

ANNUAL REPORT

Grant Code: AP6314

Title:

The objectives of this study were to evaluate the effect of liming on soil nutrient availability, plant nutrient uptake, grain quality and yield, and weed pressure. An additional objective was to conduct a lime requirement incubation study to determine how acidic Idaho soils respond to liming.

Results / Accomplishments :

Three on-farm field experiments were established in the fall of 2021 in Ashton and one at Swan Valley. Four replications of four sugar beet lime rates were applied at rates of 0, 2, 4, and 6 tons per acre on 50'x100' plots. Other than liming, the plots were managed according to the grower practices. During the 2022 growing season, irrigated spring wheat was grown at the Ashton sites and dryland barley was grown at the Swan Valley location. The centers of each plot were geo-referenced. Soil samples were collected at the 0-2, 2-4, 4-6, 6-8, and 8-12" depths in the spring and after grain harvest in 2022. These samples were dried and ground and are in the process of being analyzed for soil pH (1:1 soil: water, 1:2 soil: water, 1:1 soil:0.01 M calcium chloride),

Figure 1: Soil pH changes by depth before lime application. Soil pH followed a pattern of decreasing from the 0-2" depth to the 2-4" and 4-6" depths and increasing in the 6-8" and 8-12" depths. Historically, these soils had more alkaline soils but over 100 years of farming, applying nitrogen fertilizers, and, i

Spackman will help convert some of Dr. Tarkalson's research articles into Extension bulletins.

Dr. Spackman is conducting a lime incubation study with undergraduate students at Brigham Young University – Idaho. These students are evaluating precipitated calcium carbonate, calcium hydroxide, and calcium carbonate as liming agents and determining how long it takes for these lime products to neutralize acidic soils. They are also examining the impact of soil moisture at the time of lime application on how readily soil pH is neutralized.

Next Steps/ Projections:

For the on-farm field trials, we will continue to monitor changes in soil pH in each plot over the next two years.

After Kaone finishes analyzing the lime incubation samples, we will use the modified soils to evaluate the effect of soil pH on weed vigor. We will likely evaluate red root pigweed, wild oat, Kochia, and/or corn spurry.

Kaone will continue to analyze the soil sample results and will write them up as part of her thesis.

Publications / Presentations / Popular articles / News Releases / Variety Releases:

We have presented information about the liming study at the University of Idaho Forage Schools held in March 2022 at Mudlake, Preston, and Idaho Falls and Cereal Schools in Soda Springs. Despite many of these locations having alkaline soils, the topic generated significant interest. Kaone will present a poster at the Western Nutrient Management Conference in March 2023. We also anticipate presenting the first year of data at the 2023 American Society of Agronomy-Crop Science Society of America-Soil Science Society of America annual conference.