



## SOYBEANS

The production of soybeans in Canada has increased greatly under the stimulus of wartime requirements for oil and protein. In 1942 the acreage amounted to 46,000 acres, the largest ever produced in Canada. Most of this increase occurred in Ontario where 41,000 acres were grown. Increased acreages were also recorded in Quebec, Manitoba and British Columbia. It is confidently expected that when the value of soybeans as a commercial crop and also as a home-grown protein feed becomes more fully realized, a still further increase in acreage will occur in future years.

### Adaptation

Soybeans are best adapted to areas in which corn can be grown successfully. Like most other crops highest yields are usually secured on deep, fertile loam soils, but soybeans are a more satisfactory crop than corn and most other grains on the poorer soils. Soybeans will grow better than most legumes on distinctly acid soils, although under such conditions the application of lime is usually beneficial.

### Varieties

The varieties most commonly grown in Canada are:—

*Manitoba Brown*.—Very early, short, brown-seeded. Shatters badly when ripe.

Matures at Ottawa — 102 to 108 days.  
Average Yield at Ottawa — 20.4 bushels per acre.

*Pagoda*.—Very early, medium tall, yellow seeded.

Matures at Ottawa — 102 to 108 days.  
Average Yield at Ottawa — 22.7 bushels per acre.

*Kabott*.—Early, medium tall, yellow-seeded. Adapted to areas where the growing season is somewhat too short to mature Mandarin.

Matures at Ottawa — 113 to 118 days.  
Average Yield at Ottawa — 26.0 bushels per acre.

*Goldsoy*.—Early, medium tall, yellow-seeded. Has about the same adaptation as Kabott.

Matures at Ottawa — 116 to 121 days.  
Average Yield at Ottawa — 24.1 bushels per acre.

*Mandarin (Ottawa)*.—Medium maturing, tall, strong-strawed, yellow-seeded. Favoured by many growers throughout Ontario and in western Quebec.

Matures at Ottawa — 122 to 127 days.  
Average Yield at Ottawa — 29.5 bushels per acre.  
Matures at Harrow — 114 days.  
Average Yield at Ottawa — 24.6 bushels per acre.

*O.A.C. No. 211.*—Medium late, tall, yellow-seeded. Adapted to western Ontario.

Does not mature satisfactorily in eastern Ontario.

Matures at Ottawa — 138 days.  
Average Yield at Ottawa — 24.0 bushels per acre.  
Matures at Harrow — 125 days.  
Average Yield at Harrow — 31.1 bushels per acre.

*A.K. (Harrow).*—Late, very tall, yellow-seeded (light brown hilum). Adapted only to southwestern Ontario.

Matures at Harrow — 135 days.  
Average Yield at Harrow — 28.9 bushels per acre.

### Use on the Farm

**Seed.**—Soybean seed provides an excellent protein supplement for livestock. It is regarded as a satisfactory substitute for high-priced protein concentrates such as cottonseed meal and linseed oilmeal in feeding dairy cattle, beef cattle, sheep and brood cows. It cannot be used satisfactorily for feeding market hogs because the high oil content tends to produce soft carcasses.

Many Ontario farmers use from 15-18 per cent soybeans in grain rations for livestock. Most livestock men prefer to grind the seed before it is fed. In a few cases the mature unthreshed crop is fed in the sheaf. It is claimed that soybeans fed in the sheaf are usually thoroughly digested whereas threshed seeds fed without grinding sometimes pass through the digestive tract whole. It is a distinct advantage to be able to feed the beans whole since the ground beans tend to become rancid if allowed to stand for a considerable period.

It is sometimes difficult to grind soybeans alone in an ordinary grain grinder, but when they are first mixed with barley, oats or other coarse grains no difficulties are experienced.

Soybean meal, the residue left after the oil has been extracted from the beans at the oil mill, is used extensively in livestock rations. The meal is somewhat higher in protein than the whole seeds and contains less than 5 per cent oil as compared with 15-20 per cent in the seeds. Because of lower oil content the meal may be used safely to balance the grain rations of all classes of livestock including market hogs and poultry.

**Hay.**—Few annual legumes produce hay equal to that secured from soybeans provided the crop is harvested at the proper stage of maturity and is well cured. Because of the coarse stems the hay is somewhat more difficult to cure than alfalfa, but it can be handled satisfactorily by the same methods.

Soybeans are usually ready for harvest as hay about three months after seeding, consequently, they may be used successfully as an emergency hay crop in the event of failure of alfalfa, red clover, or other biennial or perennial legumes. The hay is regarded as being equal in feeding value to good alfalfa hay except that there is slightly more waste in feeding due to the relatively coarse stems. While the hay may be safely fed to all kinds of livestock it gives best result when fed in mixture with other roughages.

The highest yielding varieties for hay are usually the relatively late maturing sorts for the district. However, the varieties used for hay should be sufficiently early in maturity to permit of harvesting before the growing season is too far advanced and conditions unfavourable for curing hay.

**Soiling Crop.**—Soybeans may be harvested and fed green to supplement the rations of dairy cattle during dry midsummer periods when perennial pastures are relatively unproductive.

