Seed-Placed vs Side-Banded Phosphorus Fertilizer in Faba Bean

High yielding faba beans remove large amounts of P in the grain. Faba beans are also generally considered as sensitive to seed-placed fertilizer and combined with the high P requirements, this practice can create issues with plant injury and establishment. When placing P fertilizer in the seed-row for faba beans, the Saskatchewan Ministry of Agriculture suggests that rates should not exceed 25 kg/ha with narrow openers. The Saskatchewan Pulse Growers suggest a maximum safe seed-placed rate of 45 kg/ha assuming seedbed utilization of 10-15%.

This project was conducted at Swift Current in 2016 and Indian Head in 2016 and 2017. The objective of this project was to demonstrate the effects of increasing rates of phosphorus fertilizer on faba bean establishment and seed yield for both side-banded and seed-row placement. The treatments included two placement methods (seed-placed vs side-banded) combined with rates of 0, 20, 40, 60, 80 kg P_2O_5/ha in the form of MAP (11-52-0).

At Swift Current in 2016, yields exceeded 50 bu/ac with an increasing yield response that peaked at 60 kg/ha with side-banded P (Figure 1). Yield decreased only with rates of seed-placed P that exceeded 60 kg/ha. Seed-row rates for P were able to be exceeded due to the buffering effects of abundant precipitation and the use of openers that placed the seed and phosphorous in a band that is somewhat wider than a very narrow disk drill.

At Indian Head in 2016 and 2017 the plant densities were similar between the two years (25-30 plants/m^2 on average) and not affected by P treatment. The average yield was 63 bu/ac in 2016 and 38 bu/ac under the much drier conditions of 2017. Averaged over the two years, yields increased linearly by 6.5bu/ac (14%) as the P rate was increased from 0 to 80 kg/ha. There were no apparent yield differences associated with P placement.

The yield effect from P fertilization will vary from year-to-year and field-to-field. It will not necessarily be practical or economical to use rates this high and these results should not be taken to suggest that high rates of seed-placed P (i.e. > 40 kg P_2O_5/ha) will be safe under broader circumstances. However, the results do demonstrate the high potential requirements of this crop.

The results were generally consistent with past research which has shown that faba beans are less sensitive to seed-placed fertilizer, but with respect to yield, relatively responsive to P fertilizer application compared to other traditional pulse crops. This crop removes approximately 55-67 lbs P_2O_5/ac and takes up a total 89-108 lbs/ac. This illustrates the importance of P fertility for faba beans.

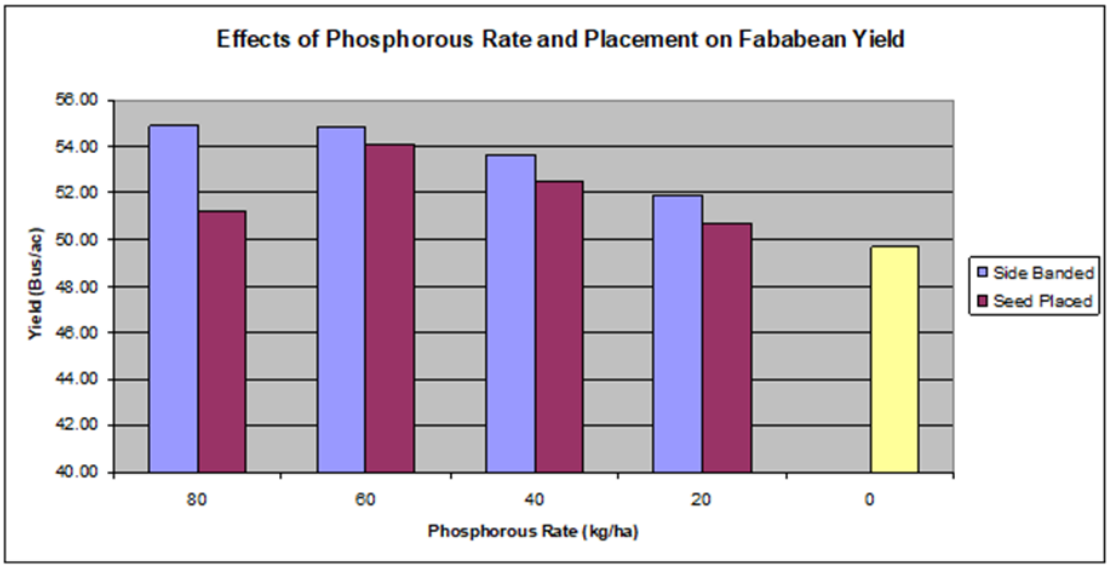

Figure 1: Phosphorous rate and placement effects on faba bean seed yield in 2016 at Swift Current.

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