AGRONOMY

INTERACTION OF NITROGEN RATES AND CULTIVARS FOR CORN PRODUCTION– COMPARING SINGLE-ROW TO TWIN-ROW SYSTEMS

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MANY PRODUCERS CONTINUE TO QUESTION WHETHER TWIN-ROW PRODUCTION IS BETTER THAN SINGLE-ROW PRODUCTION FOR CORN. THE OBJECTIVE OF THIS RESEARCH IS DESIGNED TO EXAMINE CULTIVAR EFFECTS WITH SINGLE-ROW VERSUS TWIN-ROW PRODUCTION SYSTEMS.

Cultural practices are quite important for optimum corn production in the Mississippi Delta and are the focus of several research projects. Plant population (seeding rates), nitrogen (N) fertilization, and irrigation are key components of Mid-south corn production within the wide-row planting systems. While yields may not be as high for some areas in the non-Delta region due to lack of natural fertility and irrigation potential, the profitability of corn compared to other crops has led to increased acreage. Twin-row planters and drills are being utilized to optimize soybean yield with conventional wide-row spacing common to the cotton production area. Producers want to use the same planter for corn and soybean. As fertilizer prices continue to fluctuate, increases in seeding rates, especially in twin-row planting patterns, have been more cost effective than increased N rates. Previous research has shown that the seeding rates could be increased by at least 5000 seed/ac ($3.75/1000 seed based on $300/80K bag of planting seed). Another key factor that producers must evaluate is the cost of planting seed related to the technology

Figure 1: *Summary of 2015 interaction effects for cultivars and planting pattern.*

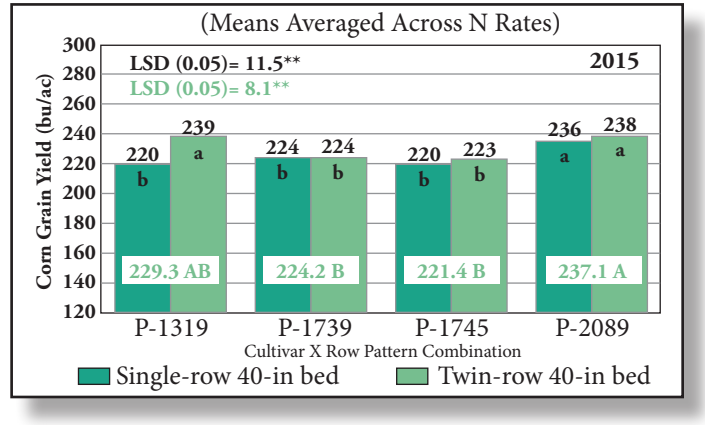
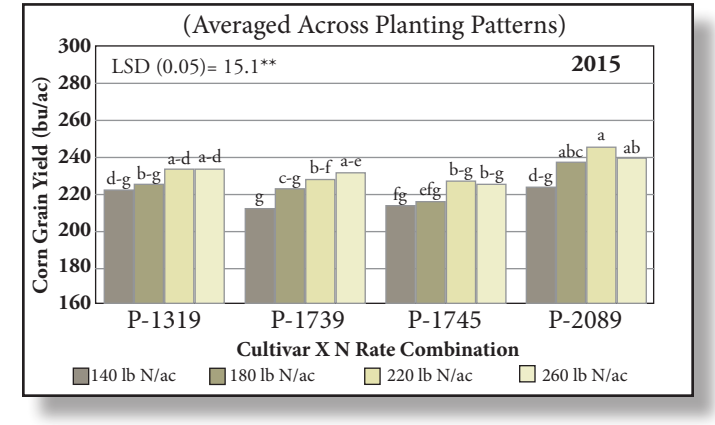


Figure 2: *Interaction effects for cultivars and nitrogen rates averaged across planting patterns.*



fees being assessed. An evaluation of these two components could lead to increased yields and reduced unit cost of production.

