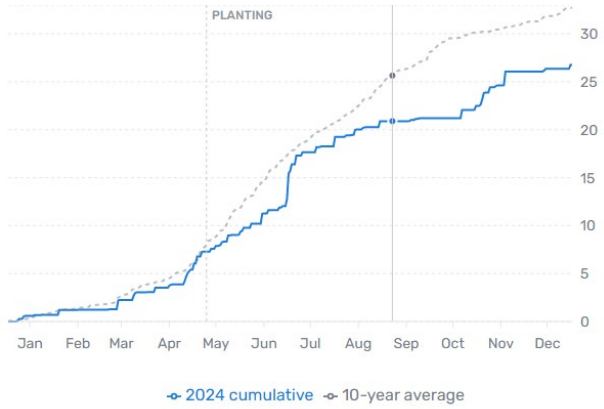
Value of Compost Extract in a Nitrogen Trial

Study ID: 1555-109-2024-01
County: Lancaster
Soil Type: Pawnee clay loam 4-8% slopes and 6-11% slopes, eroded; Burchard clay loam 6-11% slopes; Mayberry silty clay loam 3-6% and 6-11% slopes, eroded.
Planting Date: 5/9/24
Harvest Date: 9/27/24
Seeding Rate: 25,000 seeds/ac
Row Spacing (in): 30”
Variety: Hybrid 85™ 23B50
Reps: 4
Previous Crop: Soybeans
Tillage: No-till
Herbicides: ***Pre:*** 12 oz Verdict®, 42 oz Roundup PowerMAX® on 5/1/24 ***Post:*** 0.9 oz/ac Accent® Q on 5/20/24; 1 oz Armezon®, 1 qt atrazine 4L, 12 oz DiFlexx® on 6/12/24
Seed Treatment: None
Foliar Insecticides: None
Foliar Fungicides: None
Fertilizer: 32% UAN with 5% ThioSul applied with planter on 5/9/24
Irrigation: None
Rainfall (in):



Introduction: Some growers are seeking regenerative agriculture practices in hopes of reducing nutrient and chemical inputs. Biology from compost is thought to improve soil fertility and help release soil nutrients. This grower has traditionally produced compost extract and applied it with his nitrogen. The compost was extracted into water at a rate of 2 lb compost/8 gal of water and applied at 8 gal/ac in furrow at planting. This grower wanted to test any impacts on economics and yield from using the compost extract with a reduced rate of nitrogen. The treatments in the study are:

1) Check (90 lb N/ac as 32% UAN) Costing $57.60/ac
2) Reduced Check (83 lb N/ac as 32% UAN) Costing $53.12
3) Compost Extract Treatment (65 lb/ac N as 32% UAN + 8 gal/ac Compost Extract) Costing $45.60
4) 0 lb/ac Nitrogen Costing $0
5) Full Grower Treatment (65 lb/ac N as 32% UAN, 8 gal/ac Compost Extract, 4 oz/ac Ascend SL, 0.5 gal/ac Fish Hydrolosate, 1 qt Chelated Manganese 6%, 28 oz/ac Rhyzogreen) Costing $90.61

In Treatment 2, the grower was aiming for a Reduced Check rate of 65 lb/ac N so it would be comparable to the Compost Extract and Full Grower Treatments for total N. However, 83 lb/ac N was applied in error. Thus, the grower didn’t have as good of comparison as he desired to the Reduced Check without compost extract treatment. The study still shows the impact of nitrogen rate on yield and economics in this field, which is ultimately what the grower desired to learn.

This area received drought for the third year in a row. The corn was planted into terminated hairy vetch. Biomass from the hairy vetch was collected prior to termination and was shown to have 49 lb N/ac. Being a non-irrigated field, low mineralization occurred. Plants across the study area appeared nitrogen deficient and the 0 lb/ac N treatments were visible compared to the other treatments.

Results:

	Stand Counts	Stalk Rot (%)	Moisture (%)	Yield (bu/ac)†	Marginal Net Return‡ ($/ac)
Check	20,375 A	0.0 A	12.5 B	115 A	444 A
Reduced Check	20,250 A	0.0 A	12.7 B	116 A	450 A
Compost Extract	21,375 A	0.0 A	12.5 B	103 B	401 B
0 N	20,250 A	1.9 A	14.4 A	53 B	231 D
Full Grower Treatment	21,375 A	0.0 A	12.6 B	103B	358 C
P-Value	0.42	0.44	<0.001	<0.001	<0.001

*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 $4.35/bu corn, $0.60/lb nitrogen cost, $0.50/gal compost extract cost, $49.01/ac for Full grower treatment excluding the nitrogen cost.

Summary: Treatments with the Check (90 lb N/ac) and Reduced Check (83 lb N/ac) yielded significantly higher than other treatments (115-116 bu/ac). Marginal net return was also higher in these treatments. 0 N/ac resulted in the lowest yield (53 bu/ac) and marginal net return ($231/ac). Projects should continue to be tested in years with average or above average rainfall.