaves, exposed to the sunlight, the hyphae being confined to definite tan colored spots while on the lower they are borne on indefinite subolivaceous areas. I find the length of the hyphae variable; in some specimens  $20-30\mu$ , in others *ca.*  $60\mu$ . Dr. R. A. Harper has kindly compared this with specimens of *Gloeosporium cladosporioides* Ell. & Hals. in the Ellis Herbarium and transcribed the following notes from the inside of one of the envelopes; "Hyphae  $35-40 \times 4\mu$ , fasciculate, nodulose above, hyaline becoming dark; conidia oblong-elliptical  $10-14 \times 4-6$  microns". Dr. Harper writes:

"The spores seem like those on your material but the fungus on Halsted's material seems to be almost if not entirely on the stem. His host plant, of course, has narrow leaves quite different from yours. I did not get a good preparation of the conidiophores; I should think the two might be the same but I am

doubtful. The New Jersey fungus is certainly not as conspicuous as yours and produces no such leaf spots."

Considering the differences in the hosts it seems to me that there is a variable *Cladosporium* on *Hypericum* to forms of which these two names were applied. If that is the case I would prefer the later name here used to avoid tautology.

*CERCOSPORA FINGENS* n. sp. Spots suborbicular, immarginate, blackish brown, 3-5 mm.; conidiophores hypophyllous, olivaceous brown, somewhat crooked, denticulate, thicker and paler toward the apex, pluriseptate, 130-250x4-6 $\mu$ ; conidia hyaline, pluriseptate with a tendency to break apart at the septa, somewhat flaccid, tapering upward, 100-215x3-5 $\mu$ . On *Thalictrum dasycarpum*, Burnett, Washburn and Price Counties, July-September. On *Thalictrum dioicum*, Lone Rock, (R. A. Harper and G. M. Reed). Because of the long and slender hyphae and conidia this resembles, under a hand lens, *Phytophthora thalictri* Wils. & Davis for which it was mistaken in the field.

I was at first disposed to refer this to *Cercospora aquilegiae* Kell. & Sw. but as no specimens have been collected on *Aquilegia* in Wisconsin, I infer that it is distinct.

*Puccinia microsora* Koern. Amphio- and teleuto-spores on *Carex Tuckermani* Price County and *Carex scabrata*, Bayfield.

*Coleosporium sonchi-arvensis* (Pers.) Lev. II, III, on *Sonchus asper*, I on *Pinus sylvestris*, Sturgeon Bay. The uredinia were collected by Mr. J. G. Sanders, Entomologist of the Wisconsin Agricultural Experiment Station, who found it to be locally abundant. The aecia usually appear upon but one of the paired leaves.

Herbarium of the University of Wisconsin, Madison Wisconsin, March, 1913.