

THE IMPACT OF WHEAT VARIETY AND SOYBEAN SEED COATING ON RELAY-INTERCROPPED GRAIN YIELDS

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Double-crop no-till soybean are often planted into dry soil in early July which reduces stand and often results in poor soybean growth. Timely summer rains are essential for high yielding double-crop soybean. Soybean seed coat technology has progressed over the past few years and interest in relay-intercropping soybean with wheat could increase soybean production in these production systems. Limited research has evaluated the impact of wheat variety on relay-intercropped soybean grain yield. This research was initiated to evaluate the effect of wheat row spacing on wheat grain yield and the impact of wheat variety and soybean seed coat technology on relay-intercropped soybean grain yield in the presence and absence of wheat.

‘Pioneer 25R37’, ‘AgriPro 502 CL’, and ‘Ernie’ were planted at 110 lbs/a on October 12, 2002 and October 24, 2003 in 7.5 and 15 in. rows. Polymer coated (Intellicoat[®]), non-coated, and fungicide only (Captan, PCNB, Thiabendazole, and Metalaxyl) treated ‘Hubner 5143 NRR’ relay-intercropped soybean were planted with a John Deere 7200 split-row planter at 200,000 seeds/a on April 23, 2003. ‘DK 38-52’, polymer coated ‘Hubner 5143 NRR’, and non-coated ‘Hubner 5143 NRR’ relay-intercropped soybean were planted on April 28, 2004 at 200,000 seeds/a. Double crop non-treated soybean were planted at 200,000 seeds/a on July 7, 2003 and June 26, 2004. All data were subjected to ANOVA and means separated using Fisher’s protected LSD ($p \leq 0.05$).

Light interception of 7.5 in. wheat was 3 to 8% greater than 15 in. wheat (Table 1). Wheat grain yield was 11 to 15 bu/a greater in 7.5 than 15 in. rows in 2003; however, wheat grain yields in 15 and 7.5 in. rows were similar in 2004. Intellicoated soybean emergence was delayed approximately 10 to 14 days compared to the non-coated, fungicide only, or DK 38-52 soybean (visual observation). Soybean plant populations of fungicide only, DK 38-52, or non-coated soybean were 62 to 82% greater than Intellicoat soybean in mid-May (Tables 2 and 3). Fungicide only and non-coated soybean were at the unifoliate stage of development while coated soybean were either emerging or at the cotyledon stage of development (data not presented). Relay-intercropped soybean grain yield was similar to double-crop soybean following 7.5 in. wheat in 2003. Final soybean population and grain yield of full-season, relay-intercropped, and double-cropped soybean will be determined this fall.

Table 1. Light interception of Pioneer 25R37 and Ernie planted in 15 and 7.5 in. rows. Wheat grain yield of three varieties planted in 15 and 7.5 in. rows.

Wheat variety	Wheat row spacing inches	Light interception		Wheat grain yield	
		2003	2004	2003	2004
		%		bu/acre	
Pioneer 25R37	15	80	75	64	44
	7.5	88	78	75	44
Ernie	15	74	73	46	42
	7.5	82	81	58	40
AgriPro 502 CL	15	— ^a	—	38	34
	7.5	—	—	53	34
LSD ($p \leq 0.05$)		— 4 —	— 3 —	— 6 —	— 9 —

^aTreatment not included.

Table 2. The effect of soybean seed coating on soybean population in the absence of wheat and the presence of 15 in. wide-row Pioneer 25R37 and Ernie wheat varieties on May 15, 2003.

Soybean coating	Soybean population		
	No wheat	Pioneer 25R37	Ernie
plants/acre			
Non-coated 5143 NRR	176,000	157,000	179,000
Fungicide only 5143 NRR	181,000	170,000	185,000
Intellicoat 5143 NRR	63,000	52,000	33,000
LSD ($p \leq 0.05$)	— 20,000 —		

Table 3. The effect of soybean seed coating and cultivar in the absence of wheat and presence of 15 in. wide-row Pioneer 25R37 and Ernie wheat varieties on May 23, 2004.

Soybean coating	Soybean population		
	No wheat	Pioneer 25R37	Ernie
	plants/acre		
Non-coated 5143 NRR	177,000	160,000	151,000
DeKalb 38-52	171,000	177,000	155,000
Intellicoat 5143 NRR	107,000	46,000	55,000
LSD ($p \leq 0.05$)	33,000		

Table 4. Full season, double-crop, and relay intercropped soybean grain yields in 2003.

Soybean cropping system	Wheat variety and row spacing	Soybean grain yield for seed treatments		
		Non-coated 5143 NRR	Fungicide only 5143 NRR	Intellicoat 5143 NRR
		bu/acre		
Full-season		30	29	30
Double-crop	Pioneer 25R37 in 7.5 in. rows	13	— ^a	—
	Pioneer 25R37 in 15 in. rows	9	—	—
	Ernie in 7.5 in. rows	12	—	—
	Ernie 25R37 in 15 in. rows	9	—	—
	AgriPro 502 CL in 7.5 in. rows	10	—	—
	AgriPro 502 CL in 15 in. rows	9	—	—
Relay-intercropped	Pioneer 25R37 in 15 in. rows	13	12	13
	Ernie in 15 in. rows	13	16	16
LSD ($p=0.05$)		4		

^aTreatment not included.