

The Alfalfa Leaf-Spot Disease.

Pseudopeziza Medicaginis (Lib) SACC.

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HISTORY.

This most destructive of all alfalfa diseases has been known since 1832, when it was described in France by Libert. It has had occasional notice by various authors since that time, but nothing has been done toward a more thorough understanding of its life cycle until in 1890, when Prof. Chester made some experiments which led him to believe that the disease could not be prevented by treating the seed, because, like corn smut, i. e., the disease entered its host through the green, growing parts, supposedly by atmospheric infection.

LOSSES

In 1891 Prof. Pammel estimated the loss to the alfalfa crop in the neighborhood of Ames at 50 percent. Before and since that date it has been more or less destructive, not only here, but throughout most of the state, wherever alfalfa has been grown. Its commonness and great destruction to alfalfa has led me to make some experiments with the object of determining something more of its habits and the possibility of prevention or treatment. But before giving the results of these experiments it will be better to give a short description of the disease.

GENERAL CHARACTER.

Any time after the plant has attained a growth of four to six inches from the seed, but most commonly after the first year's growth, there appears upon the upper side of the leaves small, irregular brownish spots, which enlarge to about one sixteenth of an inch in diameter and extend through the leaf to the under side, turning all parts brown.

MISROSCOPIC CHARACTER.

Through these brown spots the mycelium or the thread-like, vegetative portion of the disease is distributed.

Soon there are formed blackish pustules about the middle of the brown spots on the upper side of the leaves. These pustules are composed of long club-shaped, sac-like bodies, called asci; along with these are thread-like, sterile bodies, called paraphyses, all arising from the mycelium in the interior of the brown spots.

The fruiting bodies or asci each contain eight very small, egg-shaped, or oblong ascospores which serve the same purpose as the seeds of higher plants. When many spots occur on the same leaf the whole leaf soon turns yellow and falls off. This falling of the leaves and the natural loss in vigor, due to the diseased condition before the falling, constitutes the great damage done by the disease.

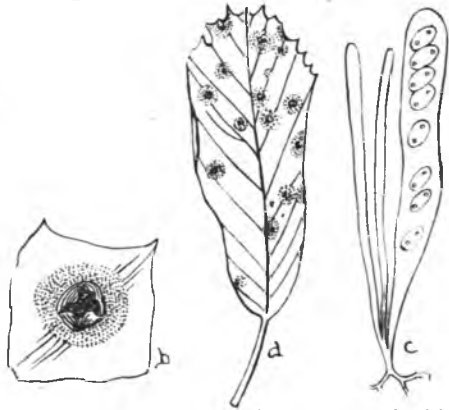


Fig. 9. Spot disease of Alfalfa. *a*, a leaf with spots; *b*, enlarged pustule; *c*, ascus with spores and sterile threads, paraphyses. Original (Combs and Miss King.)

The experiments that I have conducted so far show: First, that the plants become infected by the spores of the disease floating in the air and falling upon the upper surface of the leaves of the plant, where they germinate and enter the plant, probably through the small openings called breathing pores or stomata; second, that the disease is entirely local, i. e., its mycelium extends to no other part of the plant than that defined by the brown spot.

No experiments were conducted with methods of treatment but from what is known of its habits it would not be expedient to treat it except by measures of prevention.

The seed, if to be sown, should be selected from undiseased stock or treated with copper sulphate solution (10 percent), if to be drilled, these precautions need not be followed. Frequent cuttings of the crop materially prevents the disease. All old leaves and rubbish should be burned from the field each fall. New fields should be planted at some distance from old alfalfa fields.