

# BOTANICAL GAZETTE

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## Descriptions of new species of Uredineæ and Ustilagineæ, with remarks on some other species. II.

P. DIETEL.

WITH PLATE XXIX.

**Chrysomyxa Arctostaphyli**, n. sp.—Sori hypophyllous on red brown spots of about  $4^{\text{mm}}$  diameter, arranged into groups, flattened, of irregular outline. Depth of the layers  $160\text{--}240\mu$ , spore cells oblong, about  $18\mu$  in diameter.

On *Arctostaphylos Uva Ursi*. Wisconsin, leg. Davis (no. 921), comm. Ellis.

**Chrysomyxa Chiogenis**, n. sp.—Spots yellowish or none; sori hypophyllous, scattered. Uredo layers appearing, when fresh, honey colored; uredospores formed in chains, ovate,  $22\text{--}29 \times 15\text{--}21\mu$ , with colorless, coarsely verrucose membranes. Teleutosori orange-red, waxy,  $95\text{--}120\mu$  in depth, spores  $8\text{--}12\mu$  in diameter.

On *Chiogenes serpyllifolia*. Wisconsin, June, 1893, leg. Davis (no. 6,078), comm. Ellis.

By the dimensions of the spores this species is hardly distinguishable from *Chrysomyxa Pyrolæ* (DC.), but the uredospores on an average are smaller than in the last named species. Yet the sori do not occupy, as in this, uniformly the whole under surface of the leaves. Another difference, worthy of notice although small, consists in the structure of the membranes of the uredospores. In *Chr. Chiogenis* the tubercles, or, as DeBary has demonstrated, the prominent ends of the more dense staff-like portions of the membrane are thinner than in *Chr. Pyrolæ*. On the other hand the staff-like structure of the membrane is even more delicate in *Chr. Ledi* (Alb. et Schw.) and *Chr. Rhododendri* (DC.) than in our species under consideration.



**Puccinia vulpinoidis** D. & H., n. sp.—Hypophyllous, sori small, elliptical to linear. Uredospores obovate or elliptical, pale brownish, echinulate. Teleutosori long covered by the epidermis, afterwards erumpent, black; teleutospores clavate or fusiform, somewhat constricted in the middle, upper cell truncate or attenuated, often obliquely, thickened at the summit, lower cell cuneiform, clear brown, the apex being darker colored, epispore smooth,  $40-65 \times 14-19\mu$ . Pedicels persistent, about half the length of the spores.

On *Carex vulpinoidea*. Lafayette, Ind., Nov. 1888, leg. H. L. Bolley.

**Puccinia areolata** D. & H., n. sp.—Aecidia and teleutosori hypophyllous on pale spots of  $1-2.5^{mm}$  diameter. Aecidia forming small irregular groups, pseudoperidia decaying, white, with torn edges, aecidiospores ovoid, about  $25 \times 21\mu$ , with colorless minutely verrucose membranes. Teleutosori scattered, dark brown, punctiform to  $1^{mm}$  in diameter, soon naked, pulverulent. Teleutospores rather different in form and size, mostly elliptical to clavate, apex rounded, surmounted by a large hyaline papilla, lower cell with a similar papilla on the germ-pore beneath the septum, rounded at the base or somewhat narrowed toward it. Central constriction moderate. Epispore beset with minute warts, hardly visible in water, brown;  $50-80 \times 21-34\mu$ . Pedicels deciduous, usually short.

On *Caltha biflora*. Skamania co., Wash., Aug. 1888, leg. W. N. Suksdorf.

This is the fourth *Puccinia* on *Caltha*, all of which are said to occur in North America. *Puccinia Treleasiana* Pazschke on *C. leptosepala* and our species on *C. biflora* are exclusively American. *Puccinia Zopfii* Wint. and *P. Calthæ* Lk., both on *C. palustris*, have also a wide distribution in Europe. I have never seen the last named species from America. For comparison we give figures of all four species.—Plate XXIX, figs. 1-4.

**Puccinia hyalomitra** D. & H., n. sp.—Sori hypophyllous, oblong,  $1-5^{mm}$  long, brown, pulverulent. Spores elliptical, slightly constricted at the septum, rounded at the base, apex with a flat conical hyaline thickening, lower cell provided with a similar lateral thickening, membrane thick ( $5-6\mu$ ), chestnut brown, smooth,  $47-53 \times 32-37\mu$ . Pedicels



colorless, easily detached at their bases with the spores, 100–120 $\mu$  long.

On *Chrysopsis villosa*. Helena, Mont., April, 1889, leg. F. D. Kelsey.

