AGRONOMY

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

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Cultural practices are important for optimum corn production in the Delta and have been 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 (TR) planters and drills have been used to optimize soybean yield in conventional wide-row spacing (38 to 40 inches). Producers want to use the same planter for corn and soybean with the hope of increased yields and profitability. As fertilizer prices fluctuate, increases in seeding rates, especially in twin-row planting patterns, have been found to be more cost effective than increased N rates. Previous research has shown that for some cultivars the seeding rates could be increased by at least 5000 seeds per acre ($3.75/1000 seeds based on $300 per 80K bag of planting seed). Another key factor that producers must evaluate is the cost of planting seed related to the technology 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 TR production systems for corn on a wide-bed configuration following soybean. The study included nitrogen (N) rates of 140, 180, 220, and 260 pounds of N per acre with 100 pounds of N per acre applied pre-plant (PPN) and the remaining N (40, 80, 120, or 160 pounds of N per acre) applied as a sidedress (SDN) with both applications made to both sides of the planted row. Based on previous research, seeding rates were planned at 32,500 seeds per acre for single-row production and 37,500 seeds per acre for the twin-row system. Both planters for this study were calibrated with the planting seed used for the study and resulted in final stands very close to the desired plant populations. Four Pioneer corn hybrids (ranging in maturity from 113 to 121 days) were chosen for the study and included 1319 HR, 1739 HR, 1637 VYHR, and 2160 YHR. The hybrids were planted with a Monosem TR planter and John Deere SR planter. All cultural practices were held constant with irrigation supplied as needed. At maturity, the two center rows of each 4-row plot (for TR system, four rows of eight) were harvested with a commercial combined adapted for plot harvest. Samples were collected and used to measure harvest moisture and determine both bushel

"MANY PRODUCERS CONTINUE TO QUESTION WHETHER TWIN-ROW PRODUCTION IS BETTER THAN SINGLE-ROW PRODUCTION FOR CORN. THE CURRENT RESEARCH HAS BEEN DESIGNED TO EXAMINE CULTIVAR INTERACTIONS IN SINGLE-ROW VERSUS TWIN-ROW PLANTING SYSTEMS."

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test weight and Seed Index (100-seed weight).

Grain yields in the study have been summarized in Table 1 for all 32 treatment combinations. Yields ranged in the SR planting system from 195.5 bushels per acre (Pioneer 1637 VYHR, 220 pounds of N per acre) to 222.5 bushels per acre (Pioneer 2160 YHR, 220 pounds of N per acre) when adjusted to 15.5% moisture. Grain yields ranged, in the TR system

Table 1. *Summary of corn grain yield for an evaluation of cultivars and N rates in single-row and twin-row production systems. Delta Research and Extension Center, Stoneville, MS. 2015*

TRT	Cultivar	N Rate	Single-Row System	TRT	Twin-Row System	Differ
		(lb/ac)	(bu/ac)		(bu/ac)	(bu/ac)
1	1319 HR	140	200.5 e-i	17	206.2 b-i	5.7
2	1319 HR	180	205.2 b-i	18	211.6 a-g	6.4
3	1319 HR	220	203.6 c-i	19	220.4 ab	16.8
4	1319 HR	260	205.0 b-i	20	218.2 abc	13.2
5	1739 HR	140	201.1 e-i	21	202.1d-i	1.0
6	1739 HR	180	206.0 b-i	22	200.9 e-i	-5.1
7	1739 HR	220	200.6 e-i	23	193.8 hi	-6.8
8	1739 HR	260	204.9 b-i	24	190.3 ij	-14.6
9	1637 VYHR	140	201.5 e-i	25	171.4 k	-30.1
10	1637 VYHR	180	196.1 ahi	26	166.6 k	-29.5
11	1637 VYHR	220	195.5 hi	27	170.3 k	-25.2
12	1637 VYHR	260	197.1 f-i	28	176.1 jk	-21.0
13	2160 YHR	140	205.1 b-1	29	208.4 a-h	3.3
14	2160 YHR	180	212.1 a-f	30	215.2 a-e	3.1
15	2160 YHR	220	222.6 a	31	218.9 abc	-3.7
16	2160 YHR	260	217.9 a-d	32	218.6 abc	0.7
Fisher's LSD (0.05) = 15.9 bu/ac [Prob > F = <0.0001] C.V. (%) = 6.3%						

from 166.6 bushels per (Pioneer 1637 VBYHR, 180 pounds of N per acre) to 220.4 bushels per acre (Pioneer 1319 HR, 220 pounds of N per acre). Grain yields were increased with TR planting of 1319 HR but were lower for both 1739 HR and 1637 VYHR. The latter cultivar had significant lodging in the TR system that was difficult to pick up. The cultivar also lodged some in the SR system but the combine was more efficient. The objective of this research was to examine cultivar effects with single-row (SR) verses twin-row (TR) production systems. Interestingly, there were differences between cultivars observed in 2015 and again in 2016. The earliest maturing cultivar, Pioneer 1319 HR (113 days) averaged 10.5 bushels per acre greater yield for TR compared to SR production (Range: 5.7 to 16.8 bushels per acre) (Table 1). However, the new cultivar evaluated in 2016, Pioneer 1637 VYHR lodged in TR planting resulting in much lower yields.

Results have shown varietal differences depending on the year. Most years, TR planting has not decreased yields, thus providing an opportunity to plant more acres with the same planter.

Figure 1. *Summary of 2016 interaction effects for cultivars and planting pattern averaged across N rates. Cultivar x Planting Pattern Interaction was significant and cultivar average is not shown. DREC.*

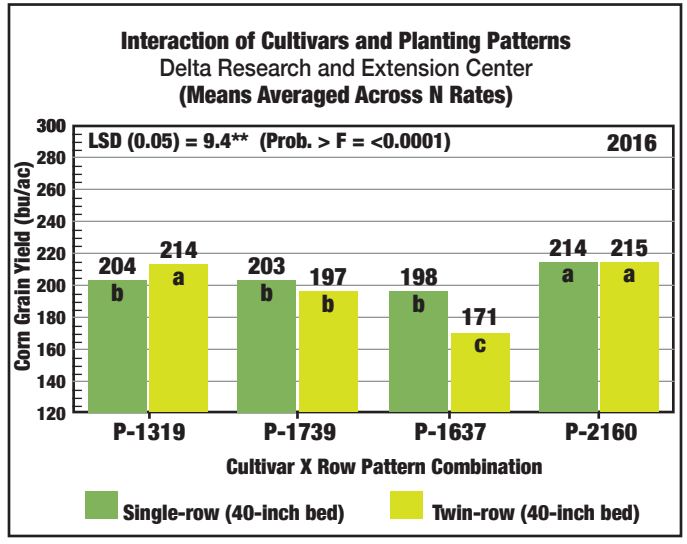

Figure 2. *Summary of 2016 interaction effects for cultivars and N rates averaged across planting patterns. DREC.*