

**EFFICACY OF SELECTED SEED TREATMENTS  
ON THE COTTON SEEDLING DISEASE  
COMPLEX AND COTTON YIELD**

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**Abstract**

Two cotton seedling disease fungicide seed treatment tests were conducted at Northeast Louisiana University. In test 1, treatments consisted of WE 120C, WE 120C + NuFlow M, WE 120C + NuFlow M + Apron TL, Captan 4000 + NuFlow M + Apron TL, NuFlow ND + NuFlow M + Apron TL, Maxim 3FS + NuFlow M + Apron TL, RTU Baytan-Thiram + Apron TL and an untreated control. In test 2, treatments consisted of Delta Coat AD, Delta Coat AD + Delta Gib, Ridomil PC 11G, Terraclor Super X 12.5 G, and an untreated control. All treatments were applied to Stoneville 474 seed by the Wilbur Ellis Corporation. Plots of test 1 were inoculated with *Rhizoctonia solani* infested oat seed in the seed furrow at planting while test 2 was not inoculated. In test 1, the high rates of WE 120C, WE120C + NuFlow M, WE 120C + NuFlow M +Apron TL, Captan 40000 + NuFlow M + Apron TL produced significantly greater cotton stands at 14 and 28 days after planting, than the control. Plant stand at 42 days after planting ranged from 77 to 38 plants per forty foot of row in the high rate of WE 120C and the untreated control respectively. Seed cotton yields ranged from 3234 to 2021 lb of seed cotton per acre for the Maxim 3FS + NuFlow M + Apron TL and untreated control respectively. In test 2, no significant differences in cotton seedling stand were observed at 7, 14, 21, and 28 days after planting. However, by 42 days the Terraclor Super X treatment had a greater stand than Ridomil PC and the untreated control. Plant stand at 42 days ranged from 153 to 138 plants per forty foot of row in the Terraclor Super X and the control treatments respectively. Seed cotton yields ranged from 2763 to 2422 lb/a of seed cotton in the Delta Coat AD + Delta Gib and untreated control respectively. The net value increase in cotton yield over the control ranged from \$27.86 to \$145.86 per acre for Terraclor Super X and Ridomil PC respectively.

**Introduction**

Seedling disease of cotton is a major problem across the cotton belt. Seedborne and soilborne organisms, acting singly or in combination, produce the cotton seedling disease complex. The seedling disease complex is composed of several fungi which cause serious problems wherever cotton is grown. In Louisiana, an estimated reduction of 6% or 95,294 bales were attributed to the seedling disease complex in 1995. The soil born pathogens most commonly involved in the seedling disease complex in Louisiana includes *Pythium* spp., *Fusarium* spp., *Rhizoctonia solani*, and *Thielaviopsis basicola*. The seedling disease syndrome includes the pregermination decay of the seed, preemergence damping off, postemergence damping off and seedling root rot. The effects of seedling root rot are often subtle and lead to long-lasting weakness of the plant and thereby reduce yields. Most of the pathogens involved in the seedlings disease complex are ubiquitous fungi that are associated with many other hosts as well as with cotton. The fungi that cause these diseases are carried in the soil and can attack either seed or seedling. The organisms that cause seedling disease are found in all cotton producing areas of the United States, but populations and virulence differ from area to area thus demonstrating the necessity of testing the various recommended control practices across a wide geographic area.

The objectives of our research were to examine the influence of selected seed treatments applied to the cotton seed for control of the seedling disease complex of cotton and subsequent effects on the growth and development of the cotton plant and yield responses.

**Materials and Methods**

Two cotton fungicide tests were conducted on the Northeast Louisiana University Layton Farm in Monroe, Louisiana to determine the efficiency of selected seed treatments for the control of the fungi involved in the seedling disease complex. The tests were located in a field which is continuously cultured with cotton and has a previous history of producing plant with symptoms of seedling disease. In test 1, treatments consisted WE 120C, WE 120C + NuFlow M, WE 120C + NuFlow M + Apron TL, Captan 4000 + NuFlow M + Apron TL, NuFlow ND + NuFlow M + Apron TL, Maxim 3FS + NuFlow M + Apron TL, RTU Baytan-Thiram + Apron TL and an untreated control. WE 120C, WE 120C + NuFlow M, and WE 120C + NuFlow M + Apron TL were applied at low medium and high rates. In test 2, treatments consisted of Delta Coat AD, Delta Coat AD + Delta Gib, Ridomil PC 11G, Terraclor Super X 12.5 G, and an untreated control. All fungicides seed treatments were applied to Stoneville 474 cotton seed by Wilbur Ellis. Treatments in each test were arranged in a randomized complete block design with five replications. Test 1 and 2 were planted May 11 and April 24, 1996 respectively. Plots

