2005 Ohio Soybean Fungicide Seed Treatment Study

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Soybean diseases in Ohio have increased in number and severity over the past 10 years so that today, the loss of productivity from disease averages over $150,000,000 per year. This loss is greater than from any other factor except weather. The increase in soybean disease is due primarily to short crop rotations or no crop rotation. It is estimated that Ohio soybean producers lose an average of five to eight bushels per acre per year to disease. In most years, several diseases are present but some are not recognized due to low levels of infection. It is noteworthy that by the time symptoms of a particular disease appear, the yield loss has already reached seven to ten percent. In many fields there is significant yield loss to disease even though no symptoms are evident.

In the past, we have relied on varieties' disease resistance and tolerance to provide some measure of control. Many of the Phytophthora control genes are no longer effective because the pathogens have evolved and can overcome the genes' defense mechanism. During the past ten years, fungicide seed treatments have been used effectively to improve soybean stands and increase the general health of soybean root systems following planting.

In 2005 we continued to evaluate soybean seed treatment fungicides. This evaluation was conducted in a randomized complete block design with eight replications. Plots were 5 feet wide and 45 feet long and included four rows spaced 12 inches apart. The soybean variety SC9344RR was used in this test. All locations except C1 were sprayed in August with insecticide to control bean leaf beetle, Japanese beetle, grass hopper and soybean aphid. The loss of leaf area had reached approximately 7 percent by the time of application. The other cultural practices for the study are described in Table 1 and rainfall, recorded in the field, is reported by month in table 2.

Table 1. 2005 Production Information

	N1	**N2**	**C1**	**C2**	**S1**	**S2**
	Henry Co.	**Huron Co.**	**Mercer Co.**	**Delaware Co.**	**Preble Co.**	**Clinton Co.**
Tillage						
Fall	None	Plow	Chisel	None	None	None
Spring	None	Field Cult.	None	None	None	None
Normal Variety Weed Control						
Preemerge	Canopy XL/Dual II/Roundup UltraMax					
Postemerge	Basagran / Flexstar / Select					
Roundup Ready Variety Weed Control						
Pre / Postemerge	Roundup UltraMax					
Soil and Crop Background						
Soil Type	Hoytville	Kibbie	Mercer	Blount	Crosby	Westland
Soil pH	6.0	5.7	6.4	6.1	6.8	6.2
Soil Test P(ppm)	98	72	40	52	78	47
Soil Test K(ppm)	299	437	221	230	298	248
Fertilizer	0-0-0	0-0-0	0-0-0	0-0-0	0-0-0	0-0-0
Previous Crop	Corn	Corn	Corn	Corn	Corn	Corn
Plant Date	5/28	5/18	5/29	5/13	5/11	5/10
Harvest Date	10/28	10/30	10/20	10/17	10/13	10/14

Table 2. 2005 Rainfall Data

	N1 Henry Co.		N2 Huron Co.		C1 Mercer Co.		C2 Delaware Co.		S1 Preble Co.		S2 Clinton Co.	
	2005 (Normal)											
May	**1.6**	(3.3)	**1.5**	(3.6)	**2.0**	(4.1)	**1.5**	(3.8)	**2.6**	(3.8)	**3.1**	(4.7)
June	**1.4**	(3.5)	**1.0**	(3.9)	**2.7**	(3.8)	**2.8**	(3.8)	**1.3**	(3.9)	**1.7**	(3.6)
July	**5.7**	(4.0)	**3.1**	(4.2)	**1.6**	(4.4)	**1.9**	(3.8)	**0.7**	(3.4)	**2.0**	(3.9)
August	**1.6**	(3.1)	**3.6**	(3.5)	**3.1**	(3.6)	**5.2**	(3.1)	**4.2**	(3.1)	**4.6**	(3.5)
September	**5.2**	(2.8)	**3.4**	(3.2)	**4.1**	(3.3)	**3.3**	(2.9)	**4.8**	(2.7)	**1.8**	(3.0)
TOTAL	**15.5**	(16.7)	**12.6**	(18.4)	**13.5**	(19.2)	**14.7**	(17.4)	**13.6**	(16.9)	**13.2**	(18.7)

Table 3. Treatment descriptions: (application rates are per 5 pounds of seed)

Treat No.	Company	Treatment Description
1)	OSU	UTC
2)	Agriliance	Warden RTA @ 7.4 ml/5#
3)	Agriliance	Warden RTA @ 7.4 ml/5# + AG03001 @ 2.95 ml/5#
4)	Agriliance	Warden RTA @ 7.4 ml/5# + AG0300 @ 5.9 ml/5#
5)	Agriliance	Warden RTA @ 7.4 ml/5# + Cruiser @ 1.9 ml/5#
6)	Syngenta	ApronMaxxRFC @ 2.2ml + Apron XL @ 0.71 ml/5#
7)	Syngenta	ApronMaxxRFC @ 2.2ml + Apron XL @ 0.71 ml + Cruiser @ 1.9ml /5#
8)	Gustafson	JAZZ (L-1269-D) @ 8.4 ml + Allegiance @ 0.8 ml /5#
9)	Gustafson	JAZZ (L-1269-D) @ 8.4 ml + Allegiance @ 0.8 ml + Gaucho @ 2.95 ml / 5#

Table 4. Yield data in Bushels per Acre:

Treatment	Site C1	Site C2	Site S1	Site S2	Site N1	Site N2	Mean
1	45.9	49.8	64.2	68.2	53.8	56.9	56.5
2	44.9	51.1	64.7	69.4	55.9	60.8	57.8
3	47.0	51.4	66.8	70.4	54.0	54.6	57.4
4	45.9	52.3	62.7	70.4	49.8	49.3	55.1
5	47.4	53.6	62.5	70.8	55.6	50.3	56.7
6	44.5	54.3	66.7	69.8	55.7	54.1	57.5
7	46.6	53.0	68.1	67.7	54.4	51.8	56.9
8	43.0	51.0	67.5	69.8	53.5	46.5	55.2
9	44.2	52.4	66.1	70.7	56.0	42.3	55.3
Max	**47.4**	**54.3**	**68.1**	**70.8**	**56.0**	**60.8**	**57.8**
Mean	**45.5**	**52.1**	**65.6**	**69.7**	**54.3**	**51.8**	**56.5**
Min	**43.0**	**49.8**	**62.5**	**67.7**	**49.8**	**42.3**	**55.1**
LSD 0.3	**1.5**	**2.5**	**2.5**	**1.6**	**3.0**	**2.4**	**1.0**

Summary:

Depending on location, the soil was relatively dry for four to five weeks following planting due to reduced rainfall, and resulting in little opportunity for the root rot diseases to develop. Even so, most of the fungicide treatments produced a significant yield increases at one or more test sites. Averaged over the six test sites, only treatments two and six produced statistically significant yield increases. This result is not surprising since all the test sites have very low potential for the development of root rot disease. The lack of disease is one of the reasons yields were so good in 2005 in spite of much lower than normal rainfall during the growing season. The potential large loss of yield due to root rot warrants the routine use of seed treatment fungicides on soybeans to control root rot diseases.