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SOME FUNGUS DISEASES OF IOWA FORAGE PLANTS.*

BY L. H. PAMMEL.

The subject was treated under the following heads: Rust, smut, mildews, spot diseases and bacterial diseases. The synonymy is that given by Saccardo, "Sylloge Fungorum." The locality is Ames, and species were mostly observed by myself.

SCHIZOMYCETACEÆ. Bacteria *Bacillus Sorghi*, W. A. Kellerman, *S. vulgare*.

PERONOSPORACEÆ. Downy Mildews. *Peronospora trifoliorum* on *Astragalus canadensis*. (Halsted.) *Vicia Americana*.

P. graminicola on *Setaria viridis*, *S. italica*. It often produces distortions of parts of the flower and is especially destructive to young Fox-tail.

ERYSIPHEÆ. Powdery Mildews. *Erysiphe graminis* on *Poa pratensis*, *P. arachnifera*, *P. serotina*, *Eatonia obtusata*, *Agrostis alba* var. *vulgaris*, *Triticum vulgare*.

HYPOCREACEÆ. Ergot or *Claviceps purpurea*, Tul., on *Secale cereale*, *Elymus virginicus*, *E. striatus*, (Halsted), *Asprella hystrix*, *Agropyrum glaucum*, *A. repens*, *Calamagrostis canadensis*, *Glyceria fluitans* (Halsted), *Spartina cynosuroides* (Halsted).

DOTHIDECEÆ. *Phyllachora graminis*, (Pers.) Fuckel on *Agropyrum repens*, *Elymus Canadensis*, *Asprella hystrix*, *Panicum dichotomum*.

P. trifolii (Pers.). Fuckel.

PHACIDIACEÆ. *Phacidium medicaginis*, on *Medicago sativa*.

HYPHOMYCETES. *Scolecotrichum graminis* on *Dactylis glomerata*.

Helmithosporium graminis on *Hordeum vulgare*.

Cladosporium graminis on *Avena sativa*.

UREDINEÆ. Rusts. *Uromyces trifolii*, (Alb. and Schw.) Wint. on *Trifolium pratense*. *T. incarnatum* (F. A. Sarrine).

U. graminicola, Burrill on *Panicum virgatum*.

Puccinia andropogonis, Schw. on *Andropogon provincialis*, *A. scoparius*, *Chrysopogon nutans*.

P. emaculata, Schw. on *Panicum capillare*.

P. graminis, Pers. on *Agrostis alba* var. *vulgaris*. *Agropyrum glaucum*. *A. repens*, *Triticum vulgare*. *Hordeum vulgare*.

* The entire paper, but adapted to general readers, was published in full in Monthly Review of the Iowa Weather and Crop Service. Vol. I., No. 5, p. 2; No. 6, p. 1; No. 7, p. 4; No. 9, p. 5. Vol. II., No. 1, p. 2; No. 2, p. 8; No. 3, p. 8; also separate 33 pp.

P. rubigo-vera, (D. C.), Winter on *Hordeum jubatum*, *Triticum vulgare*, *Elymus Canadensis*.

P. coronata, Corda. On *Avena sativa*.

P. sorghi, Schw. on *Zea mays*. A destructive species in some years.

P. vexans, Farlow on *Bouteloua racemosa*.

USTILAGINÆÆ. *Ustilaga Maydis* (D. C.) Corda on *Zea mays*.

Smuts. *Ustilago Madis* on *Zea mays*. All varieties more or less, but it is much more severe on some than others. "In 1889 the experiment station had a row of corn, the seed of which came from Phillipine Islands. The growth was vigorous; in height it exceeded by several feet the tallest corn on the ground, produced well developed nodal roots. Not only were the blades and sheaths badly infested with corn smut, *Puccinia sorghi*, but many of the stems, sheaths and nearly every plant in the row was smutted." The row adjoining this one had some smut, but no more than other varieties grown some distance from it.

U. Hordei on *Hordeum vulgare*.

U. avenæ on *Avena sativa*.

U. tritici on *Triticum vulgare*.

U. bromivora var. on *Bromus breviaristatus*.

U. panicis miliacei (Pers.) Wint. on *Panicum capillare*.

U. neglecta, Niessel, on pigeon grass (*Setaria glauca*); a very common species. It is sometimes thought to cause abortion in Iowa. There is little foundation for the opinion.

Tilletia striæformis on Timothy (*Phem pratense*); Blue grass (*Poa pratensis*) affects leaves and sheaths as well as parts of the flower.

T. foetens (B. & C.), Trelease on wheat (*Triticum vulgare*), (Bessey.)

Urocystis agropyri on Wild rye, (*Elymus canadensis*); a very common species.

BACTERIA OF MILK, CREAM AND CHEESE, WITH EXHIBITION OF CULTURES.

ABSTRACT BY L. H. PAMMEL.

Some twenty or thirty different cultures were exhibited, partly obtained from milk, butter and cheese and some from rotting beets etc. The method of obtaining pure cultures with gelatin and agar cultures was explained. The action of some of the bacteria on milk is rendering milk sour. The souring of milk is not due to a single germ, but a large number have the power of changing milk sugar into lactic acid. Of the many lactic acid germs some are especially important in giving the proper aroma to cream, and the butter made from it. Certain species of bacteria render cream bitter. The old *Clostridium butyricum* was once supposed to be the cause of bitter taste in butter. It has been shown that this germ does not render butter bitter, but there are a number of quite different germs which may cause such changes. Certain peculiar flavors are also due to the action of germs.