2-1926

Treating Seed Grains in South Dakota

Ralph E. Johnston

George H. Valentine

Extension Circular 238 February, 1926

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By
RALPH E. JOHNSTON, Extension Agronomist
and
GEORGE H. VALENTINE, Assistant Agronomy Specialist

SOUTH DAKOTA grain growers annually lose millions of dollars from plant diseases. Many of these diseases can be controlled. This circular discusses only the simple treatments which largely control the smuts of wheat, oats and barley.

Covered or Stinking Smut of Wheat

Stinking smut is one of the most serious. Actual percentages of losses cannot be accurately determined but for each per cent of smut damage to the South Dakota wheat crop each year, there is lost over $300,000 considering average production and farm price for the past five years.

The use of copper carbonate dust is recommended to control this disease. This is a very fine, fluffy, light green colored powder which is not a deadly poison except in large doses. However, it should not be carelessly handled. The copper carbonate dust of about 20 per cent copper equivalent or the so-called "extended form" is recommended. This dust is sold under various trade names, such as Copper Carb, Wheatcote,

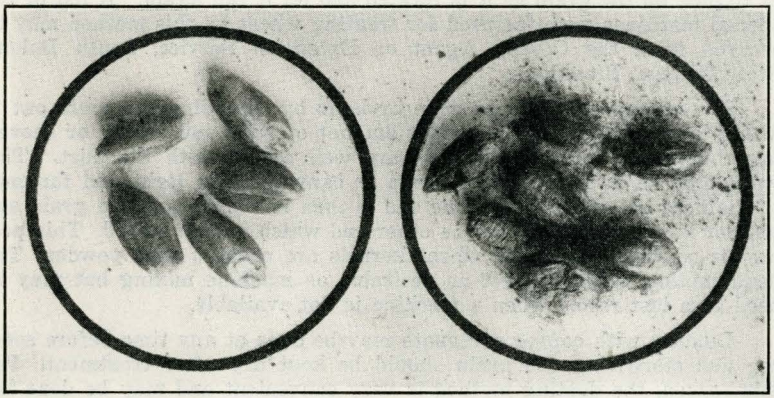

Fig. 1.—Normal and smutted kernels of wheat.

Smuticide, etc. Use two to three ounces per bushel depending upon the severity of infection. Avoid heavy, bluish or coarse powders. It is very essential that each kernel of wheat be thoroughly coated with the copper carbonate dust. This means that the dust must be very fine and the wheat and dust thoroughly mixed. If possible, use a home made machine, a churn or a special manufactured dusting machine. A concrete mixer with a tight fitting, temporary cover is satisfactory.

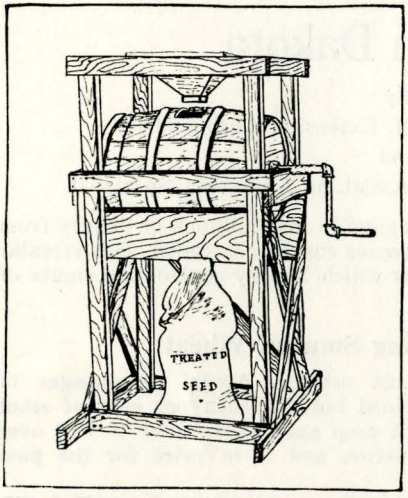

Fig. 2.—Homemade smut treating machine.

A home-made machine may be made from a wooden barrel or box, mounted on a standard. Ordinary gas pipe and fittings may be used for the axle and crank. An opening on the side of the barrel or box near the middle must be provided which can be opened and securely closed. Another simple device consists of a rotary churn which can be turned by hand or by a small engine. Either of these should not be rotated too fast. Machines should be turned long enough to thoroughly coat every kernel. They must be tight enough so as not to allow any of the powder to escape. Both barrel and churn should have projecting blades or cleats attached to the interior so as to pick up the grain as it is rotated and let it fall again. A list of the special machines manufactured for treating wheat by this method may be secured from the County Agent or Extension Service, South Dakota State College, Brookings.

The mixing may also be done by hand by spreading the grain out in a thin layer, sprinkling the proper amount of dust, and raking or shoveling thoroughly until the kernels are well coated with the dust. This work may be done on a heavy trap or canvas drawn tight and fastened to the floor at each corner. One end is then raised up and the grain and powder is allowed to roll to the other end which is next raised. This process is continued until the wheat kernels are covered with powder. The hand mixing method is not as desirable as machine mixing but may be used as a last resort when a machine is not available.

Dusting with copper carbonate may be done at any time before seeding and stored but the grain should be kept dry after treatment. For this reason, the dusting method is very convenient and may be done before seeding and during slack periods and the process not hurried.

