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Additions to the Peronosporeæ of the United States.

BY W. G. FARLOW.

The following additions should be made to the *Enumeration of the Peronosporeæ* given in the October and November numbers of the GAZETTE for 1883. Since the publication of the *Enumeration* a number of interesting forms have been received from correspondents in the Western States, to whom my thanks are due. The names of the correspondents are given below in connection with the species received from them. The numbers given are those affixed to the species in the *Enumeration*, and additional species are indicated by stars.

1. *P. viticola.*

The form on *Ampelopsis quinquefolia* was also found in September, 1883, at Ithaca, Wis., Prof. Wm. Trelease. It appears from a review in Just, which I have just seen, that Pirrota, in a paper published in Milan, 1880, stated that *P. viticola* occurs on species of *Cissus* and *Ampelopsis* in Italy. I have not seen the original paper of Pirrota, and its contents are only known to me from the review above named.

2. *P. Halstedii.*

Occurs on the following additional hosts: *Eupatorium ageratoides*, Wisconsin, Trelease; *Silphium perfoliatum* and *S. laciniatum*, Iowa, Profs. Bessey and Arthur; *Bidens chrysanthemoides*, Cambridge.

4. *P. Geranii.*

The form on *G. Carolinianum*, found by Mr. Earle, seems to belong to this species without doubt. Specimens collected in April show a large proportion of the monstrous conidia, others collected later, in May, show a smaller proportion of the large conidia, and in specimens on the same host collected by Mr. C. A. Hart in July the conidia are the same as in the normal form of *P. Geranii.*

9. *P. parasitica.*

Also on *Draba Caroliniana* and *Lepidium intermedium*, Iowa, Arthur.

10. *P. Potentillæ.*

On *P. Norvegica*, Illinois, C. A. Hart.

12*. P. ARENARIÆ (Berk.) DeBary.

Botrytis Arenariæ Berk. Journ. Hort. Soc. Lond. I., 31. Pl. IV.
P. Arenariæ DeBary. Ann. Sci. Nat. 4 Sér. Vol. XX., p. 110, Pl. XIII., f. 8, 9.

Var. MACROSPORA Farlow.

Conidiophores slender, repeatedly dichotomous, divisions flexuous, tips short, subulate, erect. Conidia ovate-elliptic, 13–17μ broad by 18–22μ long, pale violet colored. Oospores 38–48μ in diameter, very thick-walled, exospore deep yellowish brown, marked with prominent papillæ or short ridges.

On leaves of *Silene* sp.? Cobden, Illinois, Earle.

This striking species covers the under surface of the leaves of some caryophyllaceous plant, probably a *Silene*. The species is intermediate between *P. Arenariæ* (Berk.) DeBary and *P. Dianthi* DeBary. The description given above, which was taken from Illinois specimens, shows that while the oospores are larger than those of *P. Arenariæ* and in size approach more nearly those of *P. Dianthi*, yet the markings of the exospores are like those of *P. Arenariæ*. In fact, the oospores are very strikingly marked, and in several respects recall the oospores of *Cystopus candidus*. The conidiophores and conidia resemble those of European specimens of *P. Arenariæ* rather than those of *P. Dianthi*. I should hesitate to call the species new, while admitting that the American form does not conform to the type of either of the European species named, and it is difficult to say whether, in the present case, we have a form of *P. Arenariæ* with large oospores or a form of *P. Dianthi* with prominently marked exospores.

13. *P. Arthuri.*

Also on *Œnothera biennis*, Illinois, Earle.

24. *P. grisea.*

Also on *Veronica arvensis* with oospores, Anna, Illinois, Earle.

26. *P. leptosperma.*

It was stated in the *Enumeration* that this species was first found in this country at Lake Minnetonka. This is an error, as it was found by Prof. Bessey on *Artemisia Ludoviciana* in Iowa, in September, 1882.

29. *P. sordida.*

On *Scrophularia nodosa*, Iowa, Arthur; Illinois, C. A. Hart.

In the specimens examined the conidiophores formed dense dirty patches, sometimes of considerable extent, on the under side of the leaves. In microscopic characters they agree perfectly with No. 99, Fung. Scand. Eriksson. No oospores were found. The description previously given may be emended as follows:

Conidiophores much and irregularly branched, dichotomous above, divisions divergent, tips acute, rigid, erect. Conidia violet-colored, ovate-elliptic, 20–23μ long by 15–19μ broad.

31. *P. Lophanthi.*

Also on *Lophanthus nepetoides*, Illinois, Prof. T. J. Burrill and C. A. Hart.

Since the publication of the *Enumeration* I have received additional specimens of this species on *L. scrophulariæfolius* from Prof. Arthur, in which, as well as in Mr. Hart's specimens, I have found oospores. They are about 22–26.5μ in diameter, considerably smaller than the oogonia, which are from 38–46μ in diameter. The wall of the oospores is thin and delicate, of a pale yellow color, and the exospore is nearly smooth.

