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Soy Beans in Iowa

Abstract

The Iowa Agricultural Experiment station has grown a number of different varieties of soy beans each year since 1910. It finds the crop very dependable, the better varieties producing yields of from 15 to 25 bushels of seed, or 2 1/2 to 3 1/2 tons of hay per acre In most seasons. The soy bean has a large number of uses as a hay crop, for seed, for silage, and for pasturing with com, and it is well suited to Iowa's climate and soil.

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IOWA AGRICULTURAL EXPERIMENT STATION
AGRONOMY SECTION
Farm Crops

SOY BEANS IN IOWA

By H. D. Hughes and F. S. Wilkins

The Iowa Agricultural Experiment station has grown a number of different varieties of soy beans each year since 1910. It finds the crop very dependable, the better varieties producing yields of from 15 to 25 bushels of seed, or 2½ to 3½ tons of hay per acre in most seasons. The soy bean has a large number of uses as a hay crop, for seed, for silage, and for pasturing with corn, and it is well suited to Iowa's climate and soil.

IMPORTANCE

IN CORN, FOR HOGGING DOWN, soy beans are rapidly increasing in popularity. Eighty-two Iowa county agents report that five times as many soy beans were grown in 1919 as in 1918 and that shortage of seed alone will limit a large increase in acreage in 1920. These same county agents report that 89 pct. of the soy beans were grown with corn and that the crop was either "hogged" or "sheeped" down or put into silo.

More extensive tests are needed before the Iowa station can state definitely that soy beans may be grown with corn for hogging down at a profit because of the possibility that the yield of beans will not make up for the decreased yield of corn. If the soy beans are well inoculated so as to draw on the air for the nitrogen they use, if the soil is fertile and if there is plenty of moisture they reduce the grain yield of corn less than if these favorable conditions are lacking. The experiment station has been growing soy beans with corn during the past five years but wishes to duplicate the work at several different points in the state during the coming season before making a more definite statement regarding the practice.

IN CORN FOR SILAGE OR SHEEPING DOWN, soy beans appear to be more profitable than for hogging down as indicated by results secured at the Iowa station. When soy beans are used in this way the grower is interested in total tonnage and feeding value per acre, while in the case of corn for hogging down he is interested mainly in total grain and bean yields and their feeding value.

ALONE FOR HAY soy beans have a distinct place in Iowa as a catch or emergency legume hay crop to be used when clover seedings fail. They may be seeded as late as June 15 with the assurance of a hay crop, the considerably larger yields are secured when planted earlier. Soy bean hay has a higher feeding value than red clover and compares favorably with alfalfa. It is particularly valuable for sheep but is readily eaten by all classes of livestock.

FOR SEED soy beans appear to be a profitable crop. It has not been possible during the past several years to supply the demand for seed of the varieties best suited for use in Iowa and this has also been true in adjoining states. The cost of growing soy bean seed per acre is but little greater than that of growing corn. Three leading varieties of soy beans at the Iowa Agricultural Experiment station have averaged 15.8 bushels per acre during the last four years on land not as rich as that of the average Iowa farm. Yields as high as 25 to 30 bushels per acre have not been uncommon.

CLIMATE, SOIL AND INOCULATION

Climatic requirements for soy beans are practically the same as for corn. The crop can be grown in any part of Iowa. It withstands drouth better than corn.

Soil conditions for maximum production are similar to those for corn. They may be grown on soils lower in nitrogen and organic matter than corn because when inoculated they may take their nitrogen largely from the air.

Inoculation is necessary when the soy bean bacteria are not already present, if the most profitable returns are to be secured. Soy beans will grow better than any other legume without inoculation, but if the bacteria are not present, large quantities of nitrogen are taken from the soil, which might come from the air, and the percentage of protein in the plant is reduced.

METHOD OF INOCULATION

SOIL INOCULATION is the surest method when soil can be secured from a soy bean field where nodules were present on the plants the preceding year. In this method, from 300 to 500 pounds of soil per acre are scattered on the land on a cloudy day or late in the afternoon and harrowed in at once. Sunshine kills the bacteria. It usually is not possible to secure inoculated soil and even when it is available the expense often makes the method inadvisