

## Nutrient uptake and nitrogen fixation by faba bean in Saskatchewan

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SPG Contributions	Project Status	Duration/Timeline of Project (Year to Year)	Co-funders	Total Project Cost
\$37,519.00	Completed	November 2015 – November 2018	Saskatchewan Ministry of Agriculture – Agriculture Development Fund (ADF)	\$70,144.00

### Project Description

To determine the soil nutrient uptake, removal and nitrogen (N) fixation by faba bean.

### Outcome

Across the sites and years, faba bean had high yield (~4-6 tonnes ha<sup>-1</sup>), nutrient uptake and nitrogen (N) fixation (~ 80% of plant nitrogen derived from biological fixation equating to ~ 200 kg nitrogen ha<sup>-1</sup>). Since the proportion and amount of nitrogen removed in grain harvest was similar to that estimated to be derived from fixation in the entire plant, there appears to be limited opportunity for a net positive addition of nitrogen to the system through fixation, unless the seed is not harvested and the entire plant is returned and incorporated into the soil. Response to fertilization was limited when faba bean was grown on soils with good fertility, but on a phosphorus (P) deficient soil, yield and nitrogen (N) fixation responded positively to phosphorus fertilization. The faba beans had high nitrogen, phosphorus and potassium (K) removal compared to other pulse crops, with most of the above ground nitrogen, phosphorous, sulfur (S), zinc (Zn) and copper (Cu) found in the seed. Maintenance of soil fertility in crop rotations containing faba bean will require attention given to the crop removals. In general, about 45 kg nitrogen, 12 kg phosphorus 205, 28 kg potassium 20 and 2.5 kg sulfur is contained in above ground (grain + straw) biomass of faba bean per tonne of grain yield. There were few significant differences among cultivars of faba bean in the parameters assessed in the study.

### Research Objective

#### OBJECTIVE 1

To determine the soil nutrient uptake, removal and nitrogen (N) fixation by faba bean.