Multi-year research was initiated in 2013 to evaluate single-row (SR) vs twin-row (TR) production systems for corn on wide rows following soybean. The study included N rates of 140, 180, 220, and 260 lb N/ac with 100 lb N/ac applied pre-plant (PPN) and the remaining N (40, 80, 120, or 160 lb N/ac) applied as a sidedress. Based on previous research, seeding rates were planned at 32,500 seeds per acre for SR production and 37,500 seeds per acre for the TR system. Four Pioneer hybrids (ranging in maturity from 113 to 120 days) were chosen for the study and included 1319 HR, 1739 HR, 1745 BVT, and 2089 YHR. The hybrids were planted with a Monosem TR planter and John Deere SR planter. At maturity, the two center rows of each 4-row plot (for TR system, four rows of eight) were harvested with a commercial combine adapted for plot harvest. Samples were collected at harvest and used to measure harvest moisture and determine both bushel test weight and seed index (100 seed weight).

Grain yields have been summarized in Table 1. Yields ranged in the SR planting system from 211.0 bu/ac (Pioneer 1319 HR, 140 lb N/ac) to 245.5 bu/ac (Pioneer 2089 YHR, 220 lb N/ac). A similar range was observed in the TR planting system where yields ranged from 211.7 bu/ac (Pioneer 1739 HR, 140 lb N/ac) to 247.0 bu/ac (Pioneer 2089 YHR, 220 lb N/ac). Interestingly, there were differences between cultivars again in 2015. The earliest maturing cultivar, Pioneer 1319 HR (113 days) averaged 19.4 bu/ac greater yields for TR compared to SR production (Table 1). The interaction effects of cultivars and planting patterns averaged across N rates is shown in Figure 1 along with the main effects for cultivar averaged across N rates and planting patterns. Pioneer 2089 YHR produced higher yields in 2015 compared to the other cultivars when averaged across planting pattern and N rate (Figure 1). The effects of N rate are shown in Figure 2. For most of the cultivars, grain yields were increased with increasing N rates up to 220 lb N/ac with no additional yield with the last 40-lb increment of N. This study did follow soybean in rotation and some N credit is given for soybean in rotation (usually 30 lb N/ac). Yields results have differed from year to year with different cultivars coming out on top in different years. The overall yield for the research area was 228 bu/ac.

Trt	Cultivar	N Rate	Single-Row System		Trt	Twin-row System		Differ
		(lb/A)	(bu/acre)			(bu/acre)		(bu/A)
1	1319 HR	140	211.0	i	17	233.4	a-g	22.4
2	1319 HR	180	219.8	e-i	18	232.7	a-h	12.9
3	1319 HR	220	224.9	b-i	19	244.0	abc	19.1
4	1319 HR	260	222.8	c-i	20	245.8	ab	23.0
5	1739 HR	140	214.3	ghi	21	211.7	hi	- 2.6
6	1739 HR	180	223.3	c-i	22	224.1	c-i	0.8
7	1739 HR	220	228.1	a-i	23	228.8	a-i	0.7
8	1739 HR	260	231.3	a-i	24	231.7	a-i	0.4
9	1745 BVT	140	211.2	i	25	217.5	f-i	6.3
10	1745 BVT	180	219.2	e-i	26	214.5	ghi	- 4.7
11	1745 BVT	220	224.6	b-i	27	230.6	a-i	6.0
12	1745 BVT	260	223.8	c-i	28	228.5	a-i	4.7
13	2089 YHR	140	221.0	d-i	29	227.7	a-i	6.7
14	2089 YHR	180	237.6	a-f	30	237.5	a-f	- 0.1
15	2089 YHR	220	245.5	ab	31	247.0	a	1.5
16	2089 YHR	260	239.4	a-e	32	241.5	a-d	2.1
	Fisher's LSD (0.05) = 21.3 bu/acre [Prob > F = 0.0067]							
	C.V. (%) = 7.5%							

Table 1: *Corn grain yield from an evaluation of cultivars and N rates in SR and TR production systems.*