

Nitrogen Rate Study

2012 LTER Agronomic Protocol Kellogg Biological Station

Growing Season: 2012 Treatments: 9 Replication: 4

Rotation: Soybeans – Winter Wheat – Corn Tillage: No-Till

Tillable Acres: 3 Current Crop: Soybeans Previous Crop: Corn Yield Goal: 45-65 bu/A

Planting Date: May 2012 Planting Population: 180,000 seeds/A Variety: Pioneer 92Y30

Row Spacing: 15 inches Planting Depth: 1 inches Insecticide Used: None

Harvest Date: September – October 2012

Tillage Operations Applied Last Year:

Corn was harvested in October 2011. Corn stubble was fall mowed.

Tillage Operations and Fertilizer Applied This Year:

Tillage: None (No-Till).

Soybean Fertilizer:

Dry-land (rain fed):

Spring 2012 Broadcast K₂O/A in the form of Potash (0-0-60) at 200 lbs/A (120 lbs of K₂O/A).

Spring 2012 Broadcast P₂O₅ in the form of superphosphate (0-20-0) at 150 lbs/A (30 lbs P₂O₅/A).

Irrigated plots:

Spring 2012 Broadcast K₂O/A in the form of Potash (0-0-60) at 250 lbs/A (150 lbs of K₂O/A).

Spring 2012 Broadcast P₂O₅ in the form of superphosphate (0-20-0) at 250 lbs/A (50 lbs P₂O₅/A).

Winter Wheat Fertilizer: Fall 2012: Broadcast **To Be Determined**.

Cover Crop: None

Weed/Insect Control:

Burndown: Roundup OriginalMax at 22 fl oz/Acre and 2,4-D ester at 1 pt/A. Application of 2,4-D must be 7 days before planting. If Roundup application is within 7 days of planting do not use 2,4-D in the tank mix.

Preemergence: None

Postemergence: Scout for weeds and make herbicide application of Roundup OriginalMax at 22 fl oz/Acre and ammonium sulfate at 17 lbs/100 gals of water when weeds are 2-6 inches.

Insect control: Scout for aphids. If needed an insecticide application can be used to control aphids.

Soil Sample Analysis (lb./acre): No recent soil analysis is available.

pH: _____ Magnesium (Mg): _____

Lime Index: _____ Calcium (Ca): _____

Nitrogen (N): _____ C.E.C.: _____

Phosphorus (P): _____ % O.M.: _____

Potassium (K): _____ Others: _____

Fertility -- Fertilizer Recommendation:

Lime ton/A: _____ K₂O lb/A: _____

Nitrogen lb/A: _____ Other: _____

P₂O₅ lb/A: _____

Fertility -- Fertilizer Used:

Analysis	lb/Acre Used

Analysis	lb/Acre Used

Comments:

Treatments: Nine nitrogen (28-0-0) rates (lbs. nitrogen/A as 28% UAN).

Where: F1=Control, F2=20, F3=40, F4=60, F5=80, F6=100, F7=120, F8=140 and, F9=160.

Randomization: From West to East are: F1-F9. Replicate 1 F1-2-3-4-5-6-7-8-9 Replicate 2 F7-2-1-5-3-9-8-4-6
Replicate 3 F9-3-8-2-4-5-7-6-1 Replicate 4 F5-6-4-1-8-2-3-7-9

In 2003 we established a second study that is the same size and same randomization. One study is rain fed (non-irrigated) and the second study is irrigated weekly during the growing season to exceed normal precipitation. The non-irrigated study has plot numbers that range from 101-409. The irrigated study has plot numbers that range from 501-809.

In 2006 it was decided to change the crop rotation from continuous corn to a corn-soybean-wheat rotation. The n-rate study will follow the same crop rotation as the main site LTER. Most of the management and field operation will follow the LTER main site treatment 2 i.e. we will use the same herbicide on the n-rate study as we use on the main site treatment 2.

This is a working protocol used for planning purposes. Due to potential changes in chemicals, fertilizer, varieties planted, planting dates etc... please refer to the agronomic field log for actual field operations that take place during 2012.

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Irrigation Scheduling for the Resource Gradient Experiment

Irrigation events in the Resource Gradient Experiment will be scheduled by employing a soil water budget that balances the amount of plant available water. In this budget, rainfall and irrigation amounts represent a credit to the soil, whereas evapotranspiration (ET) is recorded as a debit to the soil. Daily values of ET_{max} were generated by running a 100 year simulation with the SALUS model that incorporated site-specific historical weather data (1984-2010) and crop-specific data from T1 (Basso, unpublished data).

Starting on May 1, LTER staff will record rainfall and irrigation events and these values will be entered daily into the soybean-specific soil water budget spreadsheet. This spreadsheet is located in the shared folder "LTER Irrigation", which is located in the "data entry" folder on the lter ([\lterfiles](#)) server. Based on these inputs and modeled values of daily ET_{max} , the spreadsheet calculates a daily estimate of plant available water (mm). Negative values indicate that soil water is not available for plant uptake. When a negative value is observed for two consecutive days, an irrigation event will be scheduled for the next day unless there is a rainfall event that results in net plant available water. The amount of water to be applied during irrigation events will be determined by the value of the plant available water deficit on the day prior to the scheduled irrigation event. Communication of scheduled irrigation events to key investigators and LTER staff will occur via e-mail and will be coordinated by Joe Simmons. During the 2012 growing season, the following individuals will be included on these e-mails: Stacey Vanderwulp, Kevin Kahmark, Neville Millar, Iurii Shcherbak, Justin Kunkle, Bruno Basso and Phil Robertson.

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