

ROSHOLT FARM

Nitrogen and Water Quality Research



Pope County, Minnesota

Status

Installation
2015 – 2016

Data collection
2016 – 2022

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.

GOAL

To evaluate the management of nitrogen fertilizers and cover crops in irrigated crop production and their impacts on groundwater resources.

OBJECTIVE

Quantify the impact of a living mulch (kura clover), cover crop (cereal rye), or no cover crop on nitrate leaching and nitrogen management for irrigated row crops. The project is intended to provide local information to help improve nitrogen fertilizer management in irrigated row crop production systems.

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 (see aerial photo on reverse side). The site has a long history of research dating back to 1968.

MONITORING

To assess the effect of kura clover, cereal rye and no cover crop on nitrate leaching and on crop response the following monitoring efforts are conducted.

- Collect weekly soil water samples from 200+ lysimeters placed below the root zone and analyze for nitrate-nitrogen concentration
- Collect data from six drain gauges located in research area
- Track season-long soil moisture with soil moisture probes
- Conduct whole plant tissue analysis at R6 growth stage in corn
- Sample soil for nitrogen in the spring and fall
- Assess nitrogen content of kura clover and cereal rye in late fall to determine nitrogen uptake
- Measure corn and soybean yield at the end of the season to evaluate impact of nitrogen fertilizer and cover treatments



Kura clover plot established in 2016 will be strip-till planted to corn in 2017



DESIGN

The study design includes 12 treatments in a randomized complete block design, each treatment is replicated four times.

Treatments include:

- Varying nitrogen rates – 0, 90, 180, 225 and 270 pounds/acre
- Nitrogen applications are split applied in four equal rates
- Crop rotations include: continuous corn, corn following soybean, and soybean following corn
- Cover types include: cereal rye cover crop, kura clover living mulch, and no cover

A living mulch provides continuous cover with the crop(s) planted into the mulch. A cover crop is typically planted into the crop during the growing season, is left to grow after crop harvest, and provides soil cover over winter into the following spring.

NITROGEN RESEARCH STUDY



-  Rosholt Research Farm Boundary
-  Plot Area Boundaries
-  Lysimeters (suction cup)
-  Drain Gauges

PAST RESEARCH AT ROSHOLT

The partnership at the Rosholt Farm provides the opportunity to better understand nitrogen fertilizer management and the associated water quality impacts on irrigated, sandy soils.

This unique partnership and study site has provided, in part, the basis for recommendations outlined in the University of Minnesota's, Fertilizing Corn Grown on Irrigated Sandy Soils. The recommendations were published in 2015 and are available at: www.extension.umn.edu/agriculture/nutrient-management/nitrogen/

THANK YOU TO OUR PROJECT PARTNERS



POPE SOIL & WATER

