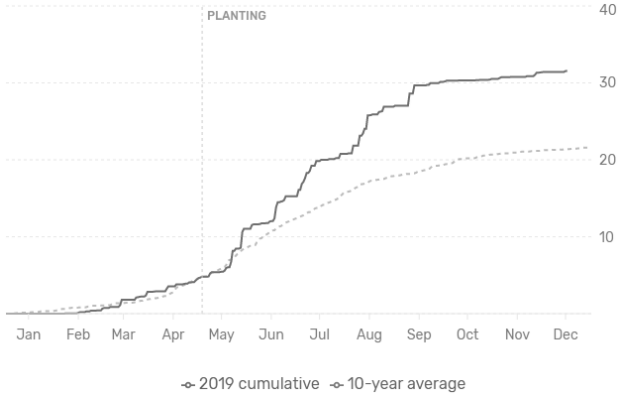
# Project SENSE (Sensor-based In-season N Management) on Non-irrigated Corn

**Study ID:** 0078155201901
**County:** Saunders
**Soil Type:** Nodaway silt loam, occasionally flooded; Tomek, silt loam, 0-2% slopes; Yutan, eroded-Aksarben silty clay loam, 2-6% slopes; Pohocco-Pahuk complex, 6-11% slopes, eroded
**Planting Date:** 5/3/19
**Harvest Date:** 11/1/19
**Seeding Rate:** 27,020
**Row Spacing (in):** 30
**Variety:** Pioneer® P1138AM™
**Reps:** 6
**Previous Crop:** Soybean
**Tillage:** No-Till
**Herbicides:** ***Pre:*** 32 oz/ac Staunch® II and 32 oz/ac Roundup® on 5/5/19 ***Post:*** 2.73 lb/ac AMS, 3 oz/ac Laudis®, and 15.4 oz/ac atrazine 4L with 4.7 oz/ac Hel-Fire® on 6/14/19

**Seed Treatment:** LumiGEN™
**Foliar Insecticides:** 2.03 oz/ac Baythroid® on 5/5/19
**Foliar Fungicides:** 14 oz/ac Trivapro® on 7/12/19
**Irrigation:** None
**Rainfall (in):**




**Soil Test (July 2019):**

| Soil pH 1:1 | WDRF Buffer pH | Soluble Salts 1:1 mmho/cm | Excess Lime Rating | Organic Matter LOI % | Nitrate – N ppm N | Nitrate lb N/ac (0-8") | Mehlich P-III ppm P | Sulfate-S ppm S | Ammonium Acetate (ppm) K | Ca | Mg | Na | CEC me/100g | % Base Saturation H | K | Ca | Mg | Na |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 6.9 | - | 0.27 | NONE | 3.5 | 3.1 | 7 | 7 | 9.1 | 201 | 3084 | 513 | 11 | 20.3 | 0 | 3 | 76 | 21 | 0 |
| 7.1 | - | 0.23 | NONE | 3.5 | 3.4 | 8 | 6 | 7.2 | 214 | 2745 | 584 | 12 | 19.0 | 0 | 3 | 72 | 25 | 0 |
| 6.1 | 6.7 | 0.09 | NONE | 3.4 | 2.9 | 7 | 9 | 9.2 | 259 | 1850 | 253 | 6 | 14.9 | 19 | 4 | 62 | 14 | 0 |
| 7.0 | - | 0.12 | NONE | 3.1 | 2.8 | 7 | 9 | 6 | 290 | 2134 | 301 | 5 | 13.9 | 0 | 5 | 77 | 18 | 0 |
| 6.2 | 6.8 | 0.13 | NONE | 3.8 | 3.8 | 9 | 8 | 8.3 | 270 | 2445 | 354 | 6 | 17.8 | 11 | 4 | 68 | 17 | 0 |
| 7.0 | - | 0.17 | NONE | 3.2 | 3.6 | 9 | 10 | 8.0 | 285 | 3126 | 577 | 8 | 21.2 | 0 | 3 | 74 | 23 | 0 |
| 6.3 | 6.8 | 0.13 | NONE | 3.3 | 2.8 | 7 | 8 | 7.9 | 254 | 2600 | 392 | 8 | 18.6 | 9 | 3 | 70 | 18 | 0 |
| 6.2 | 6.7 | 0.13 | NONE | 3.2 | 2.2 | 5 | 5 | 8.6 | 239 | 2707 | 483 | 7 | 21.6 | 16 | 3 | 62 | 19 | 0 |
| 6.3 | 6.7 | 0.09 | NONE | 3.3 | 2.1 | 5 | 5 | 8.3 | 227 | 2649 | 370 | 7 | 17.5 | 15 | 3 | 65 | 16 | 0 |
| 6.3 | 6.7 | 0.13 | NONE | 3.9 | 3.8 | 9 | 11 | 8.1 | 367 | 2649 | 370 | 7 | 20.8 | 17 | 5 | 63 | 15 | 0 |

**Introduction:** A high clearance applicator was equipped with Ag Leader® OptRx® sensors. UAN fertilizer was applied with drop nozzles as the crop canopy was sensed. This study compares crop canopy sensor-based in-season N application with the grower's standard N management.

**Grower Nitrogen Treatment:** The initial grower rate was 38 lb N/ac applied as 10 gal/ac 32% UAN and 2 gal/ac ammonium thiosulfate (ATS) on May 5, 2019. An additional application was made with a 360 Y-DROP® on July 3, 2019. It contained 33.3 gal/ac UAN 32%, 3 gal/ac ATS (12-0-0-6), 32 oz/ac Zn, 32 oz/ac B, 16 oz/ac 6% Mn. The final application was foliar applied CoRoN® (10-0-10) on July 12, 2019. The average total N rate was 160 lb N/ac.

**Project SENSE Nitrogen Treatment:** For the SENSE treatment strips, 38 lb N/ac applied as 10 gal/ac 32% UAN and 2 gal/ac ATS on May 5, 2019. Crop canopy sensing and application occurred on July 3, 2019 at the V10 growth stage. The nitrogen source applied in-season was 32% UAN with 3 gal/ac ATS (12-0-0-6), 32 oz/ac Zn, 32 oz/ac B, 16 oz/ac 6% Mn. Across all Project SENSE treatments, the average N rate applied based on the in-season sensing was 88 lb N/ac. The average total N rate was 126 lb N/ac.

**Results:**

| N Management Strategy | Total N rate (lb/ac) | Moisture (%) | Yield (bu/ac)† | Partial Factor Productivity of N (lb grain/lb N) | lbs N/ bu grain | Marginal Net Return‡ ($/ac) |
|---|---|---|---|---|---|---|
| **Grower** | 160 A* | 17.7 A | 207 A | 73 B | 0.77 A | 735.52 A |
| **Project SENSE** | 126 B | 17.7 A | 203 A | 90 A | 0.62 B | 730.25 A |
| P-Value | <0.0001 | 0.485 | 0.154 | 0.001 | 0.001 | 0.653 |

*Values with the same letter are not significantly different at a 90% confidence level.
†Yield values are from cleaned yield monitor data. Bushels per acre adjusted to 15.5% moisture.
‡Marginal net return based on $3.83/bu corn and $0.36/lb N.

**Summary:**

- The Project SENSE N management was 34 lb N/ac lower than the grower's N management.
- There was no grain moisture or yield difference between the Project SENSE N management and the grower's N management.
- Project SENSE had higher partial factor productivity of N and used 0.15 lb N/ac less to produce a bushel of grain.
- There was no difference in marginal net return between the Project SENSE N management and the grower's N management.

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