

Control of soybean rust in an indeterminate cultivar at the Gwebi Variety Testing Center, Zimbabwe, 2004-05.

Soybeans were planted Nov 04 in 35-in. row widths at the Gwebi Variety Testing Center near Harare, Zimbabwe. An early-planted, early-maturing border was planted around the test to provide additional inoculum. The experimental design was a split plot with four replications. The main effects were fungicide treatment, i. e. product and rates, with 2-application and 3-application programs as the subplots. Plots were 6 rows wide, with 4 rows receiving the fungicide applications. Four rows of each plot were harvested, with a harvest length of 16.4 ft. Fungicides were applied using a rate of 40 gal water/A with a hand-operated backpack sprayer fitted with a pressure regulator and a Lurmark® F110/1.6/3 flood-jet nozzle. The first application was made 50 days after planting (DAP) with subsequent applications 20 days apart. Soybean rust was rated as a percentage of leaf area affected in the lower, mid and upper canopy on each date of evaluation, the mean of these values were obtained to produce a single severity value for each date. These means were then used to produce an area under disease progress curve (AUDPC). The data was not transformed since preliminary analysis indicated it was not warranted. The defoliation within each plot was visually evaluated as percentage defoliation on 31 Mar 05 at 125 DAP. Plots were harvested 146 DAP. All yields were calculated in bu/A at 13% moisture.

Soybean rust was first recorded in the plots on 8 Mar 05, at 102 DAP, after the third fungicide application had been applied, thus all treatments were applied as a protectant. The only plots where soybean rust was seen on this date were the unprotected controls, where a visual severity of 5% was reported in the lower canopy. There were significant differences among the treatments for AUPDC, defoliation and yield. All fungicide treatments had significantly lower disease severity and less defoliation than the unprotected control. However, only 5 of the 19 treatments had significantly greater yield than the unprotected control. The difference between the 2-application program and the 3-application program was also significant; the 2-application program had more severe disease, greater defoliation and lower yields than the 3-application program when the program means were compared. The fungicide treatment by application program interaction was not significant. However, there were treatments where there were apparent differences between the 2 and 3-application programs for disease severity, defoliation and yield. These differences show a trend where the residual activity differs among the products. Phytotoxicity was observed on two treatments, Caramba 90SL® at 8.2 fl oz and Rubigan EC® at 11 fl oz.

Fungicide, rate per acre	Soybean rust severity (AUDPC) ^z			Defoliation %			Yield (bu/A)				
	2 applications		Mean ^y	2 applications		Mean ^y	2 applications		Mean ^y		
	3 applications	3 applications		3 applications							
Caramba 90SL ^w + Headline 250EC, 7.8 + 3.6 fl oz	18	0	9	F	43	23	33	DEF	67.8	77.7	72.7 A
Punch EC, 4.3 fl oz	73	0	37	F	55	13	34	DEF	67.2	72.4	69.8 AB
Stratego 250EC, 12 fl oz ^x	38	0	19	F	73	48	60	B C	67.6	71.2	69.4 ABC
Caramba 90SL ^w , 8.2 fl oz	9	0	4	F	18	8	13	H	66.4	70.5	68.4 ABCD
SA 120 201EC, 6.9 fl oz	0	0	0	F	45	18	31	EF G	65.6	71.0	68.3 ABCD
Impact 12SSC, 6.9 fl oz	0	0	0	F	39	13	26	F G H	64.3	70.4	67.3 ABCDE
Caramba 90SL ^w + Headline 250EC, 9.2 + 4.1 fl oz	36	0	18	F	56	25	41	DE	66.1	68.1	67.1 ABCDE
Domark 230ME, 5.1 fl oz	0	0	0	F	26	9	18	G H	66.4	67.5	67.0 ABCDE
Caramba 90SL ^w + Headline 250EC, 6.1 + 3.6 fl oz	8	0	4	F	23	8	15	H	63.6	69.2	66.4 ABCDEF
Headline 250EC, 9.2 fl oz ^x	1	0	1	F	28	14	21	F G H	64.6	67.5	66.1 BCDEF
Caramba 90SL ^w + Headline 250EC, 8.2 + 4.8 fl oz	19	0	9	F	34	15	24	F G H	65.6	66.2	65.9 BCDEF
Stratego 250EC, 8.4 fl oz ^x	98	3	51	EF	68	25	46	C D	65.0	66.4	65.7 BCDEFG
Folicur 3.6F, 3 fl oz	0	0	0	F	48	18	33	DEF	62.6	68.7	65.6 BCDEFG
Folicur 3.6F, 4 fl oz	3	0	2	F	24	8	16	H	65.2	65.8	65.5 BCDEFG
Punch EC, 3 fl oz	159	03	81	EF	38	25	31	EF G	61.5	66.3	63.9 BCDEFG
Procure 2EC, 20 fl oz	275	2166	220	C D	53	35	44	DE	61.7	64.7	63.2 CDEFG
Rubigan EC, 11 fl oz ^x	195	73	134	C D E	60	25	43	DE	62.2	62.6	62.4 DEFG
No fungicide	622	609	615	A	95	94	94	A	61.5	60.9	61.2 EFG
Echo 720 F, 27.4 fl oz	400	279	340	B C	34	15	24	F G H	56.7	63.5	60.1 FG
Plantvax 4F, 21.4 fl oz	359	179	269	B C	83	63	73	B	55.8	62.9	59.4 G
Application program mean ^y	116	66			47	25			63.9	67.7	
	a	b			a	b			a	b	

^z Area under the disease progress curve.

^y Significant differences between treatments when 2-application and 3-application program data were combined by treatment, (p=0.05) means with the same letter are not significantly different by Students LSD.

^x Significant difference between the means of the application programs, (p=0.05) means with the same letter are not significantly different by Students LSD.

^w Application at growth stage R1 was Folicur 3.6F, 4 fl oz, second and third applications were Caramba 90SL at listed rate.

^v 0.125% NIS was included in the treatment.