were rated weekly for six weeks after planting to determine the percent seedling stand loss due to damping off of the cotton seedlings. Cotton seedlings were collected and aseptically plated on Potato Dextrose Agar (PDA) to isolate and identify the specific fungi present. All plots were hand harvested on September 26, 1996 to determine the effects of the treatments on cotton yields.

### Results and Discussion

Cotton seedlings emerged within 7 days after planting in test 1 and 5 days in test 2. In test 1, there were significant increases in cotton stand between the high rates of WE 120C, WE120C + NuFlow M, WE 120C + NuFlow M +Apron TL, Captan 40000 + NuFlow M + Apron TL at 14 and 28 days after planting compared to the control. Plant stand at 42 days after planting ranged from a high of 77 to a low of 38 plants per foot of row in the WE 120C at the high rate and the untreated control respectively. (Table 1). In test 2, no significant differences in cotton seedling stand were observed at 7, 14, 21, and 28 days after planting (Table 2). However, at 42 days after planting Terraclor Super X produced a greater cotton stand than Ridomil PC and the untreated control. Plant stand at 42 days after planting ranged from 153 to 136 plants per forty foot of row in the Terraclor Super X and the untreated control respectively. Rhizoctonia solani, and Fusarium spp. were isolated most frequently from the diseased cotton seedlings. Diseased seedlings exhibited a characteristic reddish sunken lesions on the stem at the soil line.

Seed cotton yields in test 1 ranged from a high of 3234 to 2021 lb/A from the Maxim 3FS + NuFlow M + Apron TL treatment and the control respectively. Two treatments the NuFlow ND + NuFlow M + Apron TL and the Maxim 3FS + NuFlow M + Apron TL produced seed cotton yields significantly greater than the control (Table 3). Lint yields ranged from 1300 lb/A to 867 lb/A for Maxim 3FS + NuFlow M + Apron TL treatment and the control respectively. The largest lint cotton yield increases compared to the control were 433 lb/A for Maxim 3FS + NuFlow M + Apron TL treatment. In Test 2, seed cotton yields ranged from 2763 to 2422 lb of seed cotton per acre for the Delta coat AD + Delta Gib and untreated control respectively (Table 4). Lint yields ranged from 1185.4 lb/A to 973.8 lb/A for these treatments. There was a 211 lb/A increase in lint cotton yield from the Delta Coat AD + Delta Gib treatment compared to the control.

### Economic Analysis

An economic analysis indicates that all fungicide treatments had a positive net return above direct cost of the materials using the assumption of current input prices and the product price of \$0.75/lb of cotton (Table 5).

Yield data indicates an average lint yield across treatments of 1093 lb/A representing at 119 lb/A increase over the

control. The value of this additional yield using a market price of \$0.75/lb is an \$89.25 per acre increase. Using the three commercial materials (Delta Coat AD, TSX, and Ridomil PC) the average cost per acre using rates that were examined in these experiments was \$12.48 per acre. Comparing the additional cost to the additional revenue of \$76.77 per acre return to fungicide use is realized. Therefore sufficient additional revenues are generated to cover the fungicide cost.

In comparing the direct cost of the fungicides, cost varied from a high of \$20.89/acre (Terraclor Super X) to a low of \$4.16/acre (Delta Coat AD). Material cost for the Delta Coat +Delta Gib compound has not been determined. In comparing the additional revenue and cost of the different materials the Ridomil PC treatment yielded the greatest net return per acre (\$145.86 = 158.25 - 12.39). Gross returns for Delta Coat AD and Terraclor Super X were also positive, however due to differences in costs and yields the net returns were lower. The seed treatments in test 1 have not been released commercially thus we were unable to compare the net returns of these compounds to other treatments.

