Performance of Soybean-based Rotations in Manitoba: Soil P and K

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A crop rotation study was initiated north of Brandon, MB in 2014 to better understand the agronomic and economic performance of five rotations of soybean (S), wheat (W) and canola (C): SC, SW, SWC, SCW, and SSW. This study provided a unique opportunity to assess soil P and K concentrations over a number of years and under a range of rotations. Because initial Olsen P concentration was low at the study site, a long-term sustainability approach to P fertilizer management was employed to build up soil P levels, with fertilizer P applied annually to each crop at a rate of 1.5 times the estimated P removal rate in harvested grain. This approach increased Olsen P from approximately 5 to 15 ppm between 2014 and 2021, thereby moving soil test levels from a low to medium range which may better support optimum crop yield. In contrast to P, soil test K concentrations were considered sufficient for crop production therefore no fertilizer K was applied from 2014 through 2021. While year-to-year variations in soil test K were evident, soil K levels did not show evidence of depletion over this time period. This rotation study will continue until 2026 in order to better understand the longer-term effects of rotation, which will allow the continued assessment of soil nutrient levels.