

THE PULSE OF THE PRAIRIE

By Brenda Frick

Pulses are widely recognized as a good source of protein, starch, fibre and B vitamins, and are considered a healthy part of a balanced diet. These legumes are valued as high-protein livestock feed, whether as seed, for grazing, as hay or as silage. Similarly, legumes are ideally suited to feeding the soil and as a healthy part of a balanced rotation.

On the prairies, the most commonly grown pulse crops are field peas and lentils, though dry beans, chickpeas, faba beans and soybeans also have a place. Organic seed is readily available for field peas and lentils but more difficult to find for the others.

Field peas

Saskatchewan has long been the world's leading exporter of field peas, so it's not surprising that organic farmers on the prairies often turn to field peas as the legume in their rotation. Both yellow and green field peas are grown and sold as both food and livestock feed. The classic food use is in split pea soup, though of course more innovative cooks have developed a greater repertoire of pea recipes. Pea seeds contain up to 25% crude protein, so they are much valued as livestock feed. Much of the prairie organic pea crop is exported, especially to Europe, but a small local market exists for food and especially for feed.

Field peas are best suited to black and grey soil zones on the prairie, where moisture is less limiting and high temperatures are less frequent. Field peas can be grown in the drier regions if seeded early to avoid excessive heat during flowering.

Field peas are often grown at a point in the rotation where nitrogen is limiting. Legumes are able

to partner with bacteria to obtain nitrogen from the air. This gives them a tremendous advantage against weeds in low nitrogen soils.

Field peas also withstand mechanical disturbance very well. When damaged, the pea plants are often able to re-grow from nodes underground. This gives

the pea another advantage in weedy fields, where harrowing, rod weeding or rotary hoeing can be used to good effect. Many producers feel that leafy peas are more competitive with weeds than the semi-leafless varieties, perhaps because they let less light through the canopy. Research results have been inconsistent. Semi-leafless peas often resist lodging better, and this too can improve weed competition.

Powdery mildew is a common disease of field peas in the prairies. Often considered minor by producers, it can reduce yields by 10–15% on average, and the release of spores during harvest can be a risk for combine fires and grain dust allergies. The easiest way to avoid powdery mildew is to select a resistant cultivar. Field peas are relatively free from insect attack, and are not a preferred food of grasshoppers.

Field peas can be used as forage at the early bloom stage, or for winter grazing on pea stubble. They can also be used as a valuable green manure.



Field peas contain up to 25% protein.

Usually the plant material is incorporated into the soil at early bloom. With adequate moisture, field peas can provide over 190 kg/ha (170 lb/ac.) of nitrogen and a yield of 30–40 bu/ac. Small-seeded peas, such as the 4010 forage pea, are available at a lower cost per acre.

Lentils

The lentil is a relatively recent introduction to the Canadian prairie. From humble beginnings in the 1970s, lentil production has grown to the point that Saskatchewan is now the world's leading exporter of lentils. Organic farmers produce a variety of lentil types, including large-seeded greens, medium-seeded greens, small-seeded greens, French greens and reds.

Lentils are primarily grown for food. Dhal, or split lentil, is a staple in India. Lentil recipes are abundant, and range from soups and salads to casseroles and baked goods. Because of their small size and flattened shape, lentils cook quickly. Lentils average 22% protein, and are an important source of fibre, vitamin A and a variety of minerals.

Lentils are best suited to brown and dark brown soils on the prairie. They are somewhat drought tolerant, but they do not tolerate flooding or waterlogged soil.

Lentils are a relatively short stature crop, and a notoriously poor weed competitor. They are best grown at a time in the rotation when weeds are under control, after a strong competitor such as fall rye, oat or barley, or following a green manure. Harrowing lentils is possible, but lentils are more susceptible to damage than field peas.



Lentils can suppress weeds when planted at high seeding rates.

Lentil breeding on the prairies has focused on disease resistance and quality. Today it is possible to find varieties, especially of reds, that have dual resistance to ascochyta and anthracnose. Beyond these varieties, disease is manageable through rotation, isolation and the use of high quality seed.

Lentils can be highly susceptible to grasshoppers, which are especially damaging at flowering. It is not recommended to grow lentils in years when there is a forecast for a high risk from grasshoppers.

Lentils are not generally grown for forage; the straw is of high feed quality, but the amounts produced are low. The very small-seeded black lentil was developed as a green manure. With adequate moisture, it can produce up to 145 kg/ha (130 lb/ac.) of nitrogen, at a relatively low cost per acre. A good yield is 25–30 bu/ac.

Dry beans, chickpeas and soybeans

Organic producers grow relatively few acres of dry beans, chickpeas and soybeans on the prairies. Dry beans and chickpeas are used almost exclusively as food; dry beans primarily in soups and chili; chickpeas primarily in hummus, falafels, salads and as flour. Soybeans are valuable in both the food and livestock feed markets.

These specialty pulses require special care. Dry beans are limited by temperature. The plants are very sensitive to frost at both seedling and seed set stages, and they require warm temperatures for active growth. Likewise, soybeans tend to require a longer, warmer season than is reliable on the prairies. Both are high-value, high-risk crops.

Chickpeas are better adapted to the drier brown and dark brown regions of the prairie. A major limitation with the chickpea is its susceptibility to disease, especially ascochyta. Organic producers rely on a disease prevention strategy, including

clean seed, rotation and isolation for success with this difficult crop.

Faba beans

Faba beans (also known as fava beans) are currently grown on few acres on the prairies, but recent breeding efforts may change that. The benefits of the faba bean have not been accessible to producers because the very large seed size results in a very high seed cost. The goal is to bring seed size down to that of a pea, with a seeding rate of one bushel/acre.

Faba beans have tremendous potential as a green manure. With adequate moisture, faba beans and associated bacteria can fix as much nitrogen as an established alfalfa or sweetclover stand, about 300 kg/ha (270 lb/ac.) of nitrogen. Most pulses will use available nitrogen from the soil before partnering to fix nitrogen. According to Bert Vandenberg, pulse breeder at the Crop Development Centre in Saskatoon, the faba bean always produces a positive nitrogen balance; it always adds nitrogen from fixation and is the most efficient nitrogen-fixer of the pulse crops.

Faba beans may be ideally suited for flexible cropping in cool and moist areas such as the black and grey soils. The plant has good frost tolerance, and can be harrowed after it reaches 5–15 cm (2–6 in.) in height. Faba beans

make excellent forage or high protein silage. If the plant is swathed for forage or silage in early August, and if there is late season moisture, it can continue to grow and fix nitrogen well into the fall. Alternately, if allowed to go to seed, it averages about 30% protein.

Dr. Vandenberg suggests that faba bean is “delectable” to grasshoppers, and suggests that it would make an excellent bait crop for lentils. A producer could seed lentils at the usual time in a grasshopper-prone area, then later seed the faba bean. At the stage when grasshoppers do the most damage to lentils (during flowering) the faba bean would be a much more attractive crop to the grasshoppers, deflecting them off the lentils.

Small-seeded, relatively inexpensive faba bean varieties will soon be available. Organic producers may just find them “faba-lous.”

Conclusion

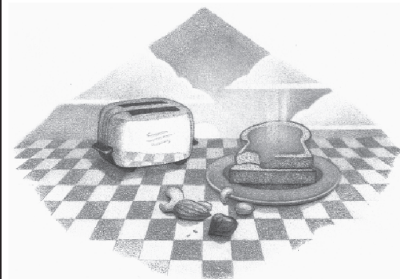
Pulses in partnership with bacteria can pull nitrogen from the air within the soil and incorporate it into plant tissue. This vital interaction provides a valuable, high-protein feed for us, for livestock and for the soil. On the prairies, there are several options that make the most of this pulse potential.

Brenda Frick, PhD, PAg is the Prairie Coordinator of the Organic Agriculture Centre of Canada, located at the University of Saskatchewan in Saskatoon. She welcomes your comments at 306-966-4975 or at brenda.frick@usask.ca. After publication, this article will be archived at oacc.info.

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