



Nebraska On-Farm Research Network

Corn Population Research Protocol: Four Populations

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Objective: Identify the most profitable corn plant population for a specific management system.

Rationale: Producers continually question whether they should be increasing corn plant populations to optimize yield and to maximize the efficiency of production inputs. In Nebraska, the environment for rainfed production can vary greatly from East to West, and from year to year at each location. For irrigated production this is also true, but producers are more interested in maximizing water productivity by selecting optimum populations.

Optimum plant populations are a moving target. Improved genetics and production practices, coupled with differences in growing conditions from year to year, make it difficult to pinpoint optimum corn plant population. In addition, private and public research has shown corn hybrids respond differently to the same population level under the same growing conditions. Evidence of environmental interactions between hybrids and years is also well known.

Previous on-farm research conducted in Eastern Nebraska would suggest corn populations, especially for rainfed conditions are too low. Experts in this field of study have also suggested that growing irrigated corn utilizing high-yield production methods requires significantly higher corn population than are currently the norm.

Procedure: To accurately determine the optimum planting rate it is suggested that four plant populations be tested. These will be replicated in the field and, ideally evaluated over multiple years.

Populations to evaluate must be considered based on rainfed/dryland or irrigated growing conditions. The following corn plant populations are being suggested as a starting point. If these are not preferred or acceptable, the participant may choose their own. However, it is strongly suggested the differences between each population be 4,000 kernels/acre. However, the highest treatment needs to be sufficient to “force” a negative yield response in order to estimate optimum populations.

Location	Populations to test			
	Population Rate 1	Population Rate 2	Population Rate 3	Population Rate 4
Rainfed/dryland West of Hwy 281	20K	24K	28K	32K
Sandy sites or dryland West of Kearney	18K	20K	24K	28K
Rainfed/dryland East of Hwy 281	24K	28K	32K	36K
Irrigated option 1 (all locations)	28K	32K	36K	40K
Irrigated option 2 (all locations)	30K	34K	38K	42K

Treatment Design: The following is the treatment design for a four population trial. A total of 4 replications are needed for this trial. The same hybrid and management practices should be used across the entire study area.

NOTE: Rows planted in each treatment need to be equal to or greater than corn head width.

Replication 1	Population Rate 1	Yield:
	Population Rate 2	Yield:
	Population Rate 3	Yield:
	Population Rate 4	Yield:
Replication 2	Population Rate 2	Yield:
	Population Rate 4	Yield:
	Population Rate 3	Yield:
	Population Rate 1	Yield:
Replication 3	Population Rate 2	Yield:
	Population Rate 1	Yield:
	Population Rate 4	Yield:
	Population Rate 3	Yield:
Replication 4	Population Rate 3	Yield:
	Population Rate 1	Yield:
	Population Rate 2	Yield:
	Population Rate 4	Yield:

Grower Requirements:

1. Flag or mark GPS location of each treatment.
2. Provide all necessary inputs for crop production.
3. Complete background agronomic form about site and practices.
4. Collect yield data and grain moisture with weight wagon or yield monitor. If using yield monitor, please designate a separate “load” for each treatment and set up separate “products” names for each treatment harvested. Yield monitor must be **well calibrated**. Contact UNL Extension if assistance with this process is needed.
5. Collect stand counts at harvest.
6. Submit harvest data to UNL Extension within 30 days of harvest or by Dec. 15.
7. Allow UNL Extension to use submitted and collected data for research, educational, and informational purposes.

Nebraska On-Farm Research Network will:

1. Provide technical assistance in setting up replicated and randomized experimental design.
2. Provide assistance upon request with treatment implementation, flagging, stand counts, stalk rot tests, and recording yield.
3. Analyze raw data using statistical analysis and provide this information to the grower.

Disclaimer: The Nebraska On-Farm Research Network does not endorse the use of products tested in on-farm replicated strip trials. While treatments are replicated within trials and may be replicated across multiple sites under various conditions, your individual results may vary.

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