

April, 1919

Extension Bulletin

Series , No. 159-A

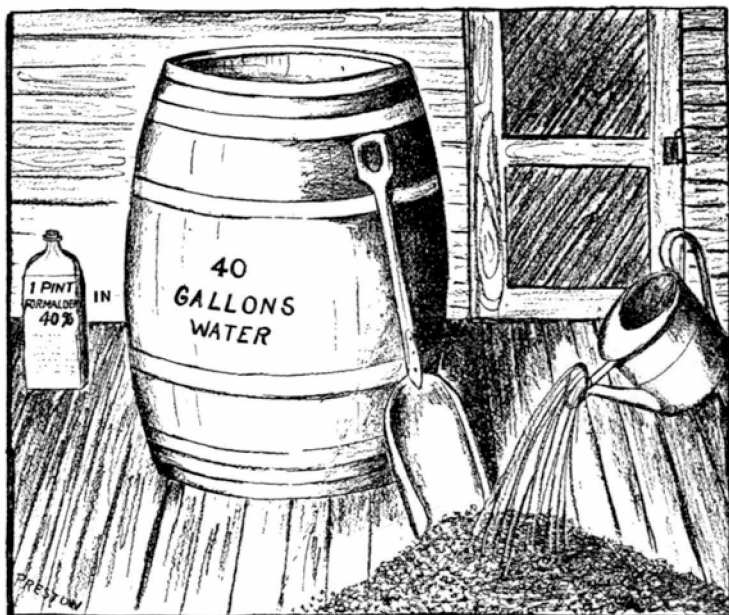
# Colorado Agricultural College EXTENSION SERVICE

Fort Collins, Colorado

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## THE PREVENTION OF CEREAL SMUTS BY SEED DISINFECTION

By  
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## *CEREAL SMUTS*

The smuts of cereals are among the most destructive of plant diseases. The smuts affecting wheat, oats, barley, and rye caused a loss of approximately 133,000,000 bushels of grain in the United States in 1917. The losses in Colorado alone from these smuts amounted to nearly 2,000,000 bushels. Fully 90 percent of this loss was due to those smuts which can be prevented by careful seed treatment.

The covered smut of wheat and emmer, the covered smut of barley, the oat smuts, the millet smuts, the kernel smuts of sorghum, and the stem smut of rye can all be effectively prevented by seed treatment. The fungi which cause these diseases live over from one crop to the next in the form of very small, seed-like structures known as spores. These spores are spread by wind, thrashing machines, smutty grain drills or other means, to the surface of healthy grains where they find lodgment in cracks, crevices or hairs. When such grain is planted, the smut spores germinate at about the same time the seed germinates and immediately infect the young seedling. The disease does not show up, however, until about heading time when, instead of forming grain, the infected plant forms a black powdery mass of smut spores.

## *HOW TO PREVENT SMUT*

Since the disease depends upon the presence of the spores on the seed at time of germination, the logical way of preventing smut is to disinfect the seed grain just before planting. Formaldehyde is undoubtedly the most effective disinfectant for this purpose. Copper sulphate or bluestone was one of the earliest ones used and is still used to some extent; several years of experimentation and practice have shown, however, that formaldehyde has many advantages over copper sulphate. Copper sulphate is often injurious to the seed. It is especially injurious to oats and should not be used for treating this crop. Formaldehyde, however, very seldom injures the seed and can be used equally well for all the cereals. The formaldehyde treatment is simpler in application; there are no crystals to dissolve and there is no necessity of treating with lime water to prevent seed injury. Moreover, grain treated with copper sulphate is poisonous while grain treated with formaldehyde is not; any grain treated with formaldehyde that happens

to be left over may be safely fed to livestock as soon as it has dried. The cost of treatment with copper sulphate is also somewhat greater than with formaldehyde. The exclusive use of formaldehyde, therefore, is recommended. If one has become accustomed to the copper sulphate method, however, and is satisfied with the results obtained, a change of methods is, of course, not necessary.

### **HOW TO USE THE FORMALDEHYDE TREATMENT**

Formaldehyde is sold by all druggists in standard 40-percent solutions. The average price is from 50 to 70 cents per pint.

There are three standard methods of treating grain with formaldehyde. Twenty years of use have shown these to be efficient and reliable. These are: (1) *The soaking method*, (2) *The open tank method*, and (3) *The sprinkling method*. Directions for the use of each of these methods are given below. Select the method best adapted to your conditions and equipment and then follow the directions carefully.

#### **THE SOAKING METHOD**

1. Estimate the amount of seed to be treated and purchase formaldehyde (40-percent strength) one pint for 40 bushels of grain.

2. Clean the seed thoroughly by fanning so as to remove all unbroken smut balls.

3. Dilute the formaldehyde at the rate of 1 pint to 40 gallons of water.

4. Put a sufficient amount of the diluted solution into a barrel or tank to immerse one or more sacks of seed.

5. Put seed in gunny sacks and immerse in solution. Do not fill the sacks too full; allow room for agitation of the grain so that each seed will become thoroughly wet.

6. Leave the seed in the solution length of time specified in Table I.

7. Remove the sacks and drain, allowing the excess solution to run back into the barrel or tank. Replenish the solution when it gets too low.

8. Leave the treated grain in the wet sacks, for not less than 6 hours nor more than 12 hours. Place the sacks where they will drain rapidly.

9. Plant immediately or empty the grain and spread out in a thin layer to dry. Drying may be facilitated by frequent shoveling.

#### **THE OPEN TANK METHOD**

1. Make the formaldehyde solution the same as for the soaking method.

2. Pour the loose grain slowly into the solution in an open vessel. Stir thoroughly and skim off the smut balls.

3. Soak for length of time specified in Table I.