

Current Report

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1979 COTTON SEEDLING CONTROL

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Seedling disease in cotton occurs each year and losses are more severe and costly during cold, wet planting season. Most of us will remember 1978 for the long, hot, dry summer, yet, spring planting conditions were not the best and cotton seedling disease was more severe than in 1977. Seedling disease losses caused by Rhizoctonia, Pythium and Fusarium fungal species were estimated at 5%, costing the Oklahoma cotton grower over 20,904 bales. At \$240 a bale for lint and \$45 a bale for seed this represents a loss of over \$5,957,640 in the State.

The five million dollar loss incurred by Oklahoma growers due to seedling disease is a needless loss that can be substantially reduced with use of certain chemical and cultural practices. Fungicide seed treatment and in-furrow fungicide applications provide the protection needed and insures profitable stands. Growers should be encouraged to have soil analyzed for nematodes and control when needed.

Seedling disease is caused by a complex of seed-borne and soil-inhabiting organisms. The disease may occur as a seed rot, seedling death before or after emergence, and as damage to the root system. The pathogenic organisms causing seedling disease are found in all cotton producing areas of Oklahoma. The fungal pathogens most commonly involved in this disease complex are Rhizoctonia solani, Fusarium spp. and Pythium spp. Several kinds of

nematodes damage cotton in Oklahoma and parasitic species will increase seedling disease incidence. Seedling disease is often more severe under cool, wet soil conditions which will retard seed germination and seedling growth.

Control

Successful control of cotton seedling disease is dependent on planting high quality seed and making soil conditions more favorable for the young cotton plant and less favorable for the disease causing organisms. Failure to get a stand of cotton many times is due to poor seed bed preparation, faulty methods of planting, packing of soil, unfavorable soil moisture, low seed germination, adverse weather conditions, and failure to protect the seed and seedling with a fungicide.

When seedling disease is severe and a second planting is required the additional seed, labor, and fuel may cost the grower as much as \$12 per acre. Poor stands and poor growth contribute to weed problems, harvesting difficulties and reduced yields.

The following suggestions are made for improving cotton stands:

1. Plant high quality seed. Seeds with less than 80 percent germination are more susceptible to seedling disease. Seeds with high germination emerge quicker and produce more vigorous seedlings.
2. Good seed bed preparation. Soil properly prepared

for planting provides more favorable conditions for seed germination and less favorable for the pathogenic organisms.

3. Provide adequate soil nutrients and a soil pH range of 6.0 to 6.5. The availability of adequate soil nutrients (major and minor elements) in proper balance aids in producing a more healthy, vigorous seedling. Low pH favors development of cotton seedling disease. Have soil tested and follow fertilizer recommendation.

4. Control parasitic nematodes. The plant parasitic nematodes found in Oklahoma soils have been found to increase incidence of seedling disease and cause severe plant damage if not controlled. Have soil analyzed for nematodes and follow control recommendations. For more information see OSU Extension Facts No. 7610, Soil and Plant Sampling for Nematode Analysis.

5. Plant fungicide treated seed. Commonly used fungicide seed treatments are effective in protecting seed from pathogens in or on seed and provides a protective zone around the seed.

1979 Fungicide Seed Treatment Recommendations

CHEMICAL	RATE FORMULATION (oz/cwt)
Arasan 42S	4.5
Arasan 70S	3.0
Busan 72A	3-3.5
Demosan 65W	6.0
Dexon 70WP	2-3.0
Demosan + Arasan	6 + 3
Difolatan 4F Seed Protectant	3-4.5
Orthocide 4	3-4.5
Terraclor 75WP	4.0
Terra-coat L-21	12-16
Terra-coat L205	12-16
Terra-coat LT-2	12-16
Vitavax - 17	16.0
Vitavax F	8.0
Vitavax WP	8.0
Vitavax 200	8.0
Vitavax 300	8.0

6. Stand Establishment. To establish a good stand of cotton, a soil fungicide should be used in combination with seed treatment fungicides. The three methods of application recommended are: In-furrow spray, In-furrow granule, and Planter box application.