### Disclaimer

The interpretation of data presented may change with additional experimentation. Information is not to be construed as a recommendation for use or as an endorsement of a specific product by Northeast Louisiana University.

Table 1. Effect of selected seed treatments on cotton stand at 14 and 28 days after planting, Test 1

Fungicide / Rate oz/cwt	14	28
	DAP	DAP
WE 120C 0.48	76	73
WE 120C 0.96	71	67
WE 120C 1.92	76	77
WE120C + Nu FlowM 0.48 + 1.75	67	67
WE120C + NuFlowM 1.92 + 1.75	94	69
WE120C + NuFlowM 0.96 + 1.75	75	71
WE120C + NuFlowM + Apron TL 1.92 + 1.75 + 2.0	75	76
WE041 + NuFlowM + Apron TL 1.35 + 1.75 + 2.0	74	69
Captan4000+NuFlowM+Apron TL 2.5 + 1.75 + 2.0	83	76
NuFlow ND+NuFlowM+Apron TL 5.0 + 1.75 + 2.0	66	63
Maxim3FS + NuFlowM + Apron TL 0.08 + 1.75 + 2.0	65	64
RTU Baytan - Thiram + Apron TL 3.0 +0.75	62	62
Control	41	38
FLSD = (0.05)	32	31

Stand represents the number of line cottonplants in 40 feet of row.

Table 2. Effect of selected seed treatments on cotton stand per 40 foot of row at 7, 14, 21, 28, and 42 days after planting for Test 2 .

Fungicide / Rate	7 DAP	14 DAP	21 DAP	28 DAP	42 DAP
Delta Coat AD 11.75 oz/cwt	135	155	153	147	140
Delta Coat AD + Delta Gib 11.75 + 1.0oz/cwt	135	163	157	142	141
Ridomil PC 7 lb/A	132	158	152	145	139
Terraclor Super X 8 lb/A	129	163	153	151	153
Control	115	151	148	144	136
FLSD = (0.05)	22	15	16	17	17

Table 3. Effect of selected fungicide treatments on seed cotton and lint yields, Test 1.

Fungicide / Rate	Seed cotton	Lint cotton
WE 120C 0.48	2625	1097
WE 120C 0.96	2239	935
WE 120C 1.92	2222	913
WE 120C + NuFlowM 0.48 + 1.75	2556	1106
WE120C + NuFlowM 1.92 + 1.75	2378	1015
WE120C + NuFlowM 0.96 + 1.75	2371	1017
WE120C + NuFlowM + Apron TL 1.92 + 1.75 + 2.0	2634	1111
WE041 + NuFlowM + Apron TL 1.35 + 1.75 + 2.0	2772	1139
Captan4000+NuFlowM+Apron TL 2.5 + 1.75 + 2.0	2469	1074
NuFlow ND+NuFlowM+Apron TL 5.0 + 1.75 + 2.0	3038	1242
Maxim3FS + NuFlowM + Apron TL 0.08 + 1.75 + 2.0	3234	1300
RTU Baytan - Thiram + Apron TL 3.0 + 0.75	2614	1016
Control	2021	867
FLSD = (0.05)	753	

Table 4. Effect of selected fungicide treatments on seed cotton and lint yields, Test 2.

Fungicide	Rate	Seed cotton	Lint cotton
Delta Coat AD	11.75oz/cwt	2549	1063
Delta Coat AD + Delta Gib	11.75 + 1.0 oz/cwt	2763	1185
Ridomil PC	7.0 lb/A	2615	1084
Terraclor Super X	8.0 lb/A	2534	1039
Control		2422	974
FLSD = (0.05)		563	

Table 5. Economic analysis of selected fungicides, Test 2.

Fungicide / Rate	Cost/ Acre	Yield/ Contro 1 lbs	Gross Value \$0.75	Net Value
Delta Coat AD 11.75 oz/cwt	4.16	89	66.75	62.59
Delta Coat AD + Delta Gib 11.75 + 1.0 oz/cwt	NA	211	NA	NA
Ridomil PC 7.0 lb/A	12.39	110	158.25	145.86
Terraclor Super X 8.0 lb/A	20.89	65	48.75	27.86

Seed treatment prices were not available from Wilbur Ellis.