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Corn Plant Populations, 2007 through 2009

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Corn Plant Populations, 2007 through 2009

Abstract
Corn hybrid genetics change yearly to increase productivity. The newer hybrids appear to possess plant characteristics that allow for higher plant populations. Over the past several years, several field trials across the state have found support for higher plant populations in corn. This trial was designed to collect information to aid in local recommendations. Additionally, this data will be combined into a larger data set of similar trials for statewide recommendations.

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Introduction

Corn hybrid genetics change yearly to increase productivity. The newer hybrids appear to possess plant characteristics that allow for higher plant populations. Over the past several years, several field trials across the state have found support for higher plant populations in corn. This trial was designed to collect information to aid in local recommendations. Additionally, this data will be combined into a larger data set of similar trials for statewide recommendations.

Materials and Methods

The previous crop was soybean. The soil type is Monona silt loam with slope ranging from 5–14%. The trial was replicated four times with four seeding rates of the same corn hybrid. Seeding rates ranged from 26,197 to 41,549 seeds/acre, based on the gear settings for the planter. Plot width was a minimum of 8 rows width and plot length was a minimum of 570 ft long.

The trial had no fall or spring tillage and was no-till planted. Adequate nitrogen was applied as anhydrous ammonia and weed control was attained with pre- and post-herbicide applications as needed. Grain yield was determined using a yield monitor.

Results and Discussion

The optimum planting population is variable, dependent on the weather conditions of each growing season. In 2007, the corn showed mid-season moisture stress, while 2008 and 2009 both had more than adequate moisture in June and July. As a consequence, in 2007, corn grain yields were higher at lower seeding rates and, in 2008 and 2009, grain yields were better at the higher seeding rates (Table 1).

The loess soils of western Iowa don't have the water holding capacity that the glacial till soils to the east have. As a result, in-season precipitation is more critical in attaining desired corn yields. Additionally, higher corn populations increase the demand for soil moisture. Therefore, determining the perfect corn seeding rate is not easy unless there is a clear, reliable forecast for the growing season. Figure 1 illustrates how a dry season (2007) and a wet season (2009) have contrasting optimal seeding rates.

The penalty of seeding too high in a dry year is much greater than the penalty of seeding too low in a wet year. As a result, the optimal seeding rate for corn in loess soils would be between 30,000 and 33,000 seeds/acre.

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Table 1. Grain yield results from four corn seeding rates at the Western Research and Demonstration Farm from 2007 to 2009.

Seeding rate	Grain yield			
	2007	2008	2009	3-yr average
seeds/acre	- - - - - bushels/acre - - - - -			
26,197	174.3 a	-	216.6 b	195.5
31,162	163.8 ab	185.9 a	222.6 ab	190.8
36,082	155.4 bc	181.7 a	228.1 a	188.4
41,549	145.8 c	208.7 a	225.4 a	193.3
$LSD_{(0.05)}$	16.9	ns	6.78	n/a

Treatment means with any letter in common are not significantly different from one another.

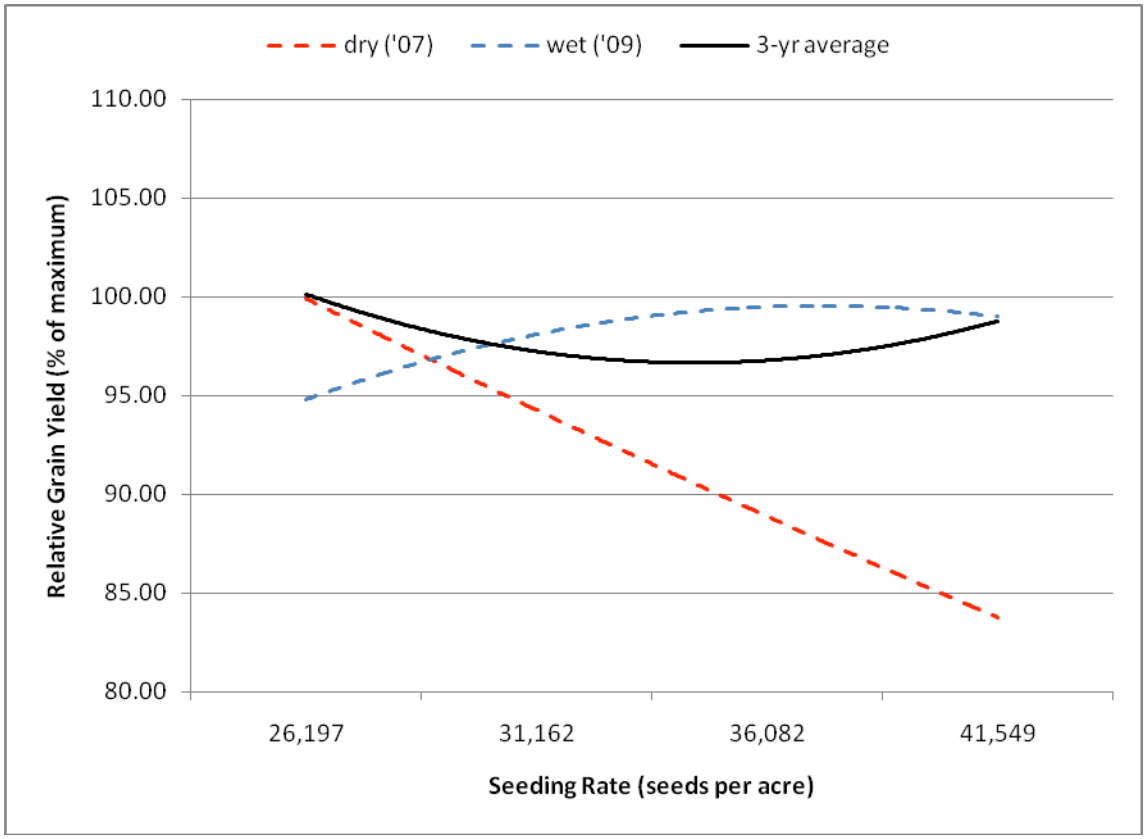

Figure 1. Corn grain yield trendlines for wet (2009), dry (2007), and 3-year average.