

Soy Beans in North Dakota

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SOYBEAN production on farms in North Dakota is relatively new. Experiment Station tests which have been made show that in order to produce ripe beans for market only the earliest varieties can be used, and these may not always fully ripen before frost. Growing season temperatures, length of frost free period and seasonal rainfall are factors that have an important bearing on production of this crop in North Dakota. Climatic conditions that favor corn will be favorable to soybeans, which means that soybeans will have a better opportunity to do well and ripen in the southeastern counties than elsewhere in the State.

Minsoy is the earliest yellow variety readily available, yields relatively well but grows rather short and bears pods near the ground, making it a little more difficult to harvest efficiently. At Fargo, Minsoy usually blossoms in late July or early August. From 6 to 8 weeks, depending on the temperature, are usually required after blossoming to bring the crop to maturity. Manitoba Brown is a few days earlier than Minsoy but shatters readily. Pagoda and Kabbot have yellow seed, ripen slightly earlier than Minsoy and have a shorter stalk. Wisconsin Black blossoms a few days later than Minsoy and grows taller. Yellow beans have preference on the market. Habaro and Mandarin, yellow beans, are from a few to several days later than Minsoy, grow taller and are satisfactory when they can ripen completely. Varieties like Manchu and Illini are usually too late to ripen here. In Table 1 are recorded

the yields obtained from varieties grown under comparable conditions at the experiment station, Fargo.

Soybeans are rich in protein. Soybean meal is used extensively as a concentrate in livestock feeding. The soybean proteins are valued and used in an increasing number of industrial products. The oil content of soybeans is about half that of flaxseed. The oil has many uses, but the principal outlet is for the production of edible oils such as vegetable shortenings, oleomargarine and so-called lard compounds.

Soybean Hay

Growers planning to grow soybeans need to have in mind the limitations of the crop in this northern region. Perhaps most of those growing soybeans for the first time should rather consider this crop for the production of a high protein roughage or hay, that is a substitute for other high protein hays, like alfalfa and sweet clover, when

Table 1. HOW SOYBEAN VARIETIES HAVE COMPARED IN YIELD. ¹ AT THE EXPERIMENT STATION, FARGO—VARIETIES ARRANGED IN ORDER OF THEIR EARLINESS

Variety	Yield—bushels of dry beans per acre							
	1922 to 1931	1935	1936	1937	1938	1939	1940	1935 to 1940
M 202 .....	....	13.0	6.1	11.8	4.7	9.8	12.9	9.7
Manitoba Brown .....	....	....	....	12.6	2.8	....	....	....
Pagoda .....	....	....	....	....	....	....	10.0	....
Kabbot .....	....	....	....	....	....	....	15.7	....
Minsoy	15.0	21.8	10.0	17.4	8.2	15.3	18.4	15.2
Wisconsin Black	12.4	21.6	6.2	17.8	6.2	11.7	12.2	12.6
Agron. No. 3 .....	....	....	....	....	6.6	13.5	15.0	....
Habaro ²	14.1	....	....	....	5.0	12.9	13.4	....
Chestnut	14.5	24.8	6.6	18.1	....	....	....	....
Manchu .....	....	6.5	8.7	15.2	5.6	13.4	11.1	10.1

¹ Planted in rows for cultivation, usually 30-inch spacing. No tests 1932 to 1934 inclusive. In recent years many other varieties have been grown in single rows for preliminary observations.

² Yellow seed with pale hilum. The 1922-31 average yield is from Mandarin.

these are not available. In the central states where soybeans are extensively grown, much of the soybean acreage is planted for hay. When hay is not needed, or when bean yields and prices appear more favorable, the crop is allowed to ripen. How satisfactory will soybeans be for hay in North Dakota? Will the crop yield sufficiently and will it fit into the needs and preferences on the individual farm?

In Table 2 are recorded comparative yields of soybeans and other annual hay crops, when grown under comparable conditions at Fargo. From this it can be seen that other crops will usually yield a larger tonnage of hay, but in yield of digestible protein soybeans rank high. A variety like Manchu should reach hay stage at Fargo in early September.

iest varieties. Chestnut and early strains of Manchu are later, leafy, grow taller and in the more favored sections of the State should reach a good hay stage before frost. Late strains of Manchu and Illini, commercial varieties now most commonly available, are still later.

(4) Plant in rows and cultivate to hold weeds in check. Soybeans start slowly, therefore do not compete well with early weeds. The regular grain drill, corn planter with proper plates, or sugar beet drill may be used for planting. Rows should be spaced to suit the cultivator that is to be used. The closer the rows, yet permitting effective cultivation for weed control, the better the yield is likely to be.

(5) Rate of planting depends upon the spacing between rows. Drop seeds from 1 to 2 inches apart.

