

Ohio Soybean Council Double Crop Soybean Report- Final Report

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Maturity Group x Seeding Rate

Background: There is very little double crop soybean research in Ohio. In 2016, the United Soybean Board and Ohio Soybean Council funded a soybean relative maturity x seeding rate study. The study was continued in 2017 with funding from the Ohio Soybean Council. The trial was also conducted in Indiana, Kentucky, and Missouri with funding from their individual state boards. A graduate student at Purdue University is summarizing the data from all states for his thesis.

Objective: To evaluate soybean seeding rate and relative maturity in a double crop soybean system.

Treatments: This trial was conducted in 2016 and repeated in 2017. Soybean seeding rate (50, 100, 150, 200, and 250 thousand seeds/acre) and relative maturity (Pioneer Brand 3.1, 3.6, and 4.1) were evaluated for double crop soybean production at the Western Agricultural Research Station in South Charleston, Ohio. In 2016, wheat was harvested on July 10 and soybeans planted on July 11. In 2017, wheat was harvested on June 29 and soybeans were planted the same day. Partial economic return was calculated by the equation: Partial economic return = Gross return (yield * \$9.44/bu) – Seed cost (thousand seeds/acre * \$0.43).

Results: Final soybean stand collected just prior to harvest and yield are shown in Table 1 and Table 2 for 2016 and 2017, respectively. In both years, final stands were reflective on the seeding rate. In 2016, the 3.1 and 3.6 relative maturity soybeans seeded at 200,000-250,000 seeds/acre were the highest yielding treatments. In 2016, the highest partial economic return was achieved when the 3.1 RM soybean was planted at 250,000 seeds/acre. In 2017, the 3.6 and 4.1 relative maturity soybeans at 250,000 seeds/acre were the highest yielding. Highest partial economic return was achieved with the 3.6 RM at 250,000 seeds/acre.

Table 1. Effect of soybean relative maturity and seeding rate on soybean final stand and yield ($\alpha = 0.10$).

Variety	Seeding Rate (plants/acre)	Soybean Stand on Nov. 1 (plants/acre)	Grain Yield (bu/acre)	Partial economic return (\$/acre)*
RM = 3.1 (P31T11R)	50,000	54,500 f	29.6 g	\$258
	100,000	77,200 e	33.9 efg	\$277
	150,000	119,400 cd	42.8 bc	\$340
	200,000	160,800 b	43.3 bc	\$322
	250,000	213,900 a	49.7 a	\$362
RM = 3.6 (P36T14R2)	50,000	50,400 fg	33.0 fg	\$290
	100,000	78,500 e	37.1 def	\$307
	150,000	124,300 cd	43.2 bc	\$343
	200,000	163,300 b	45.5 ab	\$344
	250,000	209,000 a	49.3 a	\$358
RM = 4.1 (P41T33RR)	50,000	38,900 g	34.9 ef	\$286
	100,000	77,100 e	38.9 cde	\$324
	150,000	114,300 d	40.8 bcd	\$321
	200,000	140,300 bc	43.6 bc	\$326
	250,000	189,100 a	41.0 bcd	\$280

*Using soybean price of \$9.44/bushel and seed cost of \$0.43/1000 seeds.

Table 2. Effect of soybean relative maturity and seeding rate on soybean final stand and yield ($\alpha = 0.10$).

Variety	Seeding Rate (plants/acre)	Fall Soybean Stand (plants/acre)	Grain Yield (bu/acre)	Partial economic return (\$/acre)*
RM = 3.1 (P31T11R)	50,000	53,800 i	28.2 f	\$245
	100,000	70,200 gh	31.1 f	\$251
	150,000	102,400 de	39.1 e	\$305
	200,000	116,000 cd	41.0 de	\$301
	250,000	127,400 bc	45.2 cd	\$319
RM = 3.6 (P36T14R2)	50,000	61,800 hi	37.3 e	\$331
	100,000	78,000 fg	41.3 de	\$347
	150,000	93,200 ef	46.0 bcd	\$370
	200,000	122,000 bc	47.4 bc	\$361
	250,000	136,800 b	53.7 a	\$399
RM = 4.1 (P41T33RR)	50,000	59,400 hi	38.7 e	\$344
	100,000	74,800 gh	38.6 e	\$321
	150,000	102,800 de	47.1 bc	\$380
	200,000	133,800 b	47.2 bc	\$360
	250,000	165,400 a	50.8 ab	\$372

*Using soybean price of \$9.44/bushel and seed cost of \$0.43/1000 seeds.

Recommendations: Double crop soybean yield was greater in 2017 compared to 2016 which is likely a reflection of the earlier planting date in 2017 (June 29) compared to 2016 (July 11). The 4.1 relative maturity soybean also yielded greater in 2017 compared to 2016 likely due to the earlier planting date whereas the 4.1 relative maturity soybean in 2016 was limited due to the duration of the growing season.

Based on this research, double crop soybeans should be planted at 250,000 seeds/acre. At this seeding rate, in most cases, there were at least 150,000 plants/acre at harvest which is generally what is required to maximize yield of late planted soybeans. The latest maturity soybean variety that will not be killed in a frost should be planted to maximize vegetative growth prior to the onset of flowering. However, this is difficult to predict year-to-year. In this research in Clark County, the 3.6 relative maturity yielded the greatest in both years.

Next steps- These results will be summarized in a double crop soybean management bulletin. This bulletin should be available in spring 2018 prior to double crop soybean planting.