

# Faba Bean Agronomy

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## The Bean Report

**FABA BEANS (VICIA FABA)**, also known as fava or broad beans, have tremendous potential in Manitoba due to their rotational benefits and adaptation to cool, moist growing conditions. In 2017, Manitoba saw approximately 7800 acres of faba beans scattered throughout the province (MASC). Limited acres are largely due to marketing constraints within the export marketplace. But there is also relatively limited experience and knowledge of faba bean production in Manitoba. Whether you have secured a marketing strategy as an experienced faba producer, or you are interested in trying them for the first time, this article will provide (a refresher on) the basics in faba bean agronomy.

### DESCRIPTION

Faba beans produce tall, upright plants (three to five feet in height) that develop large pods along the square, main stem. They are annual, cool-season legumes with high biological nitrogen fixation (BNF) capability. These plants prefer moist growing conditions and have a greater tolerance to flooding than other pulse crops. For maximum yield potential, faba beans require at least

10 inches of water per season. High seed protein and energy content makes them suitable for human or animal consumption, depending on the type that is grown.

### FIELD SELECTION

For faba bean production, select fields with:

- medium to heavy textured soils with good water holding capacity
- soil test soluble salt levels less than 1.0 mmho/cm<sup>1</sup>
- cereal stubble
- adequate phosphorus and potassium levels, low nitrogen – see *Fertility* section for more information.
- no carryover of residual herbicides (see *Guide to Field Crop Protection*)

### VARIETY SELECTION

In order of importance, the major considerations for faba bean variety selection should be the target market, seed size and maturity. Faba bean varieties fall into two categories:

1. **Tannin varieties** – coloured flowers or white flowers with a black spot, tan seed coats, seeds are often larger, grown for human

consumption markets due to desirable cooking quality

2. **Low or near zero tannin varieties** – white flowers, greyish-white seed coats, grown mainly for the livestock feed industry

Due to cross-pollination that can occur between tannin and low tannin varieties, ensure at least 500 metres between types. Large-seeded tannin types have better cooking quality and are more desirable in export markets, such as Egypt, the United Arab Emirates, Morocco and Ethiopia. In 2017, the most common varieties grown in Manitoba were Snowbird (smaller-seeded) and Tabasco (larger-seeded), which are both low tannin varieties. The five- and 10-year yield averages for the province are 2379 and 2127 lbs/ac, respectively (MASC). Refer to the *MPSG Pulse and Soybean Variety Guide* or *Seed Manitoba* for faba bean variety data, such as days to maturity, thousand kernel weight and yield.

### PLANT ESTABLISHMENT

#### Row Spacing and Equipment

As faba beans grow upright and do not branch out, narrower rows will provide faster canopy closure, better weed competition and moisture conservation. However, this needs to be validated by research in western Canada.

Planters or air seeders can be used for faba bean planting, although air seeders pose a greater risk of plugging, damage to the seed and uneven seed depth. Due to the irregular shape and large seed size, plugging can occur at various points in an air seeder—the metering system, distribution system, blockage sensors and soil openers. Plant slowly (less than five mph) to avoid plugging issues. According to a survey conducted by the Prairie Agricultural Machinery Institute (PAMI) across Saskatchewan in 2017, soil openers were the most common source of plugging. Openers

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▼ *Faba bean plants at the flowering stage (Source: Manitoba Agriculture).  
Inset: Square stem with clasping leaf.*



with straight-through geometry and no obstructions or change in direction reduced the probability of plugging. Follow equipment manufacturer recommendations and consider a “practice run” to ensure there are no flow issues. Also refer to the PAMI report for an extensive list of solutions to seed plugging.<sup>2</sup>

### Date, Depth and Rate

Faba beans should be planted as early as possible in Manitoba for maximum yield potential. Also to ensure they reach maturity in 105 to 110 days. Soil temperature should be at least 3°C for successful germination. Aim to plant during the last week in April to the first week in May and avoid planting later than mid-May. Hypogeal germination keeps faba bean seedlings safe from frost after emergence, as the growing point remains below ground. The recommended seed depth range for faba beans is 2 to 3 ½ inches, ensuring adequate seed to soil moisture contact for successful germination.

The recommended target population for faba beans is 40–45 live plants/m<sup>2</sup> (161,000–182,000 plants/ac). Research by Dr. Steve Shirtliffe in Saskatchewan is currently wrapping up to validate the optimal plant population. For an accurate seeding rate, calculate the thousand kernel weight (TKW), % germination and estimate expected seed survival for each seed lot. Seed survival may be reduced by seed handling and dry field conditions. Seed size and weight can also vary widely. According to the same PAMI survey and Manitoba variety evaluation trials, seed weight can range from 335 to 789 g/1000 seeds, which results in a wide seeding rate range.<sup>2</sup> Also consider seed cost, expected grain price and yield for the most economical seeding rate.

### FERTILITY

Faba beans should be inoculated with *Rhizobium leguminosarum* bacteria to promote BNF. This inoculant species is the same for peas and lentils; however, check the label to ensure the strain is registered for faba beans specifically. Faba bean plants can fix approximately 90% of their N-requirement and can leave behind an N-credit for subsequent crops.<sup>3</sup> This means fabas are a nice fit in crop rotations and a good cover crop option. Although starter N fertilizer is not necessary, ensure soil test N levels are low enough to accommodate nodulation (<50 lbs N/ac). The first root nodules will appear about two to three weeks after emergence and peak N<sub>2</sub>-fixation extends from full flower to late podding.

Faba beans are efficient at extracting phosphorus. For long-term management, ensure nutrient inputs balance grain removal throughout a rotation. See Table 1 for average nutrient removal rates of faba beans. According to research conducted at the University of Saskatchewan (U of S), up to 40 lbs P/ac can be seed-placed safely with faba beans (10–15% seed-bed utilization).<sup>4</sup> Research on faba bean nutrient uptake and nitrogen fixation is ongoing at the U of S in Dr. Jeff Schoenau’s lab, so stay tuned for more results.

**Table 1. Average faba bean nutrient removal rates.**

Nutrient	Removal	
	lbs/bu	lbs/ac*
Nitrogen (N)	3.0	150
Phosphorus (P <sub>2</sub> O <sub>5</sub> )	1.2	60
Potassium (K <sub>2</sub> O)	0.9	45
Sulphur (S)	0.1	5

\*Based on a 50 bu/ac (3000 lbs/ac) faba bean crop.

### WEED CONTROL

Early-season weed control is important for faba beans, as they are relatively poor competitors. Reduced emergence under dry conditions, for example, can further reduce competitive ability of the crop.

Research is needed in western Canada to determine the critical weed-free period of faba beans.

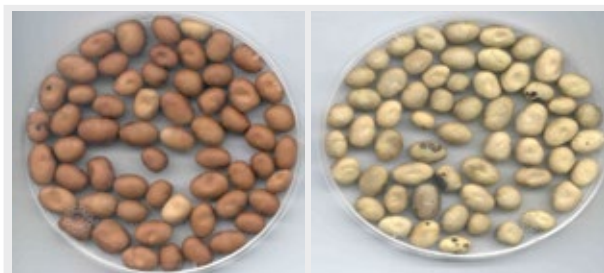
#### Tips on Weed Control in Faba Beans

- Use pre-plant herbicides to improve early-season competition and avoid the need for broadleaf weed control in-crop.
- Aim to control perennial weeds in the fall.
- Avoid late application of herbicides to prevent crop injury. Follow application timing directions on the label.
- Consult the *Guide to Field Crop Protection*, product labels and chemical reps for information on the best herbicide options, risk of herbicide carryover and pre-harvest intervals (PHI).

### DISEASES

The main disease pests of faba beans are chocolate spot (*Botrytis cinerea* or *B. fabae*), also known as grey mould, and *Ascochyta fabae*. *B. cinerea* is also a pest of chickpeas, sunflowers, buckwheat and alfalfa. Producers should be wary of using crop rotation to control this disease if these crops are also included in a rotation. Most pulse crops are associated with a type of ascochyta blight (faba beans, peas, lentils, chickpeas); however, *A. fabae* is specific to faba beans and crop rotation can successfully be used to prevent this disease.<sup>5</sup> Both diseases are seed- and stubble-borne, so purchasing disease-free seed is another method of control. The benefit of leaving infected residue on the soil surface (e.g. prevention of soil erosion) would outweigh the benefits of burying infected crop residue.

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◀ Faba bean tannin seed (left) and low-tannin seed (right). Source: Mark Olson, Alberta Agriculture and Forestry.

Like soybeans and other pulse crops, faba beans are susceptible to the root rot complex, including *Fusarium spp.*, *Pythium spp.* and *Rhizoctonia solani*. According to a 2009 survey conducted by Dr. Robert Conner at AAFC, all three root diseases were present in faba bean crops, but *Fusarium avenaceum* was the most common.<sup>6</sup> No crops were severely affected by *F. avenaceum* at the time, but inoculum can persist in crop residue for several years, especially with a wide range of host crops such as field peas. In the same study, fungicide seed treatment improved seedling emergence and yield.

