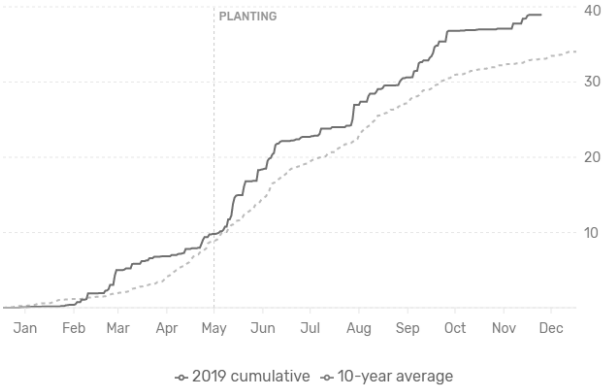
Rye Cover Crop Seeding Rate Effects on Irrigated Soybean

Study ID: 0129155201902
County: Saunders
Soil Type: Alda fine sandy loam, occasionally flooded
Planting Date: 5/15/19
Harvest Date: 10/8/19
Seeding Rate: 145,000
Row Spacing (in): 18
Variety: Pioneer® P27A17X
Reps: 6
Previous Crop: Corn
Tillage: No-Till
Herbicides: ***Pre:*** 40 oz/ac Roundup®, 10 oz/ac 2,4-D on 4/24/19 ***Post:*** 5 oz/ac Marvel™, 32 oz/ac Roundup® on 6/1/19
Seed Treatment: CruiserMaxx®
Foliar Insecticides: 2.8 oz/ac Leverage® on 08/09/19
Foliar Fungicides: 4 oz/ac Priaxor® on 8/9/19
Fertilizer: 100 lb/ac 0-0-60, 100 lb/ac 11-52-0, 25 lb/ac elemental sulfur, broadcast application on 4/10/19
Irrigation: Pivot, Total: 3"
Rainfall (in):



Introduction: The objective of this study was to evaluate rye cover crop seeding rate effects on soybean 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. Soybean was planted on May 15, 2019 at 145,000 seeds/ac and a depth of 1.25". Biomass samples were collected on May 1, 2019 and soil samples were collected on May 15, 2019. The soybeans were harvested on October 8, 2019.

Results:

	-------Cover Crop-------		----------Soil (0-8") ----------				----------Soybean----------		
	Dry Biomass (lb/ac)	Biomass N (lb/ac)	Nitrate (ppm)	P (ppm)	K (ppm)	Total Microbial Biomass (ng/g)	Moisture (%)	Yield (bu/ac)†	Marginal Net Return‡ ($/ac)
Check	0 C*	0.0 B	8.8 A	18.6 A	116.2 A	1,208.4 A	11.6 A	69 A	555.92 A
30 lb/ac	46 B	2.8 A	8.6 A	17.4 A	105.1 A	1,321.5 A	11.6 A	70 A	549.43 A
60 lb/ac	78 AB	4.2 A	8.1 A	16.7 A	105.8 A	1,567.2 A	11.6 A	72 A	557.85 A
90 lb/ac	89 A	4.2 A	7.0 A	19.3 A	109.8 A	1,485.3 A	11.5 A	71 A	541.99 A
P-Value	0.0003	0.0003	0.282	0.569	0.734	0.580	0.793	0.395	0.785

*Values with the same letter are not significantly different at a 90% confidence level.
†Bushels per acre adjusted to 13% moisture.
‡Marginal net return based on $8.10/bu soybean, $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, but had low overall accumulation before termination. Total biomass N was not different among the three rye seeding rates.
- 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 soybean grain moisture, test weight, yield, or marginal net return between any of the treatments.

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