ROSHOLT FARM

Reduced Irrigation Study

DEPARTMENT OF AGRICULTURE

Pope County, Minnesota

Status

Installation
2016

Data collection
2016 – 2018

Contact

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www.mda.state.mn.us/rosholtfarm

Partners

Collaborative effort between multiple government agencies, agricultural businesses and organizations, and the University of Minnesota

List of partners on the reverse.

CLEAN WATER LAND & LEGACY AMENDMENT

GOAL

The goal of this study is to improve irrigation water use efficiency by better understanding the interaction between water requirements of the crop and plant population.

OBJECTIVES

- To determine the grain yield impact when reducing the frequency of irrigation
- To determine the relationship between rooting depth and water use
- To determine the impact of reduced plant population under reduced irrigation frequency to optimize grain productivity

LOCATION

The study site is located at the Rosholt Research Farm in Westport, Minnesota. The 40-acre farm is owned by Pope Soil & Water Conservation District and is devoted to water quality research and crop production demonstration. The site has a long history of research dating back to 1968.

DESIGN

- The study includes nine treatments in a randomized complete split-plot design. Each treatment is replicated three times.
- Treatments include three irrigation frequencies (100%, 75% and 50%) and three plant populations (20,000, 30,000, and 40,000 plants/acre).

MONITORING

- Weekly soil moisture content is measured at 6-inch intervals to a depth of 30 inches
- Corn grain yield

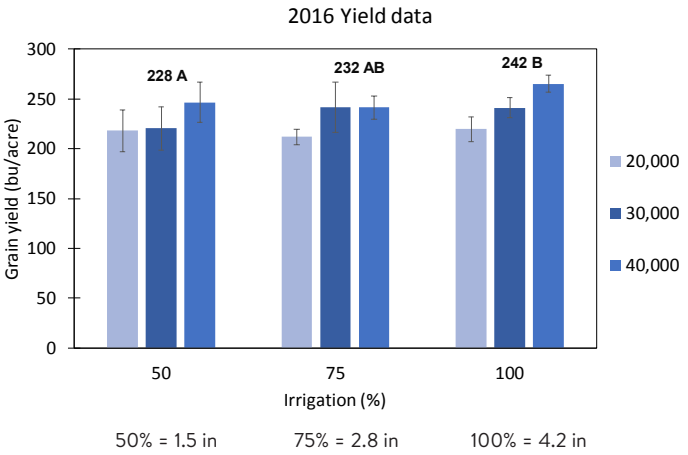
The research shows timely irrigation becomes increasingly important as plant populations increase.

RESULTS

Overall, the results of this study support that corn can be grown with acceptable yields when skipping 1 out of 4 irrigation events (75%) and planting populations of 30,000-40,000 plants per acre in the central sands region of Minnesota under similar weather condition as in the research years. Skipping 2 consecutive irrigation events out of 4 (50%) resulted in significant yield reductions. The data also shows that timely and adequate irrigation becomes increasingly important as plant population increases.

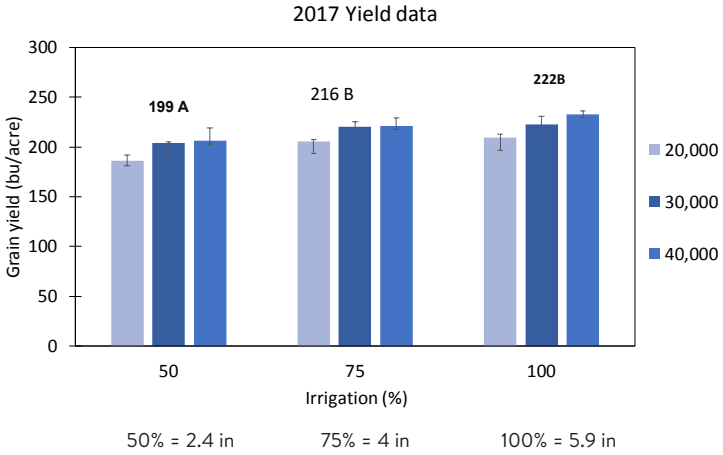
Effect of Irrigation on Grain Yield

Grain yield indicated by the same letter is not significantly different



50% = 1.5 in 75% = 2.8 in 100% = 4.2 in

- Total rain in 2016 = 18 inches
- 75% irrigation treatment used 1.4 inches less water than 100% irrigation without significantly reducing the grain yield

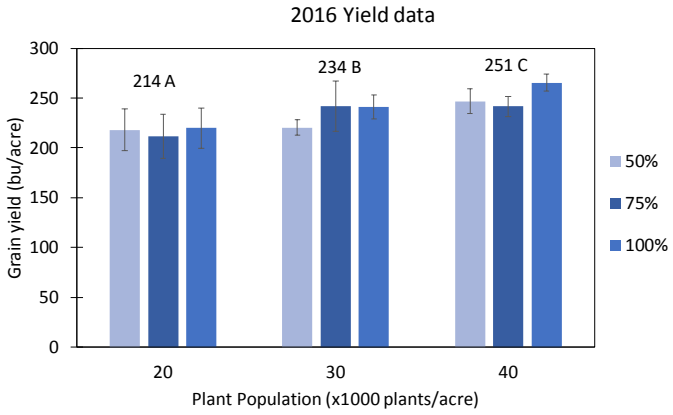


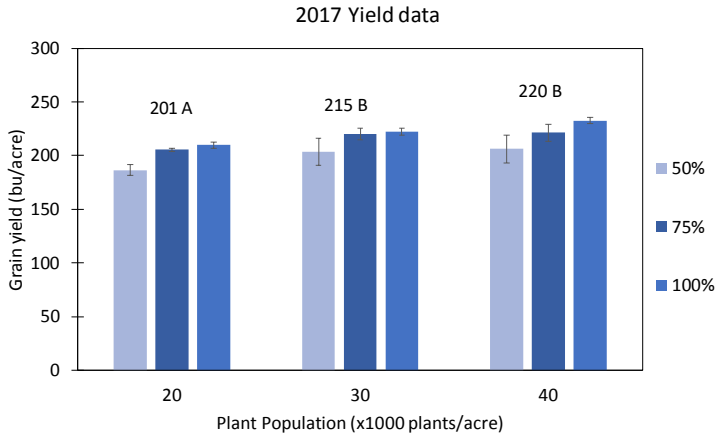
50% = 2.4 in 75% = 4 in 100% = 5.9 in

- Total rain in 2017 = 22 inches
- 75% irrigation treatment used 1.9 inches less water than 100% irrigation without significantly reducing the grain yield

Effect of Population on Grain Yield

Grain yield indicated by the same letter is not significantly different





Graphics by Dr. Vasu Sharma, University of Minnesota

PROJECT PARTNERS

DEPARTMENT OF AGRICULTURE

POPE SOIL & WATER CONSERVATION DISTRICT

West Central Irrigation, Inc.

STEARNS COUNTY SOIL & WATER SWCD CONSERVATION DISTRICT