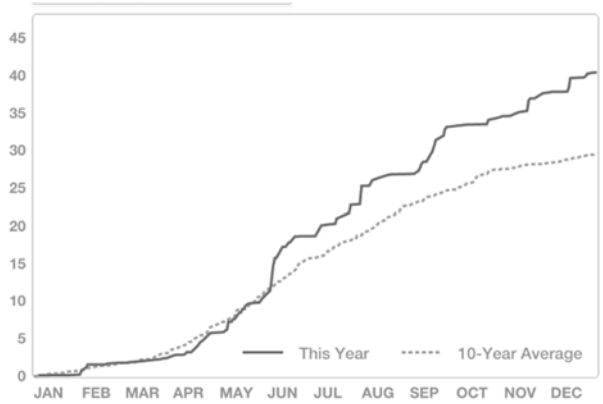
Nebraska On-Farm Research Network

In-Season Nitrogen with Crop Canopy Sensor vs Maize-N Model vs Grower Rate

Study ID: 049081201501
County: Hamilton
Soil Type: Hastings silt loam;
Planting Date: 5/4/2015
Harvest Date: 10/29/15
Population: 32,500
Row Spacing (in.) 30
Hybrid: Golden Harvest (ent) E116K4
Reps: 6
Previous Crop: Corn
Tillage: Ridge-Till
Herbicides: ***Pre:*** Lexar EZ on 5/4/15 (planting) ***Post:*** Unknown
Seed Treatment: Unknown
Foliar Insecticides: Unknown
Foliar Fungicides: Quilt XL 10.5 - 14 fl.oz at brown silk (End of July first week of August)

Note: Lodging occurred in August
High winds occurred September 3 and 4th
Hail event occurred September 9th
Irrigation: Pivot, Total: Unknown
Rainfall (in.):



Introduction: This study compares crop canopy sensor based in-season N application to Maize-N model in-season N recommendation to the grower's standard N management.

Grower Nitrogen Treatment: The grower initial N rate was 45 lbs N/acre applied at planting. A side-dress rate of 150 lbs N/acre was applied on 6/19/15. Total grower N application was 195 lbs N/acre.

Maize-N Nitrogen Treatment: (Maize-N is a nitrogen recommendation model developed at the University of Nebraska-Lincoln. The user inputs information on the current corn crop, last season crop, tillage, crop residue management, basic soil properties, fertilizer management, and long-term weather data of the field.) For the Maize-N treatment, 45 lbs N/acre were applied at planting. A side-dress rate of 187 lbs N/acre was applied on 6/19/15. Total Maize N application was 232 lbs N/acre.

Project SENSE Nitrogen Treatment: For the SENSE treatment strips, 45 lbs N/acre were applied at planting with an additional 30 lb N/ac added on 6/2/15. Crop canopy sensing and application occurred on 7/2/15 at the V10 growth stage. Across all project SENSE treatments, the average N rate applied in-season was 93 lbs N/acre with a minimum rate of 31 lbs N/acre, and maximum rate of 298 lbs N/acre.

Results: Data were analyzed using the GLIMMIX procedure in SAS 9.4 (SAS Institute Inc., Cary, NC). Mean separation was performed with Fisher's LSD.

	Total N rate (lb/ac)	Yield (bu/ac)†	Partial Factor Productivity of N (PFPn)	lbs N/ bu grain	Marginal Net Return‡
Grower N Management	195	197 A	57 B	0.99 B	$592.30
Project SENSE N Management	168	204 A	68 A	0.82 C	$635.40
Maize-N Nitrogen Rate	232	201 A	49 C	1.15 A	$582.85
P-Value	*N/A*	*0.1624*	*<.0001*	*<.0001*	*N/A*

†Wet bushels per acre. Moisture data not available to correct to standard moisture.
*Values with the same letter are not significantly different at a 95% confidence level.
‡Marginal net return based on $3.65/bu corn and $0.65/lb N fertilizer. Cost of applicator and equipment is not included in this calculation.

Summary: At this site, Project SENSE N application was 27 lb/acre lower than the grower's N application. There was no significant difference in yield between the three N recommendation approaches. Partial Factor Productivity of N was highest for the Project SENSE N treatment. Project SENSE N management maximized net returns.

In Partnership with: