

FREQUENTLY ASKED QUESTIONS (FAQ)

Q: What is the benefit to the end user when fababean is included in a cover crop mix?

A: Fababean is a great nitrogen fixer, enriching the soil without the need for nitrogen fertilizer. http://saskpulse.com/files/general/151222_Phelps_Fababean_webinar.pdf compiles data from several reports (on slide 8), indicating that fababean fixes nitrogen even better than other legumes. Importantly, unlike peas and lentils, fababean is not commonly grown as a cash crop, so does not interfere with crop rotation protocols. (The use of pea or lentil in cover crop mixtures counts towards the [USDA-RMA](#) rotational restrictions for those commonly grown crops).

Q: What is the benefit to the commercialization partner in using this fababean in a cover crop mix?

A: While fababean has great benefit in cover crop mixes, existing varieties have large seeds and/or low tannin, making seed increase too expensive to include them in typical cover crop mixes. Further, typical fababean seeds are large, which can clog seeding equipment during planting. MSU's new 14-24SB fababean is small, making it practical, for the first time, to include fababean in cover crop mixes.

Q: What is the pedigree and selection history of this fababean line?

2013

We obtained 54 fababean lines from the Plant Germplasm Introduction unit of USDA-ARS in Pullman, WA, and grew them in single rows (in close proximity) at the MSU Post Farm. The seed packets for each accession contained 25 seeds, which were highly variable in size and color (i.e. not genetically uniform). These lines were not crossed in a deliberate or controlled manner, but there is naturally a high degree of outcrossing. Five lines with the greatest proportion of dark seed coats and smallest seed size were chosen for phenotypic selection of dark seed coats and small seed size. Seed size was approximately 220 mg/seed, +/- 20 mg. Significant progress was made in one cycle of phenotypic selection at the MSU Post Farm but it was obvious that uniformity of seed color could not be achieved in a timely manner.

Winter 2014/15

We chose 10 small, dark seeds (200-220 mg/seed) from four of the parental accessions (one was discarded due to larger seed size) and grew them in individual pots in the Plant Growth Center at MSU-Bozeman, isolating each parental accession in separate rooms within the PGC. Self pollination by hand (i.e. 'tripping') of fababean plants was performed over a 2-month period. From each group, a single plant was chosen for advancement based on seed number, size, and color uniformity.

2015

Forty-eight to 72 seeds from three selected lines were hand-sown in separate areas at the MSU Post Farm with > 100 m isolation, and 11 seeds from one selection in Professor Miller's home garden. These small plots were irrigated and harvested by hand. After threshing seed from the plants, one line was discarded due to a small amount of non-dark seeds (~1.5%).

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2016

Seed was mechanically sown for three selected lines in separate areas with > 100 m isolation at the MSU Post Farm under limited irrigation. After machine harvesting, one line was discarded due to slightly larger seed size than the other two selections.

2017

From two very similar selections (indistinguishable based on seed color or size), the selection with the greatest amount of seed was chosen for further increase on a 1-acre plot at the MSU Post Farm, which was harvested and cleaned, resulting in 1,500 lb of seed.

Q: How does this fababean line compare to others?

A: This line was selected for its small seeds and dark seed coat, as part of a relatively small project. We do not have extensive data to compare it to other fababean lines in other respects. In terms of yield, testing in 2018 by one potential commercialization partner in 2 locations (one in Montana and one in North Dakota) resulted in yields just over 3,000 lbs/acre. Importantly, yield in terms of # of seeds harvested per acre planted was the highest of the varieties tested.

Q: I am trying to calculate what my costs would be to produce seed of this fababean. What is the optimal seeding rate to use in order to harvest seed?

A: These 2 sites recommend 43-45 plants/m²:

[http://www1.agric.gov.ab.ca/\\$department/deptdocs.nsf/all/agdex14482](http://www1.agric.gov.ab.ca/$department/deptdocs.nsf/all/agdex14482)

http://saskpulse.com/files/general/151222_Phelps_Fababean_webinar.pdf

when planting for grain. This is generally an economical approach. But if you are trying to scale up seed production as quickly as possible, you will get a higher seed:seed scale-up by planting thinner. We seeded 20 plants/m² in our final one acre scale-up.

We achieved seed:seed ratios > 30:1 in the early production stages (meaning the seeds harvested were enough to plant 30 times the area on the following generation). But we were closer to 20:1 in the final crop. With dry pea it is commonly accepted that the seed:seed ratio is usually not much better than 10:1. It is just the nature of large seeded crops that it is difficult to get rapid seed increases. With large-seeded fababeans the ratio is worse, which makes them uneconomical for use in cover crop mixes. That is a key advantage of this small-seeded fababean.

Q: How important is soil moisture?

A: VERY IMPORTANT. Beware of excess soil moisture especially prior to stem elongation! Annual legumes (eg. peas, lentils, chickpea, fababean, dry bean, etc.) are generally intolerant of “wet feet”. Rhizobia need a well oxygenated soil atmosphere to function so saturated soils are very bad (saturated means free water standing on the surface or very nearly so). If they are in saturated, anoxic conditions for very long, the rhizobia die and slough off the plant leaving it compromised for nitrogen supply. You may want to hold off on irrigating until very near first flower; then go with water as the season demands.

Q: How many commercialization partners will be chosen?

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A: In order for it to make economic sense for a commercialization partner to invest the time and resources required to complete variety development, legally protect the variety, market and sell the variety, there can be only one commercialization partner. That partner will have the exclusive right to market and distribute this fababean in the US. International rights are TBD, depending on the ability of the commercialization partner to effectively reach those markets.

Q: What criteria will be used to select a commercialization partner?

A: There will be multiple criteria used, including the financial terms offered and the ability of the partner to effectively complete the PVP process, raise their own seed, and to reach a wide market. It is expected the commercialization partner will be able to reach a significant portion of the US, especially including Montana.

Q: Will MSU pursue PVP on this fababean? Can a commercialization partner do so?

A: At this time, MSU does not have sufficient data for PVP, or to claim that this fababean line is a uniform, stable variety. MSU will not be registering this fababean as a variety, nor submitting an application for PVP. However, it is the expectation of MSU that licensing proposals from potential commercialization partners will include a plan to register the variety and a mechanism to legally protect the variety—most likely through PVP.

Q: Will MSU produce Breeder and/or Foundation Seed for this fababean line?

A: Since MSU will not be completing the PVP, this line will not be part of MSU's Foundation Seed Program. The commercialization partner will need to produce and maintain Breeder and Foundation seed stocks for ongoing seed production.

Q: What is the quality and quantity of the existing seed stock?

A: MSU has approximately 1250 lbs of seed stock, most of which will go to the commercialization partner. The existing seed was [analyzed by the MSU seed lab in December 2017 and found to be high purity and had a 94% germination rate.](#)

Q: Where can I learn more about raising fababeans?

A: Here are some informative websites:

<http://saskpulse.com/growing/faba-beans/>

http://saskpulse.com/files/general/151222_Phelps_Fababean_webinar.pdf

<http://horticulture.oregonstate.edu/content/faba-beans-0>