MICHIGAN AGRICULTURAL COLLEGE
EXTENSION DIVISION

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EAST LANSING

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OAT SMUT AND ITS CONTROL

Fig. 1.—Smutted versus healthy heads.

Oat Smut is a fungous disease attacking the head of the grain, forming a mass of brownish-black powder. Smutted plants do not form kernels, and are usually stunted, so that they are easily overlooked in a field of grain.

OAT SMUT—A WASTING DISEASE

The Cause

This disease is caused by a parasitic fungus—a small plant which makes no food for itself but steals its living from the oat. The body of the smut fungus is made up of threads, microscopic in size, which live inside the oat plant, growing up with it, and finally producing its own kind of fruit where the oat kernel should be produced. This fruiting mass of the oat fungus is the brown "smutty" powder. It is made up of the countless thousands of exceedingly minute balls. These balls are the "seed" of the smut fungus. They are called spores.

The Course of the Disease

These seed-like bodies, the spores, are mature at threshing time. They get into the crevices of the grain and adhere to the surfaces. When the grain sprouts, the smut fungus sprouts too, and bores into the young

Fig. 2.—Applying concentrated formaldehyde to grain.

seedling. This is the only period when the smut can infect the oats. Once inside, the smut plant grows as the oat plant grows, keeping pace with its progress. When the oat matures, the smut matures also and completely replaces the normal grain with the "smutty" powder. The seed for next year's crop becomes heavily dusted with this powder during threshing. It is not too much to say that, year in and year out, smut destroys 8 to 10 per cent of the untreated Michigan oat crop—approximately one acre out of every ten planted. This amounts to nearly a million dollars annually.

Oat Smut is Preventable

Prevention of oat smut is possible by taking advantage of the fact that the smut can only enter the grain at sprouting time, the seed grain itself being the source of infection.

Seed treatments kill the spores on the outside of the grain, without injuring the grain itself.

Smut is now so common everywhere that untreated grain gives a heavily smutted crop; treated oats give clean, healthy plants.

Clean the oats of all weed seeds, chaff, and light grains by means of a fanning mill.

Treat seed oats for smut either by the well known sprinkling method or by the new concentrated formaldehyde treatment.

Old Sprinkling Method

Mix one pint fresh formaldehyde with 40 gallons of water. Clean a place on the barn floor and sprinkle with this solution. Spread the oats in a thin layer (four inches) and sprinkle with the dilute solution of the formaldehyde. Shovel over and over until every kernel is moist. Add layer after layer, sprinkling as before. Two quarts of solution is enough

Fig. 3.—Treated grain, covering to remain no longer than four hours. The grain is then spread thinly for thorough airing. Plant at once.

to allow to a bushel. When all the gain is moistened, shovel into a compact heap, cover *two* hours with a blanket or canvas, then spread out to dry and air. Do not let the wet grain freeze, mould or sprout.

The grain may be planted as soon as it is dry enough to run through the drill. Make allowance for the slightly swollen condition when planting. One pint of formaldehyde will treat from 50 to 60 bushels.

The treatment may be modified by dipping the grain, one-half to one bushel at a time, in a barrel or tub of the dilute solution. Drain, cover for two hours, dry and the oats are ready for planting.

The New Concentrated Formaldehyde Treatment

Use formaldehyde at the rate of one pint to 50 bushels of grain. For smaller amounts of grain use correspondingly smaller amounts of formaldehyde. It is unnecessary and unsafe to use more formaldehyde than the amount recommended. Put the right amount of fresh formaldehyde just as it comes from the druggist, into a pint or quart hand-sprayer or atomizer. The concentrated formaldehyde may be diluted 4 or 5 times with water to secure better distribution of the chemical. Then spray the grain as it is shoveled over and over. (Fig. 2.) If the sprayer is kept close to the grain and if the treatment is given in a room where there is a good draft, the penetrating odor of the formaldehyde will give no discomfort.

When the right amount of formaldehyde has been applied, shovel the oats into a heap and cover for exactly *four hours* with a canvas or blanket. (Fig. 3.)

The grain should then be spread out thinly for a thorough airing in a warm place. Rake the grain over during this airing, then plant at once.

*For control of wheat stinking smut, dusting with copper dust is advised.

The copper dust method is not advised for oats.

With either treatment avoid contaminating the grain with dust from old sacks or from the drill. To disinfect the sacks, soak in formaldehyde, two tablespoonfuls to a pail of water. To disinfect the drill, pour this solution through it.

Ask your druggist for *fresh formaldehyde.*

SUMMARY

Sprinkling Treatment

1. Use one pint of fomaldehyde to 40 gallons of water.
2. Use two quarts of this solution per bushel of grain.
3. Cover two hours.
4. Dry and sow as soon as possible.

Spray Method

1. Use one pint of formaldehyde to 50 bushels of grain. Dilute 4 or 5 times with water.
2. Cover for four hours.
3. Air well and sow as soon as possible.

Caution

1. Follow directions closely.
2. Do not use too strong a solution, or keep covered longer than given in directions, as it will injure the germinating power of the seed.
3. Do not let the wet grain freeze, mold or sprout, as this also injures the grain. Treat grain on a warm, dry day, if possible.

This bulletin was prepared by Dr. G. H. Coons of the Botany Department, Michigan Agricultural College, East Lansing, Mich. For further information, write directly to him.

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