

## Soybean Response to Potassium Fertility and Fertilizer in Manitoba

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### ABSTRACT

Soybean acres have increased greatly in Manitoba in recent years, now occupying more than 25% of the province's annual crop land. Potassium removal by soybean is greater than any other crop grown in Manitoba (1.1 – 1.4 lb K<sub>2</sub>O/bu). This large removal, accompanied by the large and rapid expansion in soybean acres, has contributed to an increase in province-wide potassium removal rates and likely explains the increase in incidence of potassium deficiency symptoms reported in recent years. Although potassium fertility is a growing concern in Manitoba, the province is lacking comprehensive potassium fertility research for soybean production. Intensively managed small plot trials and field scale on-farm trials were initiated to investigate potassium fertility and fertilizer response of Manitoba soybean crops. The objectives include determining the frequency of yield response to potassium fertilizer addition and assessing the effectiveness of different combinations of potassium fertilizer rates and placements for increasing soybean seed yield (30 or 60 lb K<sub>2</sub>O/ac sidebanded, and 30, 60 or 120 lb K<sub>2</sub>O/ac broadcast and incorporated). Results from the first field season of data suggest the traditional ammonium acetate soil test extraction method, on its own, may not be an adequate predictor of soybean response to added potassium fertilizer in Manitoba. In 2017 there were no significant yield responses to potassium fertilizer treatments at small plot locations (65-101 ppm soil test potassium). Four of fourteen on-farm trials (52-235 ppm soil test potassium) showed statistically significant yield responses in 2017, with two responding positively and two negatively.

However, none of the yield responses were as predicted by ammonium acetate levels. In addition to yield data, other measurements include an investigation of differences in ammonium acetate extractable K from moist and dry soil samples, potassium supply rates as indicated by Plant Root Simulator<sup>®</sup> (PRS) probes, differences in concentration of potassium in soybean tissue midseason and in the seed at harvest.