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FORMALIN TREATMENT OF SEED GRAIN FOR SMUT.*

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The prevalence of smut in wheat and oats in Colorado calls for earnest work on the part of grain growers of our state to check its ravages and stamp out this most pernicious plant disease.

WHAT IS SMUT?

It is a parasitic fungus which feeds upon another plant as its host. It springs from a spore which corresponds to a seed in higher plants. This germinates when the grain is seeded and, penetrating the little grain plant when but a few days old, grows up within the grain stem. After entering the stem there is no evidence of its presence until the grain begins to head. At this time the smut plant robs the developing kernels of their nourishment and ripen a mass of smut spores.

HOW THE GRAIN IS INFECTED.

These spores usually ripen before the grain does and are blown about the field, many spores becoming lodged on the ripening grain kernels. The wholesale agent of infection however, is the threshing machine; the crop from a field practically free from smut is therefore liable to infection by spores carried by the thresher from some infected field. For this reason the safest plan is to *treat all your seed wheat and oats each year.*

METHOD OF TREATMENT.

First. Secure from your druggist a sufficient amount of formalin to treat your seed oats and wheat. Formalin is the

*Bulletin 79 (1903), by Jos. Reed, gives some experimental tests of various methods of treating stinking smut in wheat.

commercial name for formaldehyde gas held in a water solution. This gas should be a 40 per cent solution since this strength is necessary to kill the smut spores. It requires just about one ounce for every five bushels of grain to be treated.

Second. Clean off a space on the barn floor or sweep a clean space on the hard level ground and lay a good sized canvas down, on which to spread out the wheat. See that the place where the grain is to be treated is swept clean and thoroughly sprinkled with the formalin solution before placing the seed grain there.

Third. Now spread out your seed grain on the space prepared for treating it and prepare the formalin solution. This formalin is quite volatile so the solution should not be made until one is ready to use it.

Fourth. Use 1 ounce of formalin to every $2\frac{1}{4}$ to $2\frac{1}{2}$ gallons, 4 ounces for 10 gallons, 16 ounces (one pound) for 40 gallons of water. Put the solution in a barrel or tub, thoroughly mixing it so the formalin will be well distributed. One pound of formalin to 40 gallons of water is sufficient to treat 2,500 pounds of grain.

For smaller amounts, estimate 6 to 8 quarts ($1\frac{3}{4}$ to 2 gallons) of the solution for every 100 pounds of grain. This solution can be applied with the garden sprinkler. Care must be taken to thoroughly moisten the grain. Sprinkle, stir the grain up thoroughly and sprinkle again, until you feel certain every kernel is wet with the solution.

When you have completed the sprinkling process, place the grain in a conical pile and cover with horse blankets, gunny sacks, etc. The smut that does the damage lies just under the glume of the oats or on the basal hairs of the wheat. Covering the treated grain holds the gas from the formalin *within* the pile, where it comes in contact with the kernels, killing such smut spores as may have survived the previous treatment. After the grain has remained in a covered pile 2 to 4 hours, spread it out again where the wind can blow over it, to air and dry as rapidly as possible.

As soon as one can take the grain in the hand without the kernels sticking together, it can be sown in the field. Of course the grain is moist and therefore the kernels are enlarged so we will need to set the seeder accordingly. One can treat the grain in the forenoon and seed it in the afternoon.

Since this treatment swells the kernels it hastens germination and should be done in the spring just before seeding time. The treatment is practically inexpensive, takes but a few hours to treat a considerable quantity of grain and effectually kills smut when properly and thoroughly done.

While the copper sulphate or blue stone treatment is valuable in killing smut, the formalin treatment can be given in less time, is applied so easily and is so effectual that it is recommended as a sure and ready means of killing smut in wheat and oats.