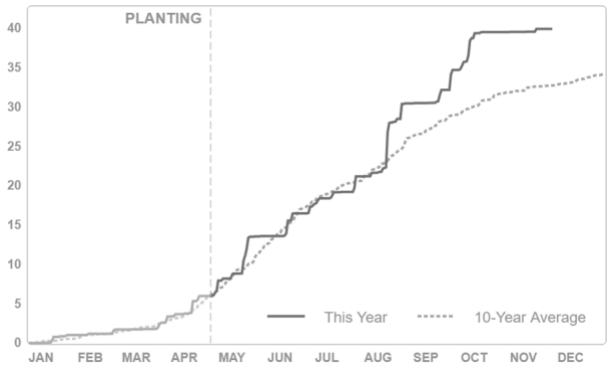
Soybeans Planted into Cereal Rye Cover Crop

Study ID: 007155201701
County: Saunders
Soil Type: Judson silt loam 2-6% slopes; Nodaway silt loam occasionally flooded; Yutan, eroded-Judson complex 6-11% slopes; Yutan, eroded-Aksarben silty clay loam 2-6% slopes
Planting Date: 4/26/17
Harvest Date: 10/23/17
Population: 140,000
Row Spacing (in): 15
Variety: Stine 28LF32
Reps: 7
Previous Crop: Corn
Tillage: No-Till
Herbicides: ***Pre:*** Killing Rye and Pre: 3 oz/ac Valor® XLT, 0.5 pt/ac 2,4-D 6# Ester, 32 oz/ac Roundup®, and 1.5 gal/100 gal Liquid AMS on 4/17/17 ***Post:*** 32 oz/ac Liberty, 3 lb/ac dry AMS, 2 pt/ac Warrant, and 5.33 oz/ac Select on 6/29/17

Foliar Insecticides: None
Foliar Fungicides: None
Fertilizer: 11-52-0 variable rate with average of 100-150 lb of 11-52-0 in spring
Irrigation: Pivot, Total: 0" applied this year
Rainfall (in):



Introduction: The objective of the study was to assess the impact of rye cover crop on subsequent crop yield. This is the second year this study has been conducted. The cereal rye cover crop was drilled following corn harvest on November 5, 2016 in alternating strips with a no cover crop check. Cereal rye strips were terminated with 32 oz/ac Roundup, 3 oz/ac Valor XLT, 0.5 pt/ac of 2,4-D 6# Ester, and 1.5 gal/100gal of Liq AMS on April 17, 2017. Rye was approximately 6" in height. Soybean was planted into rye and check strips on April 26, 2017.

Results:

	Soybean Stand Count at Harvest	Soybean Moisture (%)	Soybean Yield (bu/acre)†	Marginal Net Return‡ ($/ac)
Check	108,647 A*	8.3 A	63 A	561.50 A
Cover Crop - Rye	100,353 A	8.2 A	61 A	509.42 B
P-Value	0.166	0.415	0.511	0.084

*Values with the same letter are not significantly different at a 90% confidence level.
†Bushels per acre corrected to 13% moisture.
‡Marginal net return based on $8.90/bu soybean, $20/ac rye seed and drilling cost, and $15/ac for rye termination.

To assess differences in soil loss and soil conditioning index (SCI) for the rye cover crop, the USDA-NRCS Revised Universal Soil Loss Equation 2 (RUSLE2) was used. The output on the following page is an estimated two year scenario evaluating the impact of rye cover crop.

USDA NRCS Natural Resources Conservation Service

RUSLE2 Profile Erosion Calculation Record – Without Rye Cover Crop

Outputs:

Date	*Operation*	*Vegetation*	*Surf. residue cover after operation, %*
4/25/0	Planter, double disk opnr, 15" row spacing	Corn, grain, high yield	57
10/20/0	Harvest, killing crop 50pct standing stubble		87
5/10/1	Planter, double disk opnr, 15" inch row spacing	Soybean, 15 - 20 in rows	75
10/10/1	Harvest, killing crop 20pct standing stubble		91

Soil loss for cons. plan: **2.0 t/ac/yr** Sediment delivery: 2.0 t/ac/yr T value: 5.0 t/ac/yr
Soil conditioning index (SCI): **0.742**
Avg. annual slope STIR: 5.03

RUSLE2 Profile Erosion Calculation Record – With Rye Cover Crop

Outputs:

Date	*Operation*	*Vegetation*	*Surf. residue cover after operation, %*
4/18/0	**Sprayer, kill crop**		**63**
4/25/0	Planter, double disk opnr, 15" row spacing	Corn, grain, high yield	51
10/23/0	Harvest, killing crop 50pct standing stubble		88
5/10/1	Planter, double disk opnr, 15" row spacing	Soybean, 15 - 20 in rows	76
10/10/1	Harvest, killing crop 20pct standing stubble		91
10/15/1	**Drill or air seeder single disk openers 7-10 in spac.**	**Rye, winter cover**	**80**

Soil loss for cons. plan: **2.0 t/ac/yr** Sediment delivery: 2.0 t/ac/yr T value: 5.0 t/ac/yr
Soil conditioning index (SCI): **0.781**
Avg. annual slope STIR: 6.32

NRCS RUSLE2 Inputs:
Location: Saunders County
Soil: Yutan, eroded-Judson complex, 6 to 11 percent slopes/Yutan Silty clay loam eroded 64%
Slope length (along slope): 150 ft
Avg. slope steepness: 9.0 %
Yield values used: 215 bu/acre corn, 60 bu/acre soybean, and 3,360 lb/acre rye
Contouring: default
Strips/barriers: (none)
Diversion/terrace, sediment basin: (none)
Adjust res. burial level: bury 30% more than normal

Summary: Grain yield, moisture, and stand count did not differ between the no cover crop and cereal rye cover crop treatments. The RUSLE2, NRCS erosion calculation model indicates that no differences in soil loss occurred between the two treatments under these specific soil conditions. However, the soil conditioning index (SCI) was improved on the rye cover crop strips when compared with the no cover crop. Due to the cost of rye seed and drilling, the no cover crop check had a higher marginal net return.

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