

Soil Row Treatment at Planting Time

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The application of massive doses of fungicides to the soil surrounding the planting zone of crop seeds is a procedure of proved merit.

L. D. Leach and W. C. Snyder (1)² have published results of studies on localized chemical applications to the soil and their effect upon root rots of beans and peas.

Hildebrand, McKeen and Koch (2) have demonstrated the effectiveness of fungicide applications in the planted sugar beet row in amounts ranging from 2 to 5 pounds per acre.

Their work in soil row treatment, both in the greenhouse and in the field, demonstrated effective control of black root under conditions where ordinary seed treatments were not effective.

The protection of the growing root system of a beet seedling is self-evidently greater when fungicide is distributed throughout the root zone than when the fungicide is applied only as a seed treatment. In the latter case, the protected zone is limited to a region of about 1/2 inch from the center of the seed. Such protection will usually suffice to bring about emergence, but post-emergence damping-off occurs when the root system continues its growth into infected soil.

In continuing their field trials with beans and peas, Leach and Snyder first used a five-gallon can of fungicide solution mounted on the planter and feeding by gravity to a sprinkler head placed over the row. In their later work, they used a specially constructed trailer behind the planter comprising a 50-gallon solution tank, a ground-powered gear pump and a nozzle directing the fungicide spray into the planted row.

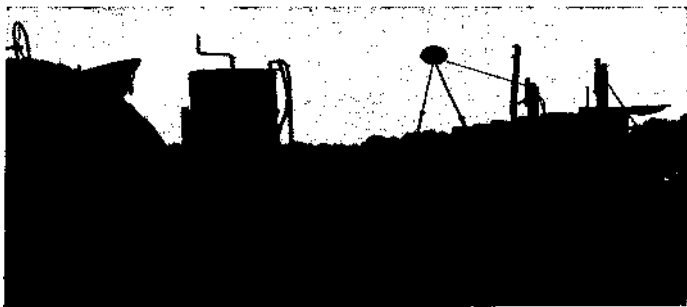


Figure 1. The soil row treater in the field. Because of the very short hitch points on the device, steering and trailing of the planters are not affected.

¹ Agricultural Engineer, Spreckels Sugar Company.

² Numbers in parentheses refer to literature cited.

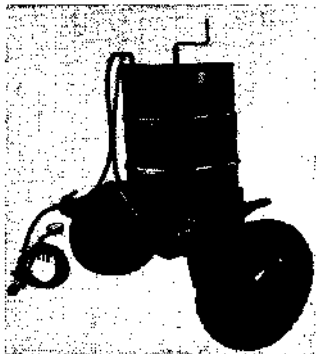


Figure 2. Experimental device for spraying massive doses of fungicide into the soil at planting time. Pumps are driven from the ground wheels, one supplying spray pressure, the other agitation of the material in the tank.



Figure 3. Fungicide is applied to the row directly behind the planter opener by two nozzles. The first wets the sides of the furrow at the instant of seed drop and the second sprays the covering soil.

When the Spreckels Sugar Company undertook a series of experiments on soil row treatment in 1950, the equipment was designed with the guidance and counsel of Dr. L. D. Leach and full advantage was taken of the pioneer work which he had done.

The mechanism as finally developed was a refinement of the equipment used by Dr. Leach which had been constructed by the Agricultural Engineering Division Research Laboratories, University of California. The Spreckels-built unit had the following characteristics:

1. A two wheel chassis which straddled the planter tongue.
2. A hitch which was adjustable vertically to match different tractors to different planters.
3. A chain and gear train from each rubber-tired ground wheel to a separate gear pump.
4. Suitable connections from one gear pump to carry fungicide liquid under pressure to a manifold with gage and pressure regulator.
5. Hose connections accommodating from 2 to 6 duplex nozzles.
6. Adjustably mounted pairs of nozzles behind each furrow opener.
7. Connections from the second gear pump to the fungicide tank for producing continued agitation.

The duplex nozzles were arranged in such manner that the forward nozzle projected a spray of fungicide onto the walls of the furrow immediately after the seed was dropped, but before any appreciable amount of soil had fallen back into the furrow. The second nozzle was directed so as to project

a fan of spray in the plane of the planted row. This had the effect of wetting the particles of soil as they fell back into the furrow.

The use of these duplex nozzles effectively surrounded the seed zone with fungicide liquid so that more or less uniform distribution of the active material was realized for a distance of 1 1/2 to 2 1/2 inches from the center of the seed.

The machine as described proved convenient and versatile. Not only could it be used for fungicide placement but also for the application of starter fertilizers designed to accelerate seedling growth. A third possibility yet to be investigated is the application of flocculating substances as a means for preventing crust formation.

The uses of the soil row treatment equipment as above described are discussed at length in a paper entitled "The Effect of Certain Soil Row Treatments on Damping-off of Sugar Beet Seedling Growing by Specific Fungicide" by L. D. Leach and F. J. Hills.

Literature Cited

- (1) LEACH, L. D., and SNYDER, W. C.
1947. Localized Chemical Applications to the Soil and Their Effect of Root Rots of Beans and Peas. *Phytopathology* V 37 No. 5 p. 363.
- (2) HILDEBRAND, A. A., MCKEEN, W. E., and KOCH, L. W.
1950. Continued Greenhouse Experiments in Row Treatment of Soil for Control of Blackroot of Sugar Beet Seedlings. *Proceedings American Society of Sugar Beet Technologists*, p. 509.