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On-Farm Corn Row Spacing Trials

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Abstract
Over the past several decades there has been a shift in corn row spacing from the traditional 40-in. rows that were needed so horses could fit between the rows, to 38-in., 36-in., and the most popular 30-in. rows. The narrow row spacing usually has resulted in increased yields due to it allowing more space between the plants within the row. More recently there has been interest in seeing if a narrower row spacing (15-in. or 20-in.) will further increase corn yield.

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On-Farm Corn Row Spacing Trials

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Introduction

Over the past several decades there has been a shift in corn row spacing from the traditional 40-in. rows that were needed so horses could fit between the rows, to 38-in., 36-in., and the most popular 30-in. rows. The narrow row spacing usually has resulted in increased yields due to it allowing more space between the plants within the row. More recently there has been interest in seeing if a narrower row spacing (15-in. or 20-in.) will further increase corn yield.

Materials and Methods

In 2014, three trials were conducted in Cass and Lyon counties looking at the effect of different row spacing on corn yield (Table 1). All trials were conducted on-farm by farmer cooperators using the farmers' equipment. Strips were arranged in a randomized complete block design with at least three replications per treatment. Strip size varied from field to field depending on equipment size and the size of the field. All strips were machine harvested for grain yield.

In Trial 1, two corn hybrids were planted at three populations (30,000, 36,000, and 42,000 seeds/acre) with two row spacings (20-in. and 30-in.). In Trials 2 and 3, corn planted in 30-in. rows was compared with corn planted in 15-in. rows.

Results and Discussion

In Trial 1, there was no yield difference among the various plant populations and row spacings with Pioneer PO193, although there was a nearly significant ($P = 0.09$) yield increase of about 7 bushels/acre with the 20-in. rows vs. the 30-in. rows (Table 2). With Pioneer PO297, there was a higher yield with the 20-in. row spacing than the 30-in. row spacing for the 30,000 and 36,000 planting populations, but with the 42,000 population the yield was higher for the 30-in. rows than the 20-in. rows.

The average yield for Pioneer PO297 was 176 bushels/acre, which was significantly greater than the 172 bushels/acre Pioneer PO193 yielded ($P < 0.01$). There was no difference in corn yields among the three corn populations with all three yielding an average of 174 bushels/acre with the two corn hybrids ($P = 0.90$). When data for both hybrids were analyzed together, there was a significant difference between the corn row spacings ($P < 0.01$), with the 20-in. spacing yielding 178 bushels/acre, and the 30-in. spacing yielding 169 bushels/acre. None of the interactions (hybrid × population, spacing × population or hybrid × spacing × population) were significant at $P = 0.05$.

In Trials 2 and 3, there was no difference in yield between the 15-in. row spacing and 30-in. row spacing (Table 3), although there was a nearly significant yield loss of 28 bushels/acre with the 15-in. row vs. the 30-in. row ($P = 0.13$). This field flooded several times and was on poorly drained soil, resulting in more variability from strip to strip. It is possible the trend for a lower yield with the 15-in. rows was because the soil did not dry as rapidly after each of the rain events with the greater early-season shading with the narrower rows.

Table 1. Hybrid, planting date, planting population, previous crop, and tillage practices in on-farm corn row spacing trials in 2014.

Exp. no.	Trial	County	Hybrid	Planting date	Planting population (seeds/A)	Previous crop	Tillage
140115	1	Lyon	Pioneer PO297 & PO193	4/25/14	30, 36, & 42K	Soybean	Conventional
140635	2	Cass	Epplys E14030VT2 PRIB	5/17/14	32,000	Soybean	No-till
140641	3	Cass	Wyffels W6628 RIB	6/15/14	32,000	Corn	1 pass vertical tillage

Table 2. Yields from on-farm corn row spacing trials with multiple comparisons in 2014.

Exp. no.	Trial	Hybrid	Row spacing (in.)	Planting population (seeds/A)	Yield (bu/A)[x]	P-Value (within each hybrid)[y]
140115	1	Pioneer PO193	20	30,000	175 a	0.09
		Pioneer PO193	20	36,000	175 a	
		Pioneer PO193	20	42,000	176 a	
		Pioneer PO193	30	30,000	168 a	
		Pioneer PO193	30	36,000	167 a	
		Pioneer PO193	30	42,000	168 a	
		Pioneer PO297	20	30,000	182 a	<0.01
		Pioneer PO297	20	36,000	182 a	
		Pioneer PO297	20	42,000	180 a	
		Pioneer PO297	30	30,000	168 b	
		Pioneer PO297	30	36,000	171 b	
		Pioneer PO297	30	42,000	172 b	

[x]Values denoted with the same letter (within each hybrid) are not statistically different at the significance level of 0.05.

[y]P-Value = the calculated probability that the difference in yields can be attributed to the treatments and not other factors. For example, if a trial has a P-Value of 0.10, then we are 90 percent confident the yield differences are in response to treatments. For P = 0.05, we would be 95 percent confident.

Table 3. Yields from on-farm corn row spacing trials in 2014.

Exp. no.	Trial	Treatments	Yield (bu/A)[x]	P-value[y]
140635	2	15-in. rows	152 a	0.41
		30-in. rows	156 a	
140641	3	15-in. rows	127 a	0.13
		30-in. rows	155 a	

[x]Values denoted with the same letter are not significantly different at the significance level 0.05.

[y]P-Value = the calculated probability that the difference in yields can be attributed to the treatments and not other factors. For example, if a trial has a P-Value of 0.10, then we are 90 percent confident the yield differences are in response to treatments. For P = 0.05, we would be 95 percent confident.