FIRST-YEAR EVALUATION OF PRECIPITATED CALCIUM CARBONATE AS A LIME AMENDMENT IN EASTERN IDAHO

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ABSTRACT

The natural process of soil acidification has become a rising issue in soil sustainability and affects approximately 30% of the world's surface. Soil acidification is enhanced by the application of ammonium- and elemental sulfur-containing fertilizers, the removal of base cations (Ca, Mg, K, and Na) at harvest, and the leaching of base cations and their conjugate bases such as nitrate. Even though most of southern Idaho soils are alkaline with a pH of around 7.0 to 8.5, there are several regional acidic areas. Periodic applications of locally available precipitated calcium carbonate can help neutralize soil acidity and maintain the productivity of acidic soils in eastern Idaho, including Fremont, Bonneville, Caribou, and Oneida counties. Precipitated calcium carbonate is a byproduct of sucrose extraction during the processing of sugar beet roots, primarily produced in Idaho and Oregon. There is limited information about the specific effect of precipitated calcium carbonate on Idaho soils. Most trials have been done in Oregon soils that may or may not correlate well with the chemical and physical properties of Idaho soils. Four on-farm field trials were conducted in eastern Idaho to assess the effect of precipitated calcium carbonate lime rates (0, 2, 4, 6 ton ac^{-1}) on the modification of soil pH by soil depth and small grain yield. Soil samples were collected at 0-2, 2-4, 4-6, 6-8, and 8-12” depths by replication in the fall of 2022 immediately before lime application and by plot in May-June and post- wheat or barley harvest in 2023. Grain yield was collected by hand harvesting a 5x5’ section of each plot. Initial soil pH measurements before liming (0-2”) at the four field sites were 4.6, 4.8, 5.0, and 5.6 and soil pH increased with increasing sampling depth to 5.7-6.2 (8-12”). Following liming, soil pH increased at all soil depths, but the greatest increase occurred in the top 6” of the soil profile. Across the four sites, the 6-ton ac^{-1} lime rate increased soil pH (0-2”) 0.7 to 1.5 pH units by the May-June sampling event relative to the non-fertilized check. Averaged across lime application rates, liming did not significantly improve grain yield over the non-limed treatment at two sites but increased wheat yield by 8 bu ac^{-1} at one location. We will continue to monitor these sites to evaluate how long a lime application lasts before soils acidify to yield-limiting levels.