

**Annual Report of Progress  
to the  
MISSISSIPPI SOYBEAN PROMOTION BOARD  
for 2007**

**PROJECT TITLE: "Use of seed and in-furrow applied fungicides to suppress the development of soybean rust and charcoal rot".**

**PROJECT LEADER:** G. L. Sciumbato, Plant Pathologist, Delta Research and Extension Center

**OTHER PARTICIPANTS:**

**OBJECTIVES AND SIGNIFICANT ACCOMPLISHMENTS:**

- 1. We have identified several strobilurin and sterol inhibiting fungicides currently registered on soybeans that can be applied to soybean seed and are not phytotoxic. Some research in South America has shown that seed treatments can be used to control or suppress early season soybean rust. Therefore, we propose to treat soybean seed with selected fungicides and determine their effectiveness in controlling soybean rust and charcoal rot.*

Results of seed treatment Trial One are given in Table 1. Seedling disease pressure was very high in this trial. Seed treated with certain rates of Headline, Dynasty, Impact and JAU 6476 much high seedling survival over the untreated seed. It is not known how much of the increased seedling survival was due to seedling disease control (seedling survival of the untreated seed was low) and how much was due to lack of phytotoxicity. Several of the other treatments significantly reduced seedling survival over the untreated seed.

*Results of the seed treatment Trial Two are given in Table 2. Seedling disease pressure was low in this trial. Seed treatment with the strobilurin fungicides at certain rates had little effect or increased seedling survival. Seed treatment with the trizole fungicides reduced seedling survival from 13 to 58%.*

- 2. The plants from the fungicide treated seed will be assayed periodically for the presence of charcoal rot and rust if it is present. Additional laboratory bioassays will be conducted against fungi which are susceptible to the test fungicides.*

*Results of the assay for the charcoal rot fungus are given in Table 3. Results varied from no reduction a 47% reduction in the amount of charcoal rot isolated from the seedlings. Most of the treatments reduced the amount of charcoal rot infecting soybean seedlings.*

- 3. Certain trials will be replicated and carried to yield to determine yield responses to the seed and in-furrow applied fungicides.*

Results of the replicated trial carried to yield are given in Table 3. Six of the treatments had significantly lower seedling survival two weeks after plant and three of the treatments had significantly lower seedling survival four weeks after plant. The trial was inoculated with charcoal rot and not irrigated to encourage charcoal rot development. Charcoal rot incidence was very high at the end of the season. This may explain why there were no significant yield differences. Soybean rust came in very late and incidence was very low.

Table 1. Phytotoxicity of seed applied fungicides, Location one. MAFES, Delta Research and Extension Center Stoneville, MS.

Seed Treatment Fungicide and Rate per CWT <sup>2</sup>	Average Rating <sup>2</sup>
Untreated control (No Seed Treatment) .....	0.0
Dynasty (azoxystrobin), 0.83F, 1.0 oz .....	+39.7
Dynasty (azoxystrobin), 0.83F, 2.0 oz .....	-9.1
Headline (pyraclostrobin), 2.08EC, 1.0 oz .....	+65.1
Headline (pyraclostrobin), 2.08EC, 2.0 oz .....	+75.3
Folicur (tebuconazole), 3.6F, 1.0 oz .....	-3.7
Folicur (tebuconazole), 3.6F, 2.0 oz .....	-35.9
Folicur (tebuconazole), 3.6F, 4.0 oz .....	-60.7
Laredo (myclobutanil), 2.0EC, 1.5 oz.....	-53.27
Laredo (myclobutanil), 2.0EC, 3.0 oz.....	-89.2
Impact (flutriafol), 25g/L, 1.0 oz .....	+82.9
Impact (flutriafol), 25g/L, 2.0 oz .....	+52.1
Impact (flutriafol), 25g/L, 4.0 oz .....	-13.9
JAU 6476 (prothioconazole), 100FS, 4.0 oz .....	+34.7
JAU 6476 (prothioconazole), 100FS, 8.0 oz .....	-17.3

1. Seed were treated with fungicide and planted in a Sharkey Clay soil. Ratings were made at two weeks after planting.
2. Average rating of four replications. Value is percent + or – germination over the untreated control (no seed treatment)

Table 2. Phytotoxicity of seed applied fungicides, Location two. MAFES, Trial One Delta Research and Extension Center Stoneville, MS.

Seed Treatment Fungicide and Rate per CWT <sup>1</sup>	Average Rating <sup>2</sup>	
	2 Weeks	4 Weeks
Untreated control (No Seed Treatment) .....	0.0	0.0
Dynasty (azoxystrobin), 0.83F, 2.0 oz .....	-6.6	-12.7
Dynasty (azoxystrobin), 0.83F, 2.0 oz .....	+4.9	+18.8
Headline (pyraclostrobin), 2.08EC, 1.0 oz .....	-16.6	-10.1
Headline (pyraclostrobin), 2.08EC, 2.0 oz .....	+7.3	-2.4
Folicur (tebuconazole), 3.6F, 1.0 oz .....	-30.2	-13.6
Folicur (tebuconazole), 3.6F, 2.0 oz .....	-24.7	-22.3
Folicur (tebuconazole), 3.6F, 4.0 oz .....	-33.2	-21.8
Laredo (myclobutanil), 2.0EC, 1.5 oz .....	-41.8	-23.7
Laredo (myclobutanil), 2.0EC, 3.0 oz .....	-47.0	-30.5
Impact (flutriafol), 25g/L, 1.0 oz .....	-58.8	-54.4
Impact (flutriafol), 25g/L, 2.0 oz .....	-24.7	-24.0
Impact (flutriafol), 25g/L, 4.0 oz .....	-56.4	-42.5
JAU 6476 (prothioconazole), 100FS, 4.0 oz .....	-24.5	-25.6
JAU 6476 (prothioconazole), 100FS, 8.0 oz .....	-22.1	-7.8

