The Effect of Granulite Sludge on Nitrogen Rates for Corn

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Objective

To determine if the addition of Granulite Sludge makes a significant difference for increasing corn yields.

Background

Cooperator:	Roland Rettig	Drainage:	Tile
County	Henry	Previous Crop:	Wheat
Soil Type:	Millgrove loam	Starter Fertilizer:	19-17-0 (140 lbs/A)
Tillage:	Conventional		

Methods

Granulite sludge is a dried, pelletized source of organic nutrients with an analysis of at least 5-3-0. In the study areas, Granulite was applied during the fall of 1997 at the rate of 4,000 lbs/acre at a cost of $17 per ton.

Three fields with Granulite application were used for study. The Knepley field in 1997 was in wheat (no clover). Nitrogen sidedress rates of 80 lbs/acre vs. 110 lbs/acre were compared in four randomized, replicated field-length strips. The Fruth field was soybeans in 1997. Nitrogen sidedress rates of 145 lbs/acre vs. 175 lbs/acre were compared in four randomized, replicated field-length strips. The Long field was wheat in 1997 with a good stand of clover. A 100 x 30 foot area did not receive sidedress nitrogen to compare 0 vs. 150 lbs/acre. In this study area, four random soil nitrate samples were collected throughout the growing season.

Pre-Sidedress Nitrogen Test (PSNT) soil samples were taken (5-26-98) in all fields before sidedress nitrogen application. After maturity (9-29-98), corn stalk nitrate samples and soil nitrate samples were taken. Corn yields were recorded with a yield monitor.

Results

Table 1. Knepley Field Nitrate and Yield.

Sidedress N Rate (lbs/A)	5/26/1998 Soil Nitrate (ppm)	9/29/1998 Soil Nitrate (ppm)	9/29/1998 Stalk Nitrate (ppm)	Yield (bu/A)
80 lb N	7.0	2.0	287.5	176.1
110 lb N	7.0	2.7	308.2	179.1
LSD (P = 0.05)	1.84	3.01	768.0	3.89
Sig. Difference	No	No	No	No

Table 2. Fruth Field Nitrate and Yield.

Sidedress N Rate (lbs/A)	5/26/1998 Soil Nitrate (ppm)	Yield (bu/A)
145	6.25	182.3
175	7.0	181.6
LSD (P = 0.05)	3.98	2.02
Sig. Difference	No	No

Table 3. Long Field Nitrate.

	1998 Soil Nitrate (ppm)									Stalk Nitrate (ppm)
	May 26	Jun 4	Jun 10	Jun 16	Jun 29	Jul 7	Jul 20	Aug 11	Sep 29	
No N	5.2	22.7	21.2	21.5	20.2	19.7	13.5	4	0.7	85
150 lb N	--	--	--	--	--	--	10	10	2.7	409
LSD (P = 0.05)									2.25	203
Sig. Difference									No	Yes

Summary and Notes

In this study, corn yields were not significantly different with different rates of sidedress nitrogen. Granulite sludge may have contributed extra nitrogen to allow the lower sidedress nitrogen to yield equally well in the Knepley and Fruth fields; however, a check strip with no Granulite was not available to confirm this. In both field sites, a reduction of 30 lbs/acre nitrogen did not significantly reduce yields.

The Knepley field showed lower than optimum levels of stalk nitrate (701 - 2,000 ppm optimal). Also, soil nitrate levels on 9/29/98 were very low. Although yields were nearly 180 bu/acre, these results indicate that the corn plant was deficient of nitrogen and higher yields may have resulted with additional nitrogen application. The economic return of adding extra nitrogen must also be considered.

The Long field indicates that with no additional nitrogen added, soil nitrate levels were nearly sufficient throughout the growing season (25 ppm soil nitrate adequate). Granulite added to the 1997 spring seeded clover crop may have contributed to this source of organic nitrogen. Corn stalk nitrate levels were significantly lower compared to fertilized corn plants; however, both were below optimum stalk nitrate levels.

The amount of release of usable nitrogen from Granulite sludge is difficult to predict. Organic sources may be slow to decompose and may not match crop needs. However, an organic source of nutrients can enhance soil quality and benefit plant growth.

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