

SOYBEAN RESPONSE TO FOLIAR FUNGICIDES AND FOLIAR FERTILIZER

R.R. Dobbs¹, N.W. Buehring¹, M.P. Harrison¹, and M.A. Blaine²

¹Northeast Branch Experiment Station, North Mississippi Research and Extension Center, Verona, MS 38879, ²Plant and Soil Science Department, Mississippi State University

ABSTRACT: Three studies were conducted during the 2004 growing season on a Leeper silty clay loam soil to evaluate the effects of foliar fertilizer applied alone, and foliar fungicides applied alone or in combination with Dimilin insecticide on soybean yield. In a Maturity Group V (DP 5634RR) fungicide study, yields for Quadris (asoxystrobin) + Dimilin (diflubenzuron) at 3.0 + 2.0 oz/ac and at 6.0 and 2.0 oz/ac; Flutriafol at 14 oz/ac; and Topsin (Thiophanate-methyl) at 0.75 lb/ac applied at the late R4 (a pod $\frac{1}{2}$ inch long at one of the four uppermost nodes with a completely unrolled leaf) reproductive stage ranged from 33.1 to 34.4 bu/ac. These yields were equal among fungicide treatments and were 4 to 5 bu/ac more than the foliar fertilizer treatments of Trisert K⁺ (5-0-20+13S) + Borosol (Boron) at 6.0 qt/ac + 1.0 qt/ac applied at the R2 reproductive stage (a flower at the node immediately below the uppermost node with a completely unrolled leaf) and Trisert K⁺ + Borosol at 6.0 qt/ac + 1.0 qt/ac applied at R2 followed by a repeat application of Trisert K⁺ at 6.0 qt/ac at R4, and the untreated check. In the AG 4403 Maturity Group (MG) IV soybean study, Quadris at 4.0 oz/ac applied at late R5 (soybean seed beginning to develop at one of the four uppermost nodes with a completely unrolled leaf) showed no yield difference from the untreated check. In another study with AG 4603 (MG IV) soybean, Quadris at 4.0 oz/ac; Quadris + Dimilin at 4.0 + 2.0 oz/ac; Headline (pyraclostrobin) at 6.0 oz/ac; and Topsin at 0.75 lb/ac applied at the late R5 stage showed no yield response differences. They were not different from the untreated check. Since the R5 fungicide applications showed no yield response, and the R4 applications showed a yield response, fungicide applications should be made earlier than R5 for improved yields with MG IV soybeans.

CITATION: Dobbs R.R., N.W. Buehring, and M.P. Harrison. 2005. Soybean Response to Foliar Fungicides and Foliar Fertilizer. Annual Report 2004 of the North Mississippi Research and Extension Center. Mississippi Agricultural & Forestry Experiment Station Information Bulletin 419:103-107.

KEYWORDS: Fungicides, soybeans, fertilizer.

Materials and Methods: Three studies were conducted on a Leeper silty clay loam soil at the Northeast Branch Station, Verona, Mississippi in 2004 to evaluate the effects of foliar fertilizer applied alone, and fungicides applied alone or in combination with an insecticide on soybean yield. All fungicide and liquid fertilizer applications were made with 8002VS nozzles at 10 gpa. All treatments in each study were replicated four times in a randomized complete block experimental design. All studies were conducted in 30 inch rows and plot lengths varied by study.

Fertilizer (P and K) was applied based on soil test recommendations. All 3 studies were bedded in the fall and do-alled prior to planting. The MG IV (AG 4403 and AG 4603) varieties were planted on 4/21/04. The MG V study initially was planted with FFR 4922RR soybean on 5/11/04. Due to stand failure and wet weather, replanting was delayed until 6/11/04. DP 5634RR, a MG V variety was selected for replanting due to the late planting date. An early burndown of Roundup WeatherMAX (glyphosate) + Clarity (dicamba) at 1.0 + 0.25 lb ai/ac was applied to all studies in mid to late March 2004. Roundup Ready soybean varieties in all 3 studies were maintained weed free during the growing season with 2 or 3 applications of Roundup WeatherMAX.

In the DP 5634RR soybean study, foliar fungicide applications of Quadris + Dimilin at 3.0 + 2.0 oz/ac and 6.0 + 2.0 oz/ac was compared to flutriafol at 14.0 oz/ac; Topsin at 0.75 lb/ac; Trisert K⁺ + Borosol (foliar fertilizer) at 6.0 qt/ac + 1.0 qt/ac applied at R2 reproductive stage; Trisert K⁺ + Borosol at 6.0 qt/ac + 1.0 qt/ac applied at R2 followed by a repeat application of Trisert K⁺ at 6.0 qt/ac at R4; and the untreated check. All fungicide treatments were applied at the late R4 stage. Plot size was 4 rows x 30 ft.

In a second study with MG IV AG 4403 soybeans, Quadris at 4.0 oz/ac applied at the late R5 stage was compared to an untreated check. Plot size was 8 rows x 300 ft.

In a third study Quadris at 4.0 oz/ac, Quadris + Dimilin at 4.0 + 2.0 oz/ac, Headline at 6.0 oz/ac, and Topsin at 0.75 lb/ac were compared to an untreated check. The fungicide treatments were applied to AG 4603 soybeans at the late R5 growth stage. Plot size was 8 rows x 50 ft.