31*. P. SCHLEIDENIANA DeBary l. c. p. 118, Pl. XIII., f. 1–3.

P. Schleideni Unger, Bot. Zeit. 1847, p. 315.
P. alliorum Fuckel. Fung. Rhen. 41.

Conidiophores stout, naked below, above rather sparsely and irregularly dichotomous, branches short, tips stout, flexuous, approximate in pairs. Conidia very large, 40–60μ long by 22–35μ, obovate, usually papillate at the apex and attenuated at the base; dark violet colored. Oospores ?

On *Allium Cepa.*

Ithaca, Wisconsin, Trelease. Europe.

A strongly marked species, characterized by its large conidia attenuated at the base and the short, stout, rather irregularly placed branches. According to Prof. Trelease it is abundant in Wisconsin, and does decided harm to the onion crop. The original name given by Unger was *P. Schleideni*, and dates from 1847. The name given by DeBary is *P. Schleideniana* Unger, and is generally adopted by recent writers. The reason for the change in name is unknown to me, but is probably on etymological grounds.

31**. P. GRAMINICOLA (Sacc.) Schroeter.

Protomyces graminicola Sacc. Myc. Ven. No. 496, 1876.
Ustilago? Urbani Magnus, Sitzungsbericht. Prov. Brand. 26 Apr. 1878.
Peronospora Setariæ Pass. Grev. VII. 99, 1879.
P. graminicola (sub-gen. *Sclerospora*) Schroeter, Hedw. VIII. 83, 1879.

Conidiophores solitary, sparingly branched above, main branches short and thick lying close to the axis, ultimate divisions dichotomous, tips short, straight, pointed. Conidia ovate or elliptic, about 20μ long, hyaline. Oospores spherical, 34–42μ in diameter, endospore very thick, exospore proper thin, the oospores enveloped rather closely by the thick lamellated, yellowish-brown oogonium wall.

On leaves of *Setaria viridis.*

La Crosse, Wis., Mr. Pammel. Comm. Trelease. Europe.

This curious species, for which Schroeter has created the subgenus *Sclerospora*, has been found in several European countries, but is at present only known at La Crosse in this country. The oospores of the Wisconsin specimens are precisely like those of European specimens. The description given above was taken from American specimens as far as the oospores are concerned, the

description of the conidia being taken from Schroeter. In the Wisconsin specimens bodies were found on the surface of the leaves which may perhaps have been the conidia, but the material examined was not in sufficiently good condition to enable me to speak with certainty. The oospores are borne superficially on the leaves, and may be seen with the naked eye as dark brown specks. They readily fall from the leaves and collect in the form of a powder in herbarium envelopes. The endospores are very thick sometimes, in American specimens as thick as 4μ, which is thicker than reported European specimens. The exospore of other *Peronosporæ* is here represented by merely a thin film, whose surface is more or less roughened, but the oogonium wall itself, which is very thick and of a dark brown color, serves the purpose of an exospore, and instead of the spore escaping from the oogonium, as is generally the case, the oogonium falls from the leaf with the spore. The antheridia are plainly seen in Wisconsin specimens, even after having been dried for several months.

32. *Cystopus candidus.*

Also on *Nasturtium palustre* near Chicago, Arthur; and on *Sisymbrium canescens* with oospores, Arizona, H. H. Rusby.

33. *C. cubicus.*

On *Artemisia biennis*, Wisconsin, Trelease.

34. *C. Bliti.*

On *Amarantus blitoides*, Iowa, Arthur.

Besides the above, *P. nivea* and *P. Viciæ* are mentioned in a Partial List of the Fungi of Wisconsin, by Dr. W. F. Bundy, in the first volume of the Geology of Wisconsin. The hosts on which these species grew is not mentioned, but Dr. Bundy kindly informs me that *P. Viciæ* grew on cultivated peas in his garden, but he does not recollect the host of *P. nivea*, and unfortunately his specimens and notes on the subject were lost.

A Botanical Holiday in Nova Scotia. III.

BY T. J. W. BURGESS, M. D.

Led by the advertisements to believe that if we reached Port Mulgrave, on the Gut of Canso, in the evening, all we would have to do was to step off the cars on to the steamer for Sydney, we made no effort to catch the morning express, but loitered about Pictou and New Glascow until the afternoon. Our train, an accommodation, certainly deserved the name. Time seemed to be no object, and at every station train-hands and passengers "piled off" to gather wild strawberries, which were very fine and plentiful. Along the track *Senecio aureus*, L. var. *lanceolatus*, Oakes, seemingly the leading form throughout the country, grew