1. Seed were treated with fungicide and planted in a Sharkey Clay soil. Ratings were made at two and four weeks after planting.
2. Average rating of four replications. Value is percent + or – germination over the untreated control (no seed treatment)

Table 3. 2007 Soybean charcoal rot – rust seed treatment trial<sup>1</sup>. MAFES, Delta Research and Extension Center, Stoneville, MS

Treatment, Rate	Percent Stand <sup>2</sup>		Yield (Bu/A) <sup>5</sup>
	2 weeks	4 weeks	
No Seed Treatment .....	54.3 ab <sup>3</sup>	42.6 ab	32.1 a
Dynasty (azoxystrobin), 0.83F 2.0 oz/CWT .....	51.3 abc	37.2 abc	31.7 a
Dynasty (azoxystrobin), 0.83F 4.0 oz/CWT .....	57.0 a	50.6 a	32.0 a
Headline (pyraclostrobin), 2.09EC.....	45.4 a-d	38.3 abc	31.6 a
Headline (pyraclostrobin), 2.09EC.....	58.5 a	41.6 abc	30.8 a
Folicur (tebuconazole), 3.6F.....	37.9 b-f	36.8 abc	32.1 a
Folicur (tebuconazole), 3.6F.....	40.9 a-e	33.1 bcd	30.9 a
Folicur (tebuconazole), 3.6F.....	36.3 c-f	33.3 bcd	31.2 a
Laredo (myclobutanil), 2.0 EC .....	31.6 def	32.5 bcd	30.4 a
Laredo (myclobutanil), 2.0 EC .....	28.8 def	29.6 bcd	31.7 a
Impact (flutriafol) , 25 G/L.....	22.4 f	19.4 d	31.2 a
Impact (Flutriafol) , 25 G/L.....	40.9 a-e	32.4 bcd	30.7 a
Impact (flutriafol) , 25 G/L.....	23.7 ef	24.5 cd	31.3 a
JAU 6476 100 FS .....	41.0 a-e	31.7 bcd	31.5 a
JAU 6476 100 FS .....	42.3 a-d	39.3 abc	32.0 a
M.S.D. <sup>4</sup> .....	17.77	17.18	6.39
F Value .....	3.70	2.33	0.30
C. V. ....	28.73	28.29	6.42

1. Plots were 4, 40 inch rows, 40 ft long. Seeding rate was 8 seed/row ft. Trial was plated on 5-9.
2. Stand counts were taken on 5-23 (two weeks) and 6-6 (four weeks) after planting.
3. Means in the same column followed by the same letter are not significantly different according to the Waller-Duncan t test (K ratio = 100)
4. MSD is minimum significant difference by the Waller-Duncan t test.
5. Trials harvested with John Deere 3600 adapted for plot harvesting on 8-23.

Table 4. Prevalence of the charcoal rot fungus in soybean seedlings eight weeks after planting. Delta Research and Extension Center, Stoneville, MS.

Seed Treatment Fungicide and Rate per CWT <sup>1</sup>	Charcoal Rot Rating <sup>2</sup>
Untreated control (No Seed Treatment) .....	0.0
Dynasty (azoxystrobin), 0.83F, 1.0 oz .....	-20
Dynasty (azoxystrobin), 0.83F, 2.0 oz .....	-47
Headline (pyraclostrobin), 2.08EC, 1.0 oz .....	-7
Headline (pyraclostrobin), 2.08EC, 2.0 oz .....	-40
Folicur (tebuconazole), 3.6F, 1.0 oz .....	-40
Folicur (tebuconazole), 3.6F, 2.0 oz .....	-20
Folicur (tebuconazole), 3.6F, 4.0 oz .....	-7
Laredo (myclobutanil), 2.0EC, 1.5 oz.....	0.0
Laredo (myclobutanil), 2.0EC, 3.0 oz.....	-33
Impact (flutriafol), 25g/L, 1.0 oz .....	-40
Impact (flutriafol), 25g/L, 2.0 oz .....	-14
Impact (flutriafol), 25g/L, 4.0 oz .....	-33
JAU 6476 (prothioconazole), 100FS, 4.0 oz .....	0.0
JAU 6476 (prothioconazole), 100FS, 8.0 oz .....	-40

1. Seed were treated with fungicide and planted in a Sharkey Clay soil. Seedlings were collected eight weeks after planting and plated out on Potato Dextrose Agar. Ratings are based on percent of seedlings infected with charcoal rot relative to the untreated control
2. Average rating of four replications of five seedlings each. Value is percent + or – germination over the untreated control (no seed treatment).