Seed Treating Machinery

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For a number of years the beet sugar industry has been aware of the need to protect beet seed with a fungicide before issuing the seed to growers.

This paper will discuss three different types of seed treaters the Great Western Sugar Company has experimented with in the past three years. Before this time all of our seed treating has been done with a Calkins dry treater. Treating has not been satisfactory because the materials generally used were a hazard to the men operating the treater, and the machines do not meter small quantities of fungicide efficiently without a carrying agent. Also, in the dry-type treating method, it has been found that the fungicide would not stick to the seed sufficiently, and some material would settle to the bottom of the seed bags.

In our area, beet seed is treated with several fungicides, namely: Arasan, Arasan SF-X, improved Ceresan M, Phygon and Manzate. Also fume phosphate. Lindane and Heptachlor are used. For a treater to operate efficiently for our purposes, it should handle any of the above fungicides as well as commercial fertilizers and insecticides. This presents a problem because these materials comprise both the dry powder type and the wettable powder type. Further, a perfect treater should handle the liquid fungicides as well.

The three treaters to be discussed are:

1. The Clute wet treater made by the Clute Manufacturing Company of Rocky Ford, Colorado.

2. The Gustafson slurry treater made by the Ben Gustafson 8c Son Manufacturing Company, Moorhead, Minnesota.

3. The Kromer treater made by the O. W. Kromer Company. Minneapolis, Minnesota, and developed by the Green Giant people at LeSeuer, Minnesota.

The Clute Treater

The Clute treater is a relatively small machine, comprising a double hopper for dry powder fungicide, a metering scroll for the fungicide, a beet seed hopper, two mixing chambers, spray nozzle, drives, and a i/^ H. P. motor.

In the Clute system, the fungicide hoppers are equipped with syntron vibrators to keep the fungicide loose and even flowing. The fungicide is metered from the hoppers continuously with a small scroll and it contacts the beet seed in the first mixing chamber. The mixing chamber is a 6-inch diameter tube with a broken scroll moving the seed and fungicide to the end opposite the seed entry. Here the mixture drops down to another mixing chamber 7 inches in diameter and much the same as the first. After

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the dry material and seed have been thoroughly mixed, the seed is sprayed with water or other solution to bind the fungicide to the seed. Xhe spray is operated on 15 to 40 pounds pressure, and the amount of material used can be varied by the size of spray nozzle used. Among this machine's favorable points are its smallness, its simplicity, and the small amount of power required to operate it.

There are two apparent disadvantages with this machine. One is the machine's ability to handle only the dry type fungicides and insecticides. The other is the way the spray is used to set the fungicide to the seed. The spray nozzle is mounted on the side of the 7-inch diameter lower mixing chamber, and this does not allow the spray to contact all of the seed evenly. It was recommended by the manufacturer that we use an airlift to remove excess moisture that is added with the spray nozzle. The airlift will remove most of the moisture, but all also remove a relatively large portion of the fungicide. We tried changing the quantity of moisture added to correct this situation, but were unable to reduce the loss materially.

The Gustafson Treater

The Gustafson slurry seed treater is a batch-type treater. A weighing dump that is part of the machine weighs the seed and drops it into a mixing chamber. A batch or bucket of slurry is dumped into the chamber each time the weighing hopper is dumped. Instead of the slurry being dumped directly on the seed, it runs through a hopper which spreads the slurry more evenly on the seed. Wettable powder or the liquid type fungicide is used in the treater and is kept in suspension by an agitator which operates while the machine is running. The treater is small and operates simply and smoothly. It requires a $1/_3$ H. P. motor to drive it.

Some of the good points of the Gustafson machine are its compactness, its simplicity, and the small amount of power required to operate the treater. Also, the wettable powder or the liquid fungicides are much safer for the operating personnel to handle because of freedom from toxic dust.

A disadvantage of this machine for use with beet seed is the manner in which the slurry contacts the seed. Because of the absorbent qualities of beet seed, the slurry will be absorbed by only the seed it contacts directly. In this machine the mixing chamber is small and the slurry will not contact all of the seed.

The Gustafson people are developing a new type slurry treater that has some very desirable features. In this treater the slurry drops on a disc spinning at a high speed to atomize the slurry. The atomized slurry then contacts the seed. From what we have learned of this machine, it should have some definite improvements for handling beet seed.

The Kromer Treater

The Kromer treater (developed by the Green Giant people) is a large machine that will handle both dry and wettable type fungicides. It is also possible that the liquid type fungicides may be used in this machine much

Figure 1.—The Kromer uniform coat seed teater.

the same as in the (1)[3] Kepner and Leach treater. The Kromer treater consists of a double funnel fungicide hopper, mixing chamber, seed feeding hopper, a small centrifugal pump, water or set tank, a small air compressor, and a three-H. P. motor with drives.

The double funnel fungicide hopper forms a well controlled metering device. The inside hopper is to control the depth of the fungicide in the outside hopper. The inside hopper has an agitator tending to push the fungicide upward to keep it from packing. The outside hopper has a syntron vibrator on it to keep the fungicide loose and free flowing. The outside hopper feeds into an adjustable vibrating metering trough or hopper, to keep the flow of the fungicide constant. The fungicide then enters the upper end of the mixing chamber. A blast of air from a small air compressor mounted on the machine is directed on the fungicide as it enters the chamber to produce a fog. The treater also has a water spray pipe and a seed chute entering the upper end of the mixing chamber and operates at 40 pounds pressure. The mixing chamber is 2 feet in diameter and 10 feet long with $i/_2$-inch half round bars spaced at 90 degrees around the inside of the chamber to keep the seed turning over and over. Located on the lower end of the mixing chamber is an inspection glass and light so the operator can watch the operation. Because of the abrasiveness of the beet seed, none of the fungicide sticks to the sides of the chamber; however, there is a definite relationship between the seed, fungicide, and moisture for the machine to operate properly.

The principal advantage of this machine is the complete coverage of fungicide on the seed. This coverage is no doubt due to the large mixing chamber and the time it is in the tube.

Disadvantages are its size and the seals that have to be made at the ends of the mixing chamber, as the ends are stationary and the chamber revolves.

[3] Numbers in parentheses refer to literature cited.

Treating tests using Arasan, Arasan SF-X and Manzate were run on the three machines. Norman Gerhold[3] at Colorado A and M College is conducting mold tests on the treated seed. The tests were not completed in time for this meeting, but they will be available later.

In conclusion, I believe that our treaters of the future will have to handle the wettable powder and liquid type fungicides with sticking agents. The new fungicides will no doubt be of these types. The principal features of these new machines will include a spray, a churning of the seed, and a long enough time in the mixing chamber to properly attach the material.

Literature Cited

(1) KEPNER, R. A., and LEACH, L. D.
1950. A continuous spray type seed treater, Proc. Am. Soc. Sugar Beet Tech. pp. 54.

[3] N. R. Gerhold, Asst. Plant Pathologist, Colorado A and M College Experiment Station.