

Rye Cover Crop Seeding Rate Effects on Irrigated Corn

Study ID: 0129155201901

County: Saunders

Soil Type: Alda fine sandy loam, occasionally flooded

Planting Date: 5/4/19

Harvest Date: 10/29/19

Seeding Rate: 32,000

Row Spacing (in): 30

Variety: Pioneer® P1563

Reps: 6

Previous Crop: Soybean

Tillage: No-Till

Herbicides: Pre: 40 oz/ac Roundup® on 4/24/19

Post: 2 qt/ac Volley® ATZ Lite NXT, 2.5 pt/ac Resicore® on 6/15/19

Seed Treatment: Poncho® 250

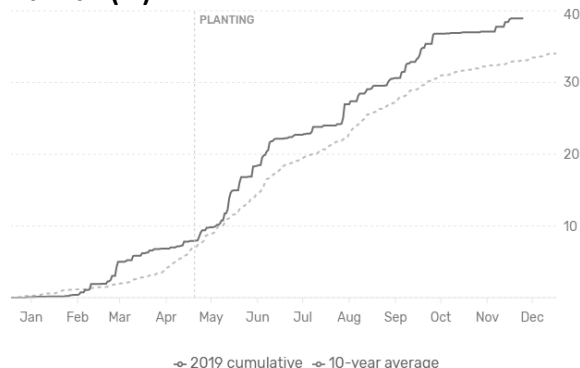
Foliar Insecticides: 5 oz/ac Brigade® 2 EC on 7/9/19

Foliar Fungicides: 10 oz/ac Headline AMP® sprayed at full tassel on 07/29/2019

Fertilizer: 3 gal/ac 10-34-0 and 1 pt/ac zinc in-furrow on 5/4/19; 5 gal/ac 32% UAN and 20 gal/ac 10-34-0 applied 2" to the side of each row; 180 lb N/ac as 32% UAN and 36 lb/ac Thio-sul® as sidedress application on 6/19/19

Irrigation: Pivot, Total: 3.75"

Rainfall (in):



Introduction: The objective of this study was to evaluate rye cover crop seeding rate effects on corn production and soil properties. The rye cover crop was planted at three different seeding rates: 30 lb/ac, 60 lb/ac, 90 lb/ac and a 0 lb/ac control. The rye variety used was Rymin and was planted by drilling on November 16, 2018 in 7.5" rows. Cover crops were terminated with 40 oz/ac Roundup® on April 24, 2019. Cover crops were around 6" at the time of termination. Corn was planted on May 4, 2019 at 32,000 seeds/ac and a depth of 2". Biomass samples were collected on May 1, 2019 and soil samples were collected on May 15, 2019. The corn was harvested on October 29, 2019.

Results:

	---Cover Crop---		-----Soil (0-8")-----				-----Corn-----				
	Dry Biomass (lb/ac)	Biomass N (lb/ac)	Nitrate (ppm)	P (ppm)	K (ppm)	Total Microbial Biomass (ng/g)	Harvest Stand Count (plants/ac)	Test Weight (lb/bu)	Moisture (%)	Yield (bu/ac)	Marginal Net Return† (\$/ac)
Check	0 C*	0.0 C	22.7 A	11.0 A	123.6 A	1,272.7 A	30,778 B	59 A	18.1 A	155 A	594.75 A
30 lb/ac	71 B	4.0 B	19.6 A	12.6 A	158.9 A	1,804.0 A	32,333 A	59 A	18.3 A	156 A	576.18 A
60 lb/ac	103 A	5.3 A	11.8 A	10.7 A	115.8 A	1,709.9 A	31,667 AB	59 A	18.3 A	157 A	573.11 A
90 lb/ac	127 A	6.3 A	18.4 A	16.1 A	122.2 A	1,460.8 A	31,611 AB	58 A	18.5 A	157 A	568.51 A
P-Value	<0.0001	<0.0001	0.277	0.406	0.141	0.22	0.088	0.363	0.312	0.895	0.144

*Values with the same letter are not significantly different at a 90% confidence level.

†Bushels per acre adjusted to 15.5% moisture.

‡Marginal net return based on \$3.83/bu corn, \$21/ac for 30 lb/ac rye seed and drilling, \$27.60/ac for 60 lb/ac rye seed and drilling, and \$34.20/ac for 90 lb/ac rye seed and drilling.

Summary:

- Cover crop total dry biomass increased with increasing rye seeding rate; however, biomass accumulation was low for all seeding rates. Total biomass N followed a similar trend to the dry biomass accumulation.
- Soil nitrate, P, K, and microbial biomass in 0-8" were not significantly impacted by the rye cover crop treatments.
- There were no differences in corn grain moisture, test weight, yield, or marginal net return between any of the treatments.
- Corn stand counts varied, with the untreated check having a lower stand count than the 30 lb/ac rye treatment.

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