Corn Population and Nitrogen Trial

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Introduction
Corn plant populations have increased at approximately 400 plants/acre per year over the last two decades. Seeding rates are now commonly in the 32,000 to 38,000 seeds/acre range with some hybrids being recommended at higher seeding rates. Because corn plant populations and grain yields are increasing, there has been a renewed interest in looking at corn seeding rate and nitrogen rate interactions.

Materials and Methods
This trial was conducted beginning in 2016 using Stine 9538-20 planted April 19. This trial was set up as a randomized complete block design. It was designed to compare two seeding rates (35,000 and 45,000 seeds/acre) and two nitrogen rates (160 and 210 lb N/acre). Pre-planting 160 lb N/acre of UAN was applied to all plots, and an additional sidedress of 50 lb N/acre of UAN was applied to specific plots June 9.

Results and Discussion
The main effects and interaction effects of seeding rate and nitrogen rate were not found to be statistically significant (Table 1). Although there was numerial evidence the 45,000 seeds/acre and 210 lb N/acre treatment was higher yielding, the additional cost ($49.80/acre) was not captured with enough yield response to pay for the additional inputs.

Acknowledgements
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Table 1. Corn grain yields and cost of added inputs for the seeding rate × nitrogen trial in 2016.[1]

	160 lb N/ac	210 lb N/ac	35,000 seeds/ac	45,000 seeds/ac		160 lb N/ac	210 lb N/ac
	grain yield (bu/ac)					[2]Difference in cost	
160 lb N/ac	192.4				35,000 seeds/ac	--	$15.50 (4.6 bu/ac)
210 lb N/ac		194.6			45,000 seeds/ac	$34.30 (10.2 bu/ac)	$49.80 (14.6 bu/ac)
	P = 0.5467						
35,000 seeds/ac	192.3	191.4	191.8				
45,000 seeds/ac	192.5	197.8		195.2			
	P = 0.3983		P = 0.3611				

[1]P-values within boxes are used to compare yields of the main effects or interaction effects within each box.
[2]Difference in cost between the baseline treatment 35,000 seeds/acre and 160 lb N/acre and added input. The number in parenthesis below the cost is the equivalent bushels/acre needed to return cost of inputs.
Note: Difference in cost was calculated based on $3.43/1,000 seeds and $0.31/lb N (Source: Estimated Cost of production FM1712 publication). The difference in cost was then divided by the calendar year corn price of $3.40 (Source: Ag Decision Maker File A2-11 for Iowa Cash Corn & Soybean Prices).