Soil Fungicides Suggested for Oklahoma Growers in 1979

TYPE OF TREATMENT AND CHEMICAL	RATE OF FORMULATION/A
<u>In-furrow spray:</u>	
Terraclor 2EC	.5-1 gal
Terraclor 75 WP	1 1/3-2 3/4 lb
Terraclor Super-X EC	2-3 qt
<u>In-furrow granule:</u>	
Terraclor Super-X 10-2.5G	10-15 lb
Terr. Super-X + Di-Syston	15 lb
Terr. Super-X + Thimet	15 lb
<u>Planter Box Application:</u>	
Captan-Terraclor 30-30	
Seed Protectant	1 lb
Ortho Soil Treater 3X	1 lb
Terraclor Super-X 20-5 Dust	1-1.5 lb

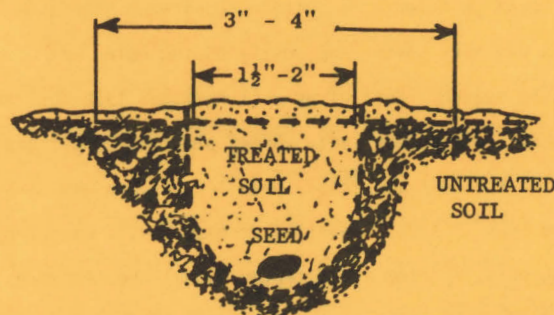


Figure 1. Fungicides used to control seedling damping-off should be thoroughly mixed with the soil that surrounds the seed. (Drawing taken from Texas Agr. Exp. Sta. Progress Report 2181).

METHODS OF APPLICATION

Planter box method. Mix recommended fungicides thoroughly with fuzzy or reginned seed just before placing, or as they are placed, in the planter box. Mixing long before planting may cause seed injury. Soil fungicides cannot be satisfactorily applied by the planter box method with acid-delinted seed.

When properly mixed, some fungicide will fall out with each seed to give a treated area of soil around it. The fungicide may reduce the seeding rate by 10 to 20 percent. Therefore, you must calibrate the planter with the weed and fungicide mixture to get the desired seeding rate. Since a very limited amount of fungicide is dropped with the seed, this method is not

recommended where seeds are to be planted more than one inch deep. This less expensive method is also less effective than in-furrow spray and granule. However, when properly used, it usually gives better results than seed treatments.

In-furrow treatment. This seems to be the best way to apply soil fungicides. In-furrow treatments mix the fungicide with the soil to give a greater zone of protection around the germinating seed and young seedling (Figure 1). Seedling disease fungi are suppressed in this zone long enough to allow the plant to grow older and become more resistant to disease.

Tests with in-furrow fungicide treatments have resulted in stand increases. Soil fungicides may be applied in the furrow as either sprays or granules.

In-furrow spray. Effective control can be obtained by applying the fungicide through a cone-type and a fan-type nozzle tip or two cone-type tips. The front cone-type nozzle is mounted just behind the seed-drop outlet to treat the soil around the seed (Figure 2). The rear nozzle, which may be a cone- or fan-type, is directed to spray soil as it is tumbled into the seed furrow, with a small amount of spray striking the top of the covered row. The ideal height is 1½ to 2 inches above the original soil surface for the front and 2 to 3 inches for the back nozzle.

Drawing taken from Georgia Fact Sheet pp no. 1B-1

Recommended nozzle tips are X6 in front and an 8003 or an X8 in the rear. On planters with limited space between the seed-drop outlet and the seed-covering device which does not permit the use of two nozzles, substitute one nozzle with an X8 or X10 tip.

Apply the fungicide in 10 to 15 gallons of water per acre. To get the desired gallonage, the pressure may be varied depending on the desired planting speed. However, for best results do not vary the pressure below 20 or above 80 pounds. For extremely fast or slow planting speeds you may need to increase or decrease the nozzle tip size.

For ease in calibration you can figure the total discharge from two nozzles per row as one nozzle per row. Following this procedure you can see OSU Extension Fact Sheet No. 1206, Calibration Guide for Weed or Insect Spray Equipment.

In-furrow granules. Tests have shown granular soil fungicides to be equal to the in-furrow spray application. Using a granular treatment eliminates the need for spray equipment, chemical mixing and water. A combination granular systemic insecticide-soil fungicide is now available for growers who wish to apply both chemicals in one operation. It is important that

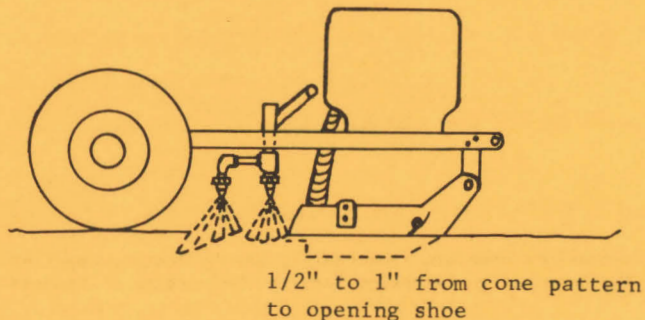
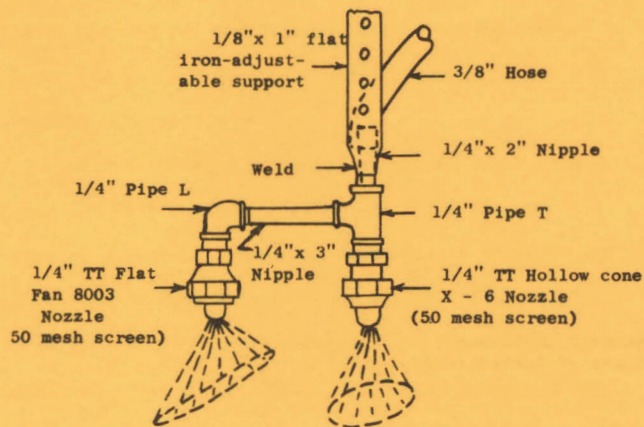


Figure 2. A suggested nozzle assembly for applying in-furrow fungicides.

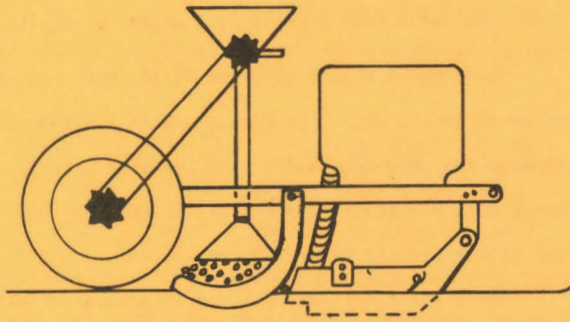


Figure 3. A single delivery tube with flared baffle attached.

correct rates of these materials be used in accordance with the manufacturer's specifications.

Proper placement and soil incorporation are necessary for best results. Granules should be placed in the furrow between the seed-drop chute and the covering device (Figure 3).

If a single delivery tube is used, a flared baffle should be attached to the end of the tube. The baffle should be in a lengthwise position, parallel to the row so that granules fall into the furrow from the point where the seed drop to where they are covered. Not only

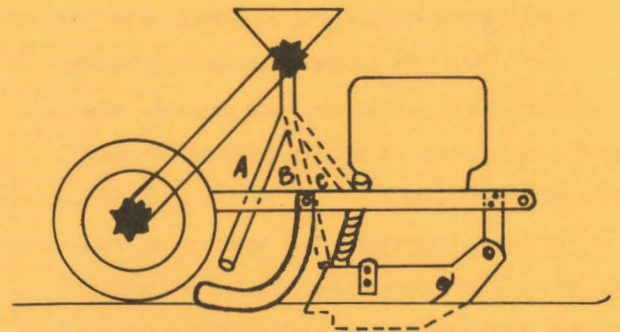


Figure 4. Delivery tube split to drop granules with seed and in covering soil.

do granules fall directly into the bottom of the seed furrow, they are mixed into the soil as it is pulled back over the furrow.

Another successful delivery arrangement involves two delivery tubes (Figure 4). One of these is attached to the planter seed-drop tube, so that some granules fall with the seed. The other tube (A) is mounted to the rear of the seed-drop tube so that it deposits granules in the row as soil is covering the seed. When using this method, check to be sure the granules are well dispersed around the seed and in the cover soil.

Illustrations used are from Leaflet No. 49 "Cotton Seedling Diseases" published by the Cooperative Extension Service, University of Georgia College of Agriculture.

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