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Bacteria of Milk, Cream and Cheese, with Exhibition of Cultures

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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. panicæ 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. fetens (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.

Red color in milk and cream is caused by *Bacillus prodigiosus*; blue milk by *Bacillus cyanogenus*; yellow milk is produced by *Bacillus synxanthus* cultures of pathogenic germs like *Bacillus pyocyaneus*, *Staphylococcus pyogenes* var. *aureus* and *S. pyogenes* var. *citreus*, were shown, and it was stated that these may sometimes occur in milk and cause injuries.

CORN SMUT.

It is the generally accepted opinion among botanists that corn smut (*Ustilago zeæ-mays*) enters the tissues of its host during the early stages of corn, shortly after germination. These opinions are based on the careful experiments conducted by Dr. Julius Kuehn,¹ a careful German investigator. Last spring some experiments were started on the College Farm with the view of preventing this troublesome disease. It was expected, of course, that the results at the close of the season would show a decided advantage in the treated corn, but to my surprise the results were entirely negative.

In the meantime a bulletin was received from Prof. Kellerman,² in which the results of his experiments with Corn Smut are given in detail. The experiments on the College Farm were somewhat more extended than those of Prof. Kellerman. It is not necessary to give details in this connection. The results of some of these experiments are as follows:

A plat of ground was selected which for several years had been in grass, so that the chances were against any great amount of smut in the soil. Although the weather was somewhat unfavorable a good share of the corn came up, though the stand was considerably injured by ground squirrels. First planting, May 7; second planting, June 1. Sample *a* was treated with hot water: vessel one, 44-46° centigrade; vessel two, 53-55° centigrade. Time was not kept though it was subjected to this heat for several minutes. The corn of second planting was kept in one vessel subjected to 50-56° centigrade.

No. I.—Treated, smutty; 1 ear; 3 staminate ears, 2 staminate 6
 Not treated, smutty; 1 ear; 7 stalks 8

HOT WATER.

No. II.—Treated, smutty; 6 stalks 6
 Not treated, smutty; 1 leaf; 1 ear; 5 stalks 7

No. III.—This corn was planted on soil which had been planted to corn in 1890.

Hot water treatment. Results of treated and check are as follows:
 Smutted, treated: 2 ears, 4 leaves, 2 staminate ears, 3 staminate, 31 stalks . . . 42
 Checks not treated: 3 ears, 3 leaves, 9 staminate ears, 2 staminate, 21 stalks. 38

No. IV.—Treated with ammoniacal carbonate of copper.
 Treated: 2 ears, 2 leaves, 3 staminate ears, 1 staminate, 30 stalks 38
 Check: 10 ears, 1 leaf, 1 staminate, 20 stalks 32

1. Bot. Zeitung, Vol. XXXII, p. 122.
 2. Bulletin No. 23, Kansas Agricultural Experiment Station, August, 1891, Manhattan, Kansas.