Table 2. YIELDS OF SOY BEAN HAY IN COMPARISON WITH OTHER ANNUAL HAY CROPS GROWN IN 6" DRILLS, FARGO—ALSO CALCULATED YIELDS OF DIGESTIBLE PROTEIN AND TOTAL NUTRIENTS. ^a

	Comparable yields of hay (8 years) ^c		Calculated pounds per acre	
	Lbs. per acre	In % of Siberian	Digestible protein	Digestible nutrients ^d
Soybeans ^b	3742	52	389	1774
Siberian millet	7264	100	356	3530
German millet	7131	98	321	3451
Sudan grass	5908	81	242	2729
Early Black Amber	7766	107	264	3899

^a Using figures from Morrison's "Feeds and Feeding" for these calculations—85% dry matter.

^b Chestnut variety first 4 years—later Manchu.

^c 1928-39, omitting 1932-33 when soybeans were not grown.

^d Sum of digestible protein, carbohydrates and fat x 2.25

Suggestions for Growing Soybeans

To one growing soybeans for the first time these suggestions may be helpful:

(1) A warm, well drained soil, suitable for corn production will be satisfactory for soybeans. A fairly long and warm growing season will be most favorable. The crop stands drouth fairly well, but unless there is ample rainfall, yields will be low. Soybeans can be expected to do better in the southeastern counties than elsewhere in the State.

(2) Plant about corn planting time or a little later. Soybeans do not germinate or make rapid growth until the soil and surroundings are warm.

(3) Manitoba Brown, Pagoda, Kabbot, Minsoy, Wisconsin Black, Mandarin and Habaro are the earl-

This will require from 20 to 35 pounds of seed per acre, depending on how far apart the rows are and the size of the seed used. Plant about 1½ to 2 inches deep. Planting too deep, or in a crusted soil, may result in poor emergence and poor stand.

(6) Inoculation for the purpose of introducing the "soybean bacteria" into the soil is recommended for soils where soybeans have not been grown before. Only with these organisms present can soybeans obtain nitrogen from the air and function as a nitrogen storing crop. Without them the plant would have to draw exclusively on the nitrogen in the soil. The soybean is not regarded as efficient a "nitrogen storer" as sweet clover or alfalfa. Having a smaller root development in proportion to its top

growth, a smaller portion of the nitrogen gathered is left in the soil if the crop is removed.

(7) Cultivation to destroy weeds should be early and continue as necessary. In this way plant competition will be reduced and moisture conserved for use of the soybean plant.

(8) The crop may be cut for hay any time after blossoming, and until the lower leaves begin to yellow. The yield and quality of the hay will be highest when the plant is well podded and beans one-half or more developed. Because of our short season we may have to cut earlier, or soon after pods have formed, sacrificing some in yield in order to escape damage from frost, and to permit the crop to cure while there is satisfactory curing weather. Either a mower or the binder may be used for cutting. In handling, exercise care to avoid loss of leaves as much as possible. The hay should be valued for its high protein content and quality rather than for its yield.

(9) For the production of ripe beans to market the crop is ready to cut when the seed is hard, and the leaves practically all off. Small green wrinkled beans, as a result of cutting too early, or frosted beans, sell at a disadvantage on the market. The seed crop may be harvested with the regular binder and threshed with the ordinary grain thresher, or if non-shattering varieties are used the crop can stand until dry and combined direct. This appears to be an efficient way of harvesting the seed crop.

To prevent splitting or cracking of the beans in threshing, the use of

a larger diameter cylinder pulley, which will reduce the cylinder speed about one-half, but which maintains the rest of the machinery at normal speed, is advisable. Beans usually thresh easily and concaves should be adjusted accordingly. When beans are dry concaves often may be removed completely. Threshing machines that have the beater or rubbing type of cylinder as their threshing principle, are widely used where soybeans are extensively grown. Beans not sufficiently dry for safe storage, should be spread out, to permit occasional stirring and further drying out, thus avoiding heat damage.

(10) A light frost in the fall will destroy the leaves, yet may not completely kill the plant. Beans that had reached full size may not have been seriously injured by this frost, and will continue to "ripen" and take on color. Beans less advanced when the leaves were destroyed likewise may "ripen", but the beans will be small and the yield correspondingly reduced.

(11) Jackrabbits have a liking for growing soybeans and if numerous in a community may be very destructive in a small field. Grasshoppers can be very destructive at blossoming time, destroying the blossoms and preventing a good seed set.

(12) A soy bean crop leaves the surface soil fine, loose and somewhat dry, factors to be kept in mind if the crop is grown on soils that may blow easily. Cultivation that destroys weeds and conserves the moisture, however, has prepared the seedbed for the succeeding crop.

Races of Smut and Resistance of Hard Wheat Varieties

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COVERED smut or bunt in wheat may be prevented satisfactorily by cleaning and treating the seed. Varieties of wheat which are resistant to smut need not be treated for this disease but frequently should be treated to reduce seedling blight and other diseases. Some of our best wheat varieties are rather susceptible to smut. Marquis, Ceres, and Thatcher wheat are good