

For most crops, fertilizer is one the largest input costs and typically provides a large return on investment when appropriate rates are applied. Flax often responds well to N fertilizer application and rates of approximately 35-80 kg N/ ha is typically applied. On the other hand, flax response to P fertilizer tends to be less consistent and pronounced than for other crops such as spring wheat and canola. Still, significant responses have been detected when residual P availability is low and many producers apply at least enough P fertilizer to replace what the crop removes as a strategy for maintaining soil productivity over the long term. While sulphur deficiencies can potentially limit yields in any crop, serious deficiencies in S are relatively uncommon in most Saskatchewan soils.

Research previously done at Indian Head in 2013 and 2014 showed a response to increasing N rates and to the addition of P. Sulphur applied in this study also had a yield benefit, but was applied with K; therefore, it was difficult to separate the effect of S alone.

Trials were conducted at Indian Head in 2015 to demonstrate the potential response (or lack thereof) of flax to varying rates of N, P, K and S fertilizer in the thin-Black soil zone of southeast Saskatchewan. The treatments were an unfertilized control plus a factorial combination of three N fertilizer rates (45, 90 and 135 kg N/ha), three P fertilizer rates (0, 22 and 45 kg P₂O₅/ha) and two S fertilizer rates (0 and 22 kg S/ha).

Flax emergence, maturity, and test weight were affected by N rate but not P rate or S rate. Flax seed yield was affected by both N rate and P rate but not S rate. Mean flax yields in the N treatments were within 59 kg/ha (0.9 bu/ac) for rates ranging from 45-135 kg N/ha, but were significantly higher at 90 kg N/ha than for either the 45 or 135 kg N/ha rates. While the response to N rates beyond 45 kg/ha was weak, there was a strong overall response to N fertilizer with an average increase of 35% over the control. The response to P fertilizer was smaller in magnitude than for N, but was also highly significant.

On average, P fertilizer increased flax yields by approximately 58 kg/ha (0.9 bu/ac). Despite low residual levels, there was no yield response to S fertilizer application.

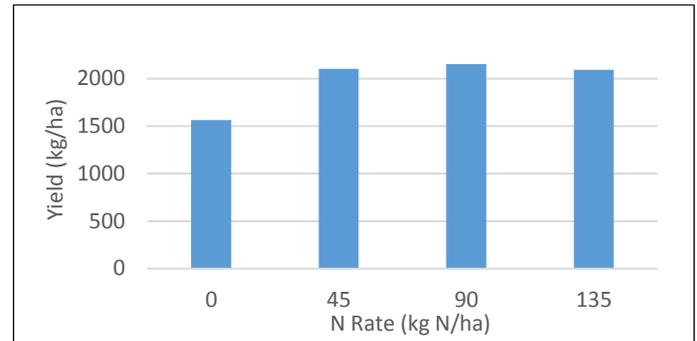


Figure 1: Effect of Nitrogen fertilizer on flax yield.

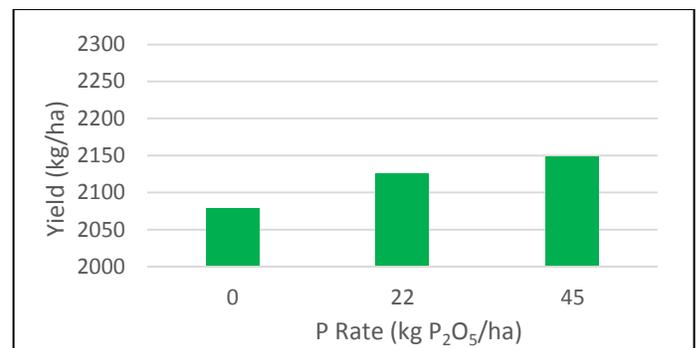


Figure 2: Effect of Phosphorus fertilizer on flax yield.

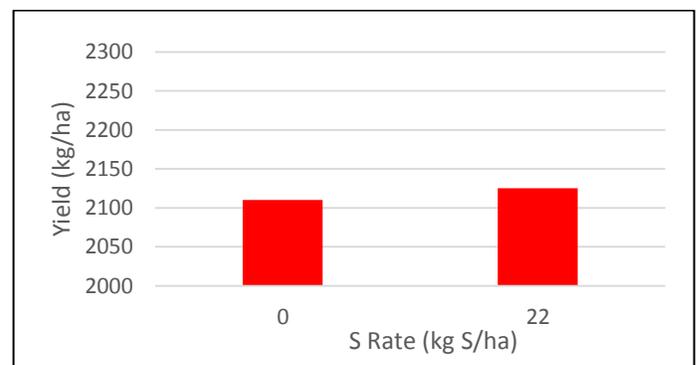


Figure 3: Effect of Sulphur fertilizer on flax yield.

This project was financially supported by the Saskatchewan Flax Development Commission, with in-kind support provided by BASF, Bayer CropScience and Syngenta.