IMPORTANT.—Do not inhale the copper carbonate dust as it is very irritating to the nasal passages and in excess causes vomiting. A regular dust mask may be worn for protection or a moist hankerchief tied over the nose and mouth may be used to advantage. Care should be taken to avoid the dust getting into cuts or open sores. Treated grain is poisonous. See that none of it is fed to livestock. After working with copper carbonate or the treated grain, thoroughly wash hands before touching food.

Smuts Of Oats And Barley

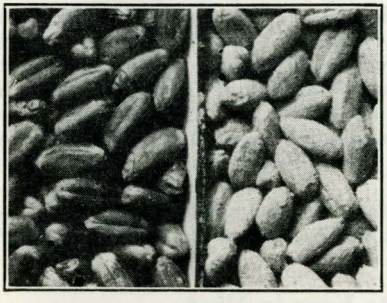

Fig. 3.—Kernels untreated (left). Kernels treated with copper carbonate (rt.).

The covered smuts of oats and barley and loose smut of oats can be controlled by proper seed treatment. For every per cent of smut damage to the South Dakota oat crop each year, there is lost over $250,000 considering average production and farm price for the past five years.

Treatment.— The use of formaldehyde is recommended. Copper carbonate is not recommended for oat and barley smuts. Use one pound (one pint commercial formalin) to 40 gallons of water. Dip or treat in any one of the following methods depending upon which is most convenient. The seed should be thoroughly cleaned by fanning before treatment to remove smut balls, light seeds, thrash and infected straw.

Soaking method.—Put the solution (one pint to 40 gallons) into a barrel or tank large enough to immerse one or more burlap sacks loosely filled with the seed. Leave oats immersed for 5-10 minutes and barley 2 hours. This is the best treatment for barley. After removing the sacks, let them drain on slats over the barrel. The grain is then emptied into a pile and covered with sacks or a canvas, previously wetted with the solution, for 2 to 5 hours.

Open tank method.—The solution is put into an open tank or barrel provided at the bottom with a hole which is covered on the inside with a small piece of screen. Pour the grain in and stir thoroughly and skim off the smut balls and seeds which float. Soak the same length of time as indicated above. Remove the grain, after draining off the solution and cover with a canvas or sacks, which have been previously wetted with the solution. Leave covered for 2 to 5 hours and sow while damp. In this and the soaking method, the solution may be used repeatedly, as it does not lose its strength.

Sprinkling method.—The grain is placed on a clean floor or in a wagon box to a depth of 4 to 6 inches. The same strength solution is sprinkled over it using an ordinary garden sprinkling can. The grain is then shoveled over and over. Another layer of grain may be added and the process repeated. A gallon of the solution should be used for each bushel covered and handled as in the other formaldehyde methods.

Dry Method for OATS Only.—The so-called "dry" formaldehyde method may be used with oats. This method is popular because it does not wet the seed. Mix one pint of formaldehyde with a pint of water and apply this to the oats by means of an ordinary air pump sprayer, not a sprinkler. This may be done conveniently by spraying the solution on the grain as it is being shoveled from one pile to another. Direct the spray on the oats as it is falling from the shovel, holding the sprayer close to the pile which has been treated. Each quart of the solution should treat 50 bushels of oats. After spraying, cover the oats with clean sacks or canvass for five hours. They can then be sown immediately. A slight variation of this "dry" method is to mix one pint of formaldehyde with 10 or 12 pints of water and sprinkle oats as they are shoveled over. They can then be sacked immediately and planted at once. Seed does not have to be dried. This does away with the strong solution which is so irritating to the nose and throat.

Hulless oats and hulless barley can be treated with copper carbonate the same as wheat is treated. Formaldehyde injures the germination of hulless oats.

Important Points to Keep in Mind

In all treatments, bins, bags, wagon box and drills should be disinfected with the formaldeyhde solution.

If formaldehyde is used on wheat, plant while damp and in moist soil. If planted in dry ground. some seed injury may result

If oats and barley are allowed to dry before planting, test germination of seed before planting or seed a trifle thicker.

After treating with formaldehyde and the seed is still damp and swollen, the seeder or drill should be set to sow one-half bushel (barley and wheat) to three-fourths bushel (oats) more to an acre than the usual anount.

Do not allow wet grain to heat or freeze.

None of these treatments prevent loose smuts of wheat or barley.

For further information write to the Extension Service of State College or County Agents.

Extension Service
South Dakota State College of Agriculture and Mechanic Arts
Brookings, South Dakota

Published and distributed under Act of Congress, May 8, 1914, by the Agricultural Extension Service of the South Dakota State College of Agriculture and Mechanic Arts, Brookings, A. E. Anderson. director, U. S. Dept. of Agriculture cooperating.