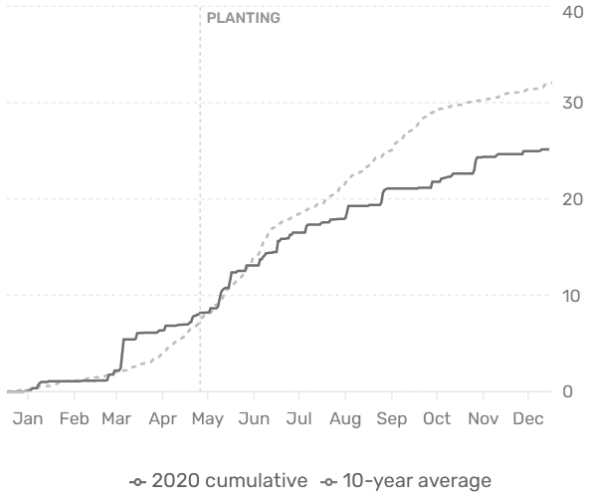
# PSNT-N Sidedress Rates in Corn Following Cover Crop

**Study ID:** 0996037202001
**County:** Colfax
**Soil Type:** Belfore silty clay loam 0-2% slope; Moody silty clay loam 2-6% slopes; Nora-Crofton 6-17% slopes
**Planting Date:** 5/10/20
**Harvest Date:** 11/2/20
**Seeding Rate:** 28,000
**Row Spacing (in):** 30
**Hybrid:** Pioneer® P1082AM
**Reps:** 5
**Previous Crop:** Soybean
**Tillage:** No-Till
**Herbicides:** ***Pre:*** 10.5 oz/ac 2,4-D LV6 and 8 oz/ac dicamba on 4/26/20; 96 oz/ac Trizar™ and 32 oz/ac glyphosate on 5/14/20 ***Post:*** 4 oz/ac Status® and 32 oz/ac Roundup PowerMAX® on 6/22/20

**Seed Treatment:** PPST 250
**Foliar Insecticides and Fungicides:** None
**Irrigation:** None
**Rainfall (in):**




**Soil Tests (December 2019):**

| Soil pH | Soluble Salts | OM | Nitrate | Mehlich P- | $SO_4$-S | Ammonium Acetate (ppm) | | | | Sum of Cations | DPTA (ppm) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1:1 | 1:1 mmho/cm | LOI % | lb N/A | III ppm P | ppm | K | Ca | Mg | Na | meq/100g | Zn | Fe | Mn | Cu |
| 5.9 | 0.3 | 2.9 | 30 | 31 | 9 | 258 | 3291 | 609 | 18 | 27 | 2.0 | 52 | 6 | 1.3 |
| 7.8 | 0.6 | 1.5 | 30 | 24 | 9 | 210 | 4490 | 645 | 16 | 28 | 1.9 | 21 | 2 | 1.4 |
| 8.3 | 0.5 | 1.1 | 30 | 15 | 8 | 180 | 4468 | 648 | 16 | 28 | 1.3 | 14 | 1 | 1.5 |

**Introduction:** The purpose of this study was to compare sidedress rates for a corn crop following a cover crop. Rates were determined using soil sampling and the pre-sidedress nitrogen test and compared the recommended rate to rates that would have been used in the past for a 215-bushel yield goal. A 5-way mix cover crop consisting of rye, winter peas, hairy vetch, crimson clover, and rapeseed was drilled in the fall of 2019 at a rate of 42 lbs. All but the rye winter killed, with the rye 8 inches tall when terminated at planting.

At planting, 65 lb of N was applied; 5 lb/ac N was applied as 10-34-0 in-furrow and 60 lb/ac N and 7 lb/ac S were applied from a 7.5:1 blend of 32% UAN and ammonium thiosulfate placed by a 360 BANDIT™. Sidedress rates were determined using the pre-sidedress nitrate test (PSNT). Sidedressing was done on June 24, 2020, at V7 using a bar with homemade Y-drops, which banded N on the soil surface. A 7.5:1 blend of UAN 32% and ammonium thiosulfate was used; therefore, S rates also varied between treatments. Additionally, approximately 0.5 lb/ac boron as Solubor® was applied with the sidedress application.

The PSNT indicated 18 ppm nitrate-N in the soil. Using the Iowa State University Extension and Outreach recommendation for PSNT (https://store.extension.iastate.edu/product/5259), the appropriate sidedress rate was 56 lb/ac N ([25 ppm – 18 ppm] * 8). The applicator over applied by 12 lb/ac for the PSNT strips, resulting in a treatment of PSNT rate + 12 lb/ac, but was close to the intended rate on the other strips. This was compared to additional N sidedress rates as follows:

- PSNT + 12: 68 lb/ac N and 7 lb/ac S sidedress; 133 lb/ac total N
- PSNT + 30: 83 lb/ac N and 9 lb/ac S sidedress; 148 lb/ac total N
- PSNT + 60: 114 lb/ac N and 12 lb/ac S sidedress; 179 lb/ac total N

**Results:**

| | Nitrogen Tissue Test (%) | | | Stand Count | Moisture | Yield | Marginal Net Return‡ |
|---|---|---|---|---|---|---|---|
| | June 12 (V4) | July 17 (V14) | August 20 (R4) | (plants/ac) | (%) | (bu/ac)† | ($/ac) |
| PSNT + 12 | 4.25 (S-L)‖ § | 3.41 (S) | 1.85 (D) | 25,950 A* | 11.6 A | 158 B | 492.81 A |
| PSNT + 30 | NA | 3.51 (S) | 2.10 (L-D) | 25,475 A | 11.6 A | 162 AB | 499.96 A |
| PSNT + 60 | NA | 3.58 (S) | 2.29 (S-L) | 24,950 A | 11.8 A | 166 A | 503.09 A |
| P-Value | - | - | - | 0.389 | 0.746 | 0.095 | 0.695 |

‖Only one tissue test for all treatments was taken at the June 12 date as this was before sidedress applications occurred.
§Sufficiency level as indicated by Midwest Laboratories. S indicates sufficient, L indicates L, D indicates deficient.
*Values with the same letter are not significantly different at a 90% confidence level.
†Bushels per acre corrected to 15.5% moisture.
‡Marginal net return based on $3.51/bu corn and $0.45/lb N.

**Summary:** There was no difference in harvest stand counts or moisture between the N rates. Yield for the PSNT + 60 treatment (total of 179 lb/ac N) was 8 bu/ac higher than the PSNT + 12 treatment (total of 133 lb/ac N). Dry conditions for the 7-10 days following sidedressing may have resulted in N loss. There was no difference in the net return between the three treatments. Drought conditions reduced yields compared to the 5-year average used to determine the yield goal.

**Sponsored by:** University of Nebraska Lincoln

**In Partnership with:** Nebraska Corn Board; Nebraska Soybean Checkoff; Nebraska Corn Growers Association; Nebraska Dry Bean Commission