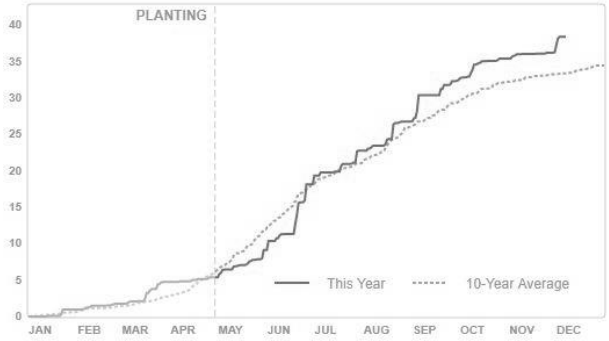
Corn Planted into Cereal Rye Cover Crop

Study ID: 0007155201801
County: Saunders
Soil Type: Yutan, eroded-Judson complex 6-11% slopes; Judson silt loam 2-6% slopes; Yutan, eroded-Aksarben silty clay loam 2-6% slopes
Planting Date: 4/29/18
Harvest Date: 10/28/18
Population: 35,000
Row Spacing (in): 15
Hybrid: Channel® 213-19 STX
Reps: 5
Previous Crop: Soybean
Tillage: No-Till
Herbicides: ***Pre:*** 4.5 oz/ac Corvus® and 1 lb/ac Atrazine on 5/5/18 ***Post:*** 24 oz/ac Buccaneer® 5, 3 oz/ac mesotrione, 8.5 lb/100 gal dry AMS, and 5 gal/1,200 gal crop oil concentrate
Seed Treatment: Basic Acceleron® 500
Foliar Fungicides: 13.7 oz/ac Trivapro® fungicide with 2 oz/ac WETCIT®
Fertilizer: 100 lb/ac N as anhydrous ammonia in the fall; 120 lb/ac N as 32% UAN and 1 gal/ac Humate with herbicide on 5/5/18; 7 gal/ac 6-24-6 and 1 pt/ac Zn in-furrow at planting
Irrigation: Pivot, Total: None
Rainfall (in):



Introduction: The objective of the study was to assess the impact of rye cover crop on subsequent crop yield. This is the third year this study has been conducted. The cereal rye cover crop was drilled following soybean harvest on October 20, 2017 in alternating strips with a no cover crop check. Cereal rye strips were terminated with herbicide on May 1, 2018. Rye was approximately 6" tall. Corn was planted into rye and check strips on April 29, 2018.

Results:

	Moisture (%)	Yield† (bu/ac)	Marginal Net Return‡ ($/ac)
Check	16.3 A*	276 B	891.05 A
Cover Crop - Rye	16.2 A	282 A	875.11 B
P-Value	0.326	0.021	0.036

*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 $3.23/bu corn and $20/ac rye seed and drilling costs, and $15/ac for rye termination.

To assess differences in soil loss and soil condition 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.

Summary: Grain moisture did not differ between the no cover crop and cereal rye cover crop treatments. The rye cover crop treatment yielded 6 bu/ac more than the no cover crop check. The increased costs of seeding and termination for the rye cover crop treatment resulted in a $15.94/ac loss in marginal net return compared to the no cover crop check.

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 of Previous Years (Year 1 and 2)

In year one (2016), cover crops were drilled on October 15, 2015. Rye was terminated with 32 oz/ac Roundup and 1.5 gal/100 gal of liquid AMS on April 16, 2016. Rye was approximately 16" in height. Corn was planted on April 25, 2016.

2016 Results:

	Moisture (%)	Corn Yield (bu/ac)†	Marginal Net Return‡ ($/ac)
Check	15.9 A	229 A*	698.45
Cover Crop - Rye	15.9 A	229 A	666.45
P-Value	0.1019	0.6735	-

†Bushels per acre corrected to 15.5% moisture.
*Values with the same letter are not significantly different at a 90% confidence level.
‡Marginal net return based on $3.05/bu corn, $12/ac cover crop seed and chemical to kill rye, and $20/ac for the drilling and spraying operations.

In year two (2017), cover crops were drilled on November 5, 2016. Rye was 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/100 gal of liquid AMS on April 17, 2017. Rye was approximately 6" in height. Soybeans were planted on April 26, 2017.

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.

In years one and two, there were no differences in grain yield between the no cover crop and cereal rye cover crop treatments.

Sponsored by: **In Partnership with:**