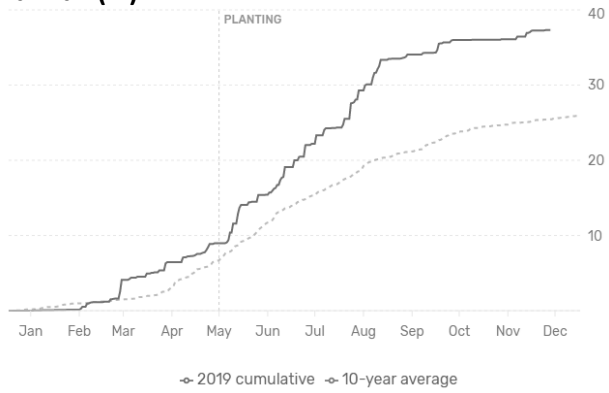
# Irrigated Soybeans Planted Following a Cover Crop Mix and No Cover Crop

**Study ID:** 0708077201901
**County:** Greeley
**Soil Type:** Hersh fine sandy loam 3-6% slopes; Gates silt loam 6-11% slopes; Gates silt loam 11-17% slopes
**Planting Date:** 5/15/19
**Harvest Date:** 10/16/19
**Seeding Rate:** 140,000
**Row Spacing (in):** 30
**Variety:** Asgrow® AG21X7
**Reps:** 6
**Previous Crop:** Corn
**Tillage:** No-Till
**Herbicides:** ***Pre:*** 5.0 oz/ac Zidua® PRO, and 32 oz/ac Roundup® on 5/5/19 ***Post:*** 22 oz/ac FeXapan®, and 32 oz/ac Roundup® on 6/28/19
**Seed Treatment:** Vault® SP inoculant

**Foliar Insecticides:** None
**Foliar Fungicides:** None
**Fertilizer:** 40 lb P/ac, 40 lb K/ac on 6/8/19
**Irrigation:** Pivot
**Rainfall (in):**




**Introduction:** This study is being conducted on a soil health demonstration farm as part of the Nebraska USDA/Natural Resources Conservation Service's (NRCS) Soil Health Initiative, and involves the farmer, the Nebraska On-Farm Research Network, and the USDA/NRCS. This is the second year of this study; however, it is the first time crop yield is being reported. The two treatments are a no cover crop check and a cover crop mix, which included rye, forage collards, turnips, rapeseed, and kale. The cover crop was drilled following corn harvest in 2018. Soybeans were planted into the cover crop on May 15, 2019. The cover crop was terminated on June 1, 2019, with a herbicide application. Cover crops were 10" tall at the time of termination. The year was very wet with 21" of rain from planting to August 26, 2019.

**Results:**

**Table 1.** Soil physical, chemical, and biological properties for cover crop and no cover crop treatments. Samples were collected on 10/22/19 (1 sample per treatment replication, 6 samples per treatment).

| Treatment | Infiltration (in/hr) | Soil moisture (%) | Bulk density (g/cm$^3$) | Soil temp. (F) | Soil respiration[1] |
|---|---|---|---|---|---|
| Check | 2.03 A* | 13.25 A | 1.41 A | 44.16 B | 2.44 A |
| Cover Crop Mix | 6.45 A | 14.56 A | 1.27 A | 46.06 A | 2.86 A |
| P-Value | 0.267 | 0.488 | 0.179 | 0.098 | 0.296 |

[1]Soil respiration (Modified Solvita burst).
*Values with the same letter are not significantly different at a 90% confidence level.

**Table 2.** NRCS field assessments of soil health. Samples were collected on 10/22/19 (1 sample per treatment replication, 6 samples per treatment).

| | NRCS Field Assessment of Soil Health | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Treatment | Structure | Structure type | Surface condition | Mgmt | Soil pores | Earth worm | Biological activity | Soil smell | Overall indicator[2] |
| Check | 1.81 A | 1.50 A | 1.63 A | 1.50 B | 2.00 A | 1.43 A | 1.81 A | 1.50 A | 1.65 A |
| Cover Crop Mix | 1.75 A | 1.63 A | 1.50 A | 2.00 A | 2.00 A | 1.25 A | 1.88 A | 1.56 A | 1.70 A |
| P-Value | 0.364 | 0.171 | 0.679 | <0.0001 | 1.0 | 0.308 | 0.612 | 0.352 | 0.370 |

[2]Score based on field assessment. The overall indicator score is based on the sum of 8 indicators (averaged from 1-3; 1=degraded, 2=in transition, 3=healthy): soil structure, structure type, surface condition, soil management, soil pores, earthworms, biological activity, and smell.

**Table 3.** Soybean yield, moisture, and marginal net return for cover crop mix and no cover crop treatments.

| | Test Weight (lb/bu) | Moisture (%) | Soybean Yield (bu/ac)† | Marginal Net Return‡ ($/ac) |
|---|---|---|---|---|
| No Cover Crop | 57 A | 10.0 A | 55 A | 444.82 A |
| Cover Crop Mix | 57 A | 9.9 A | 54 A | 397.26 B |
| P-Value | 0.180 | 0.530 | 0.514 | 0.010 |

†Bushels per acre adjusted to 13% moisture.
‡Marginal net return based on $8.10/bu soybean, $25/ac cover crop seed cost, and $14.40/ac for drilling.

**Summary:**

- There were no differences in soybean yield, moisture, or test weight between the cover crop treatment and no cover crop check. Marginal net return was lower for the cover crop treatment due to the additional cost of cover crop seed and drilling.
- Results of the soil physical, chemical, and biological properties evaluation showed no differences between the two treatments with the exception of soil temperature. The no cover crop treatment had cooler soil temperature than the cover crop treatment in October.

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