The center 2 rows of each plot in the AG 4603 and the DP 5634RR studies were harvested with a plot combine. The seeds were cleaned with a 3 sieve seed cleaner and weighed. Seed samples from MG IV studies were collected and 1,000 seed were weighed to determine kernel weight. In the AG 4403 study, the center 6 of 8 rows were harvested with a full size combine and the grain was weighed with a weigh wagon to determine plot weight. Samples were obtained from each plot for grain moisture analysis. Seed moisture for all studies was determined with a Dickey John® 2000 seed analyzer. Yields were adjusted to 13% moisture. All data were subjected to Analysis of Variance and treatment means were separated using Fisher's Protected LSD calculated at the 5% significance level.

Results and Discussion: DP 5634RR soybean response to fungicides and foliar fertilizer:

Yields ranged from 28.0 bu/ac for the Trisert K⁺ + Borosol applied at R2 to 35.5 bu/ac for Topsin (Table 1). Results indicated that all fungicide (Topsin, Flutriafol) and fungicide + insecticide (Quadris + Dimilin) treatment yields were equal and produced 4 to 5 bu/ac higher yield than the untreated check and the Trisert K⁺ + Borosol treatments. The Quadris + Dimilin at 3 + 2 oz/ac produced yields equal to the 6 oz/ac rate of Quadris + 2 oz/ac of Dimilin. Single or sequential applications of Trisert K⁺ had no effect on yield. This indicates that the soybeans were able to obtain sufficient nutrients from the soil with recommended fertility levels. Plant heights ranged from 21 to 24 inches for all treatments.

AG 4403 response to late season fungicides: Quadris at 4 oz/ac yield of 48.9 bu/ac was not different from the untreated check yield of 48.0 bu/ac (Table 2). One thousand seed weights were 97.8 grams untreated check and 102.7 grams for Quadris and were not different. However,

at harvest the Quadris treatment showed less pod disease discoloration than the untreated check. Since Quadris is recommended to be applied at R3 reproductive stage, the late R5 applications Quadris may have been applied too late to enhance yield.

AG 4603 response to late season fungicides: In the AG 4603 late R5 fungicide application study, yields ranged from 35.8 bu/ac for Quadris + Dimilin at 4.0 + 2.0 oz/ac to 39.5 bu/ac for Headline at 6.0 oz/ac (Table 3). However, there were no significant yield differences between treatments and the untreated check. Percent defoliation observations indicated that all fungicide treatments were similar in that all maintained their foliage longer than the untreated check. Seed weights ranged from 128.5 for the untreated check to 131.6 grams per 1000 seed for Headline at 6.0 oz/ac with no differences among treatments. These results indicate that although fungicide treatments maintained their foliage longer, there was no significant yield or 1000 kernel weight response. The fungicide application at the R5 reproductive stage may have been too late for a yield response.

The MG V late R4 fungicide application study was the only study which showed a yield increase from a fungicide application. The MG IV soybean variety studies where fungicide applications were delayed until late R5 showed no yield response. These results suggest that the yield response may have been affected by fungicide application timing.

Cooperators: None

Publications: None

Table 1. Delta Pine DP 5634RR soybean response to fungicide and fertilizer applications in 2004, Verona, MS.

Fungicide	Product rate/ac	Appl stage	Bu/ac	Pl ht (In)
1. Unt check	----	----	29.2	24
2. Trisert K ⁺ 1 + Borosol 10	6 qt + 1 qt	R2 R2	28.0	23
3. Trisert K ⁺ 1 + Borosol 10 Trisert K ⁺	6 qt + 1 qt 6 qt	R2 R2 Late R4	28.4	21
4. Quadris + Dimilin	3 oz + 2 oz	Late R4 Late R4	33.9	21
5. Quadris + Dimilin	6 oz + 2 oz	Late R4 Late R4	34.4	23
6. Flutriafol	14 oz	Late R4	33.1	21
7. Topsin	0.75 lb	Late R4	35.5	23
		Mean	31.8	----
		LSD (0.05)	3.9	----
		% CV	8.3	----

¹Trisert K [5-0-20 + 13S, (NPK-S)] liquid fertilizer contains potassium thiosulfate and urea-triazone

Table 2. Asgrow AG4403 soybean response to late season (late R5) fungicide application in 2004, Verona, MS.

Fungicide	Product rate/ac	Yield bu/ac	1000 seed wt (gm)
1 Untreated check	—	48.0	97.8
2 Quadris	4 oz.	48.9	102.7
	LSD (P=.05)	NS	NS
	% CV	4.4	5.4
	Grand Mean	48.4	100.1

Table 3. Asgrow AG 4603 soybean response to late season (late R5) fungicide applications in 2004, Verona, MS.

Fungicide	Product rate/ac	Yield bu/ac	Defoliation %		1000 seed wt (gm)
			8/24	8/28	
1 Untreated check	-----	36.9	100	100	128.5
2 Quadris	4 oz	38.7	88	96	128.6
3 Quadris+ Dimilin	4 + 2 oz	35.8	85	94	129.8
4 Headline	6 oz	39.5	84	93	131.6
5 Topsin	0.75 lb	37.2	88	95	130.9
	LSD (P=.05)	NS	4	3	NS
	% CV	5.4	3	2	2.1
	Grand Mean	37.6	89	96	129.9