

Effects of Eggshell and Ag Lime Applications on Soil pH and Crop Yields

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The Northwest Research Farm (NWRF) in Sutherland was selected as a site to research the effect of eggshell application and the effect of ag lime on soil pH and crop yields (Table 1). The research area was identified in April 2002 at the recently acquired 120-acre tract of land adjacent to the NWRF location. In April 2002, the research area had an initial pH of 5.4 and phosphorus and potassium levels were 24–31 ppm and 151–215 ppm, respectively.

The experimental area was soybean in 2002. Ag lime and eggshell treatments were applied on May 21 and May 30, 2003. The corn planting date was delayed in 2003 to accommodate the delivery of the eggshells.

Ag lime applications and eggshell applications increased the soil pH in a manner that corresponded to the rate of application (Table 2). The increase in soil pH was more uniform with the ag lime application than with the eggshell application. The variability of the eggshell product likely contributed to the differences in the increase of the soil pH compared with ag lime. Corn yields did not respond to the increase in soil pH. The presence of high pH subsoil in the Galva-Primghar-Sac Soil Association often limits corn yield increases to ag lime applications. Previous research with ag lime applications at the NWRF has shown yield increases with soybean but not with corn. Soybean yields were not measured in 2004 due to severe crop damage from a hailstorm on July 12.

Table 1. Chemical analysis of eggshells and ag lime.

	Eggshells	Ag lime
H ₂ O, %	17	5
ECCE (dry basis), lb/T	300	
ECCE (wet basis), lb/T	249	1640
CaCO ₃ , %	56	97
P, ppm	683	
K, ppm	775	
Total nitrogen, %	0.53	
Calcium, %	27.95	
Magnesium, ppm	3,260	

Figures shown are on a wet basis.

Table 2. Effect of ag lime and eggshells on soil pH and corn yields.

Treatment	spring '03 soil pH	fall '03 soil pH	soil ph, chg. '03	fall '04 soil pH	'03 corn yld, bu/a @15.5%
<i>lbs ECCE, ag lime</i>					
0	5.4	5.4	0.0a	5.5	100.9
500	5.4	5.4	0.0b	5.6	99.6
1000	5.3	5.5	0.2c	5.9	101.5
2000	5.4	5.7	0.3cd	6.0	100.0
4000	5.4	6.2	0.8cd	6.4	100.0
8000	5.3	6.5	1.2d	6.7	101.7
<i>lbs ECCE, eggshells</i>					
0	5.3	5.4	0.1a	5.6	100.4
500	5.4	5.5	0.1a	6.0	99.6
1000	5.4	5.8	0.4ab	6.2	104.1
2000	5.4	5.6	0.2a	6.5	102.4
4000	5.3	6.1	0.8c	6.7	99.2
8000	5.3	6.1	0.8bc	6.4	96.4