Analyzing the Effect Plant Population Has on Yields for Dryland Corn

UNIVERSITY OF GEORGIA EXTENSION

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Background

Across all of these different production systems, Georgia corn growers have demonstrated the ability to achieve great corn grain yields in the past. These yields have been achieved through adoption of modern corn hybrids coupled with improved management technologies and careful attention paid to all production practices. One aspect of production practices involves determining seed population and spacing. There is no one plant population to maximize yield and net returns across all fields in Georgia. Optimum populations vary according to soil type, hybrid, irrigation capabilities, and individual management practices. Generally speaking, irrigated cropping systems can support greater plant populations than dryland cropping systems. Current plant population recommendations for irrigated corn in Georgia are between 28,000 to 36,000 plants per acre. In dryland cropping systems current plant population recommendations are between 18,000 and 20,000 plants per acre in sandy soils.

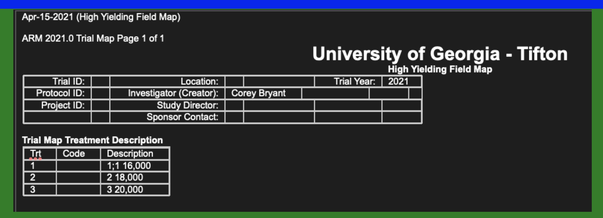
Situation

A local grower was frustrated with the money spent on seed when compared to their yields. The grower, in previous growing seasons, planted 24,000 seed to the acre on sandy dryland fields with the yield goal being 100 bu/acre. Using that information, as well as the growers desire to find out what populations work best for different fields, a seed population study was created.

Project Design

Three fields were identified and labeled as high yielding, mid-yielding, and low yielding. Three seed populations were tested in each field and were replicated 4 times across the fields using randomization. The mid and low yielding fields used the same three populations while the high yielding field had a different population set to test. The corn was planted on April 23rd, 2021; plots were 8-rows wide by the length of the field.

TRT	REP
14,000	1
16,000	1
18,000	1
16,000	2
18,000	2
14,000	2
18,000	3
14,000	3
16,000	3
14,000	4
16,000	4
18,000	4



Apr-15-2021 (High Yielding Field Map)

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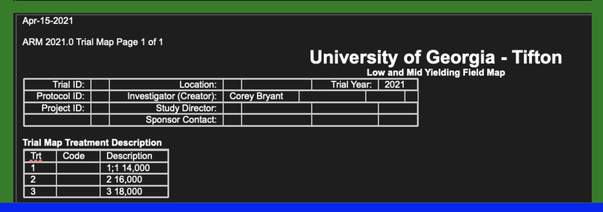
High Yielding Field Map

Trial ID:		Location:		Trial Year:	2021
Protocol ID:		Investigator (Creator):	Corey Bryant		
Project ID:		Study Director:			
		Sponsor Contact:			

Trial Map Treatment Description

Trt	Code	Description
1		1;1 16,000
2		2 18,000
3		3 20,000



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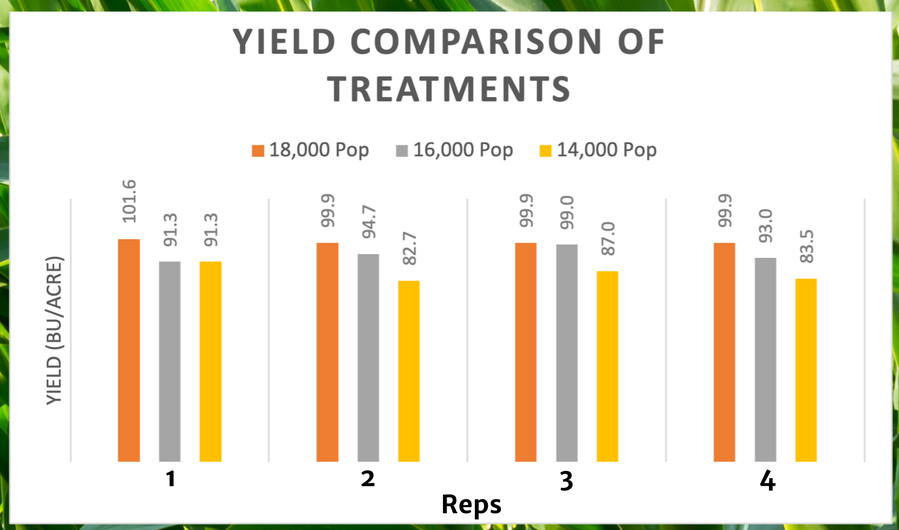
Low and Mid Yielding Field Map

Trial ID:		Location:		Trial Year:	2021
Protocol ID:		Investigator (Creator):	Corey Bryant		
Project ID:		Study Director:			
		Sponsor Contact:			

Trial Map Treatment Description

Trt	Code	Description
1		1;1 14,000
2		2 16,000
3		3 18,000

TRT	REP	Weight	Moisture	Corr. Wt.	Plot Area	Yield
14,000	1	5300	14.7	5350.177515	45600	91.26477622
16,000	1	5300	14.7	5350.177515	45600	91.26477622
18,000	1	5900	14.7	5955.857988	45600	101.5966377
16,000	2	5500	14.7	5552.071006	45600	94.70873004
18,000	2	5800	14.7	5854.911243	45600	99.87466076
14,000	2	4800	14.7	4845.443787	45600	82.65489167
18,000	3	5800	14.7	5854.911243	45600	99.87466076
14,000	3	5050	14.7	5097.810651	45600	86.95983394
16,000	3	5750	14.7	5804.43787	45600	99.01367231
14,000	4	4850	14.7	4895.91716	45600	83.51588012
16,000	4	5400	14.7	5451.12426	45600	92.98675313
18,000	4	5800	14.7	5854.911243	45600	99.87466076



Trial Results

Due to inclement weather conditions only data from the mid-yielding field was collected and analyzed. It is also worth noting that weights were collected using semi-truck scales provided by the Department of Transportation. Downforce as well as weight of the grain cart were taken into account before recording yields. It was found that the yields from the 18,000 seed population resulted in an average yield of 100 bu/acre which matched the yield goal for the grower. 16,000 population did not show a significant difference when compared to 18,000, while yields from the 14,000 population were 15% less than 18,000.

Conclusion

It was found that the recommended population for the growers farm would be 18,000 seed population, though depending on field quality and weather prediction, there is a possibility that 16,000 population could be more advantageous. After analyzing the growers costs 18,000 population saved the grower $17,645.83 in seed cost alone. The grower also had an increase in revenue of $13,860 due to the change in population.