*Puccinia Chloridis* mihi in Hedwigia **31**: 290, 1892, is apparently identical with the previously named *Puccinia Chloridis* Speg.

**Phragmidium biloculare** D. & H., n. sp.—Sori hypophyllous and on the pedicels and stems, on the leaves circular or oblong, often following the principal veins and confluent into long patches, soon naked, pulverulent. Uredosori orange yellow, teleutosori dark brown. Uredospores ovoid or elliptical, 22–30  $\times$  15–23 $\mu$ , membranes colorless with minute distant papillæ. Teleutospores usually two-celled, seldom three-celled, elliptical, blunt or rounded at both ends, barely constricted or not at all, membranes yellow brown or dirty brown, so transparent as to make recognizable the orange red contents, covered with large tubercles which swell somewhat in water, sometimes nearly smooth, provided with three germ-pores in each cell, 30–44  $\times$  20–28 $\mu$ , three-celled spores 45–54 $\mu$  long. Pedicels colorless, to 60 $\mu$ , detached with the spores.

On *Potentilla gelida*. Chiquash Mts., Skamania co., Wash. Aug. 1892, leg. W. N. Suksdorf (no. 351).

It will seem contradictory that we have placed this fungus in the genus *Phragmidium*, for the three-celled spores are present only in a very small number, about one per cent. But in many other respects it accords so completely with the typical *Phragmidia*, that, in placing it in the genus *Puccinia*, one would separate this species from its nearest allies. We shall discuss particularly this point on another occasion.

**Tilletia Elymi** D. & H., n. sp.—Spore masses black, destroying the ovaries. Spores globose, dark olive brown, 24–28 $\mu$  in diameter. Epispore reticulated with ridges 2.6–4 $\mu$  high and about 3 $\mu$  apart.

On *Elymus* spec. Skamania co., Wash., Aug. 1886, leg. W. N. Suksdorf.

**Tolyposporium Davidsonii** D. & H., n. sp.—Spores produced in spherical firm walled galls of about 0.7<sup>mm</sup> diameter, on the outside and at the bases of the perigonal leaves and the leaflets within the inflorescence. Spore mass powdery, light chocolate brown, discharged by irregular ruptures of the



galls. Spores aggregated in very different manner into balls of 2 to 7 cells or isolated, longish or isodiametric, flattened on the sides of contact, pale, densely verrucose. Dimensions of the spore cells  $12-15 \times 7-13 \mu$ .

On *Atriplex* spec. Los Angeles, Calif., Sept. 1893, leg. Dr. A. Davidson. This is a very remarkable fungus on account of its peculiar appearance, represented in plate XXIX, fig. 5. The arrangement of the spore cells is a very variable one. In bicellular spores the cells touch each other by their longer sides, or the plane of separation is inclined (figs. 7a, 7b). In three-celled spores the cells are arranged into a triangle (7c) or into a straight line or in an intermediate manner (7d). If the spore ball is four-celled, the component cells are situated across in the same plane (7e), or may be arranged in a different manner (7f). Likewise in aggregates of more than four cells, these may lie in the same plane (7g) or form a nearly spherical body (7h). More than seven cells in one spore ball have not been observed; the most frequent cases are two to four cells. The spores are produced within small pisiform receptacles walled by a few layers of parenchymatous cells of the host plant. The formation of the spores begins in the center of the galls and gradually proceeds outwards. In the more advanced conditions the interior wall of the cavity is covered with a stratum of hyphæ whose innermost beds are transformed into a gelatinous mass forming the spores (see figs. 6 and 8).

**Peronospora phlogina** D. & H., n. sp.—Conidiophores erumpent in whitish afterwards dirty flocks from the under surfaces of the leaves, five to seven times bifurcated, the terminal branchlets slightly curved. Conidia ovoid,  $26-29 \times 16-20 \mu$ , nearly colorless, in masses appearing dirty brownish, smooth. Oospores spherical,  $32-48 \mu$  diam., coarsely verrucose, yellow brown.

On *Phlox divaricata*. Decorah, Iowa, June 1888, leg. Holway.

Leipzig, Germany.

#### EXPLANATION OF PLATE XXIX.

Fig. 1, *Puccinia areolata*.—Fig. 2, *Puccinia Treleasiana*.—Fig. 3, *Puccinia Zopfii*.—Fig. 4, *Puccinia Calthæ*.  $\times 400$ .—Figs. 5-8, *Tolyposporium Davidsonii*.—Fig. 5, A diseased twig of *Atriplex* (with broken leaves)  $\times 2$ .—Fig. 6, Part of a section through a gall.  $\times 250$ .—Fig. 7, Spores.  $\times 500$ .—Fig. 8, Young spores.



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