Wheat and Canola Response to Liming on Slightly Acidic Soils after Application

The application of lime to soils with low pH (4.0-6.0) has been shown to increase the pH of the soil. This may result in increased crop yields and health of the soil due to increased availability of nutrients to the plant, especially phosphorus (P). SuperCal 98G is a 98 % pure calcitic limestone source. It can be broadcast similar to a typical agricultural lime source. SuperCal lime has been shown to influence soil pH as low as 400 lb/ac to achieve a desirable soil pH change and provides soil amendment benefits for up to five successive years following its first application.

The study was conducted at the AAFC Scott Research Farm in 2015, 2016 and 2017 growing seasons. The objective was to determine if an application of SuperCal 98G can provide an economic return to producers in the year following application. A randomized complete block design arranged as an RCBD with four replicates was used. Crop type (canola and wheat) was considered as main plot factor and lime rates as sub-plot factor. Fertilizer was applied at seeding according to soil test recommendations for each crop during the project. Weeds were controlled using a pre-seed burndown and registered in-crop herbicides.

Soil analyses (0-6") were done prior to seeding, in-crop and after plots were harvested in 2015, 2016 and 2017 growing seasons. This was done to see the impacts of lime on pH change in application year and a year after that. Following visible rows, spring plant densities were assessed for both crops to determine the impacts of different liming rates on crop emergence.

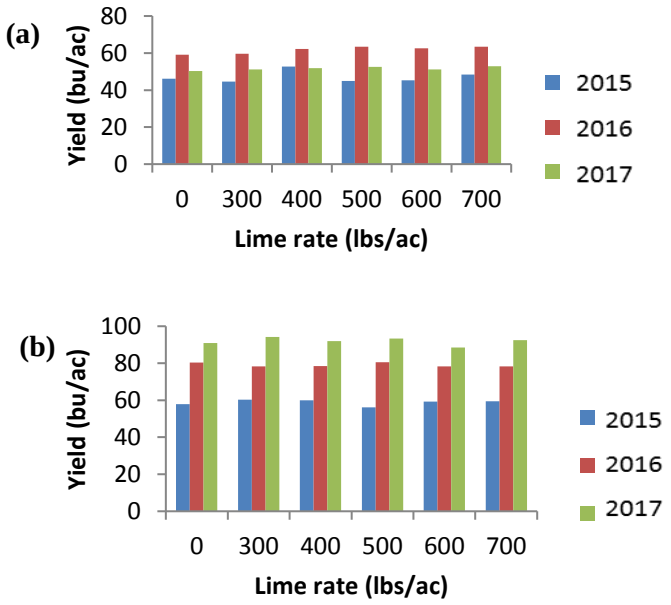

Figure 1: Mean yield of canola **(a)** and wheat **(b)** under different lime rates in 2015, 2016 and 2017 at Scott, SK.

Soil pH change under both canola and wheat crops were not different due to the varying lime rates during the three growing seasons. There were no significant effects of lime rates on the yield of both crops in 2015, 2016 and 2017 growing seasons and as a combined analysis. Although, when a comparison was made among years there were differences. The 2015 canola had the lowest yield with an overall average of 47 bu/ac and had an increase of 32% in 2016 with an average of 62 bu/ac, in 2017 yield decreased to 52 bu/ac but still was 11% higher than 2015. There were linear positive correlations between pH and average yield as a combined analysis for canola (r^2 = 0.28; P=0.01) and wheat (r^2 = 0.48; P = 0.0006).

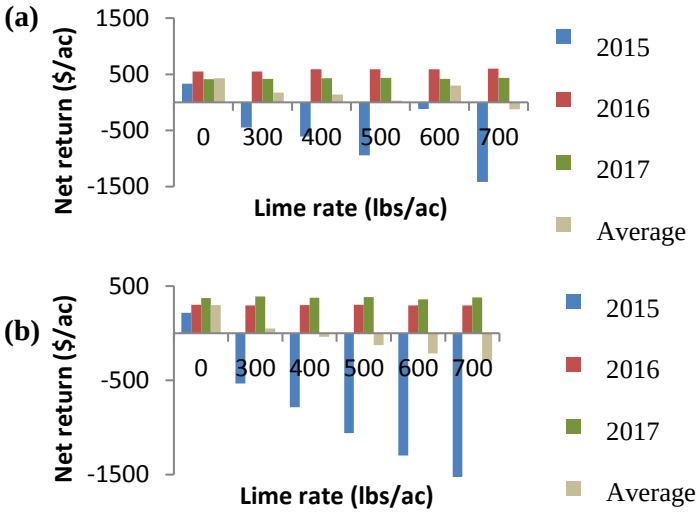

Figure 2: Net Economic return ($/ac) of lime application on slightly acidic soils under canola **(a)** and wheat **(b)** 3 years after lime application.

From the economic analysis (Figure 2), application of SuperCal 98G may start yielding a positive return in the year following application relative to the negative returns in the year of application. However, there is no apparent initial benefit after lime application (0 lbs/ac vs. other rates).

Though liming in no-till systems may not result necessarily in crop yield responses, especially in the year of application, the continued use of NH_4–based fertilizers and projected decline in soil pH suggest some form of pH control may be needed in the future assessing fields periodically and reapplying lime if necessary. Though the net economic gain may not be worthwhile in the year of application and even a year following application, farmers should bear in mind that it is a capital investment rather than an input and expect a net return after few years following application!

Full report at:

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