**Pasture.**—While soybeans provide a highly nutritious type of pasture they do not recover quickly when once grazed and consequently under average conditions they are not very productive.

**Ensilage.**—Soybeans alone do not make the best ensilage. However, in combination with corn they provide ensilage of high quality. For this purpose the two crops may be grown in mixture, or they may be grown separately and mixed in the proportion of about three parts of corn to one part of soybeans as they are put into the silo.

**Green Manure Crop.**—Like other legumes soybeans, when provided with the necessary root-nodule bacteria, have the ability to draw upon the nitrogen from the air. Hence, when an inoculated crop of soybeans is ploughed down the nitrogen content of the soil is increased. For best results, soybeans should be ploughed down not later than the flowering stage.

**Straw.**—Since most of the leaves fall from the soybean plant before it reaches maturity the straw consists chiefly of stem and pods. The straw of soybeans is nevertheless usually higher in protein and fat than the straw of wheat or oats and is superior to corn stover in feeding value.

### Cultural Practices

**Preparing the Soil.**—The seed-bed must be well prepared. Fall ploughing followed by cultivation early in the spring of the year to provide a fine, smooth seed-bed is essential. This should be followed by thorough shallow cultivation at intervals before seeding in order to destroy weeds.

**Use of Fertilizer.**—The soybean is a heavy feeder of phosphorus and potash and, unless the land is amply supplied with these minerals, the crop will benefit by an application of fertilizer (0-12-6 to 2-12-6) at the rate of 125 to 375 pounds per acre. The fertilizer is usually applied either broadcast or with the fertilizer attachment on a grain drill, just prior to the last working of the seed-bed. If the soybeans are sown in rows to permit cultivation, the fertilizer may be sown in bands on either side of the rows by using a corn planter fertilizer attachment. Germination may be definitely lowered if the fertilizer applied comes in direct contact with the seed.

**Cultivation of the Crop.**—Light harrowing following seeding, and just before the young plants break through the soil, aids in weed control and will destroy any crust which may have formed on the soil and which may cause damage to the young seedlings. After the crop is up, harrowing may be done from the time the plants are 2 inches high and continued at intervals until they are 6 inches high. A light harrow should be used and harrowing should be done in a direction crosswise to the drills or rows. Best results are derived from harrowing the crop during bright warm weather and preferably during the afternoons. After harrowing, cultivation between the spaced rows should be continued as necessary to control weeds.

### Seeding

**Rate.**—When sown in drills spaced 6 or 7 inches apart for hay production, about 1½ to 2 bushels of seed are required per acre. For seed production, rows spaced 28 inches to 30 inches apart have given best results. From 35 to 45 pounds of seed are required per acre in the widely spaced rows (one bushel=60 pounds).

**Time and Depth.**—The time of seeding for soybeans is about the same as for corn. The seeds should be covered not more than 1 to 1½ inches deep.

**Method.**—Seeding can be done satisfactorily with the ordinary grain drill.

**Inoculation.**—One of the most frequent causes of failure with soybeans is lack of proper inoculation. Culture containing the necessary bacteria for inoculating soybeans can be secured from many of the seed houses. Full instructions for applying the inoculum are supplied with the cultures.

### Harvesting

**The Hay Crop.**—The crop should be harvested for hay when the proportion of leaf is at a maximum. Soybean leaves are higher in protein than other parts of the plant except the seeds and it is therefore important not only to choose the time of maximum leaf production for harvesting but also to adopt those harvesting methods which will result in the minimum loss of leaf.

For hay of best quality harvesting should start soon after flowering or at latest when the seeds are about half developed. The methods that have been found most successful in harvesting and curing alfalfa hay may be applied successfully to the soybean crop. The usual method is to cut the crop with the mower, taking care to delay cutting in the morning until all the dew is dried off the plants. After the crop has been mowed it may be left in the swath for a day or until the leaves are thoroughly wilted then raked into windrows. After curing for two or three days in windrows the hay may be put up in small bunches to complete curing.

**The Seed Crop.**—Soybeans are admirably suited to harvesting with the combine harvester and this method has become very popular in southwestern Ontario. Combining not only brings about a great saving in time and labour, but the loss of seed from shattering is almost eliminated. Harvest when the crop is well ripened, that is, when the pods are dry and the seed hard, for seed with a high moisture content cannot be stored safely.

Where the combine is not available, harvesting is normally accomplished with the grain binder in the same manner as any other grain crop. The crop is ready for harvest when about 95 per cent of the leaves have fallen from the plants and the seeds are in hard dough stage. At this stage the pods are normally brown and dry. Loss of seed through shattering may be avoided by harvesting when the pods are slightly tough from dew. The sheaves should be made small and set up in small shocks to cure, or if the pods are dry and the seeds ripe and hard, threshing may take place immediately. The shorter varieties can sometimes be handled to advantage with a mower equipped with a bunching or windrowing attachment.

### Threshing

Threshing may be done satisfactorily with the ordinary grain separator. The following adjustments will help to prevent splitting of the seeds. Reduce the speed of the cylinder. Use blank concaves, pea grates or replace concaves with wooden blocks. The crop should be fed into the separator slowly.

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