Below is a list of foliar diseases to scout for in faba beans:

- chocolate spot (*Botrytis fabae* or *B. cinerea*)
- ascochyta blight (*Ascochyta fabae*)
- anthracnose
- bean yellow mosaic virus (BYMV)
- white mould (*Sclerotinia sclerotiorum*)
- alternaria leaf spot
- rust
- powdery mildew

All except for BYMV are fungal pathogens. However, ensure that foliar fungicides are registered for control of the disease in question, and that it would be economical to apply the product. Not all diseases listed here will occur at economical levels in Manitoba. Note that higher incidence of these diseases can be expected under irrigation.

### INSECTS

Insect pests to watch for in Manitoba-grown faba beans include cutworms, lygus bugs, pea aphids, bertha armyworms and grasshoppers. Pea leaf weevil is also a pest of faba beans, but its presence has not been confirmed in Manitoba. Blister beetles are of concern if faba beans are grown for livestock feed, due to the toxin cantharidin. Scout for severed plant tissue caused by cutworms early in the season. Note that insecticide seed treatments do not provide protection against cutworms and faba seedlings can re-grow from the growing point at the seed after they are damaged. Scout for lygus bugs

▼ Chocolate spot (left) and Ascochyta blight (right) on faba bean plants. Source: Pulse Australia.



starting in mid-June. Lygus bugs pierce the pod and cause damage to the seed coat, appearing as a brown spot on the seed. This direct damage to the seed can cause downgrading. As lygus bugs and bertha armyworms are also pests of canola, be vigilant of pest pressure if these two crops are close in rotation. Less is known about the extent of aphid damage to fabas in Manitoba, but damage will appear as brown spotting on the undersides of leaves. Grasshopper and bertha armyworm forecasts are also available from Manitoba Agriculture each season.

### HARVEST

High volumes of plant biomass typically make faba bean harvest a challenge. This crop can be direct harvested or swathed then combined. However, swaths can be difficult to pick up and do not dry out if they are rained on. On the flip side, pod shatter losses can occur if the crop is left standing to completely mature. Due to this,

desiccation is recommended to help speed up maturity. If desiccating, refer to PHIs and maximum residue levels (MRLs) to prevent market restrictions (keepingitclean.ca). Faba beans should be direct harvested at 18–20% moisture to reduce seed damage, then aerated. Seed is considered dry enough for storage at 16% moisture. A flex header is not crucial for direct harvesting due to high pod clearance. Also keep an eye on harvest loss. With a seed weight of 450 g/1000 seeds, approximately 1 ½ seeds/ft<sup>2</sup> equate to 1 bu/ac of yield loss. ■

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To date, MPSG has funded three projects focused on faba beans in recent years, representing \$111,031.

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### References

- <sup>1</sup>Grieve, C.M., S.R. Grattan and E.V. Maas. 2012. Plant salt tolerance. In: W.W. Wallender and K.K. Tanji (eds.) ASCE Manual and Reports on Engineering Practice No. 71 Agricultural Salinity Assessment and Management (2nd Edition). ASCE, Reston, VA. Chapter 13:405-459.
- <sup>2</sup>Prairie Agricultural Machinery Institute (PAMI). 2017. Identification of issues related to seeding faba beans through air seeders in western Canada. [http://saskpulse.com/files/general/170426\\_Faba\\_Bean\\_Air\\_Seeding.pdf](http://saskpulse.com/files/general/170426_Faba_Bean_Air_Seeding.pdf)
- <sup>3</sup>Walley, F.L., G.W. Clayton, P.R. Miller, P.M. Carr and G.P. Lafond. 2007. Nitrogen economy of pulse crop production in the Northern Great Plains. *Agron. J.* 99:1710-1718.
- <sup>4</sup>Weiseth, B. 2015. Impact of fertilizer placement on phosphorus in crop, soil and run-off water in a brown chernozem in south-central Saskatchewan. M.Sc. Thesis. University of Saskatchewan.
- <sup>5</sup>Gossen, B.D., S.F. Hwang, R.L. Conner and K.F. Chang. 2011. Managing the ascochyta blight complex on field pea in Western Canada. *Prairie Soils & Crops J.* 4:135-141.
- <sup>6</sup>Conner, R. 2012. Impact and control of root rot in faba bean. Agriculture and Agri-Food Canada. <https://www.manitobapulse.ca/research-project/impact-and-control-of-root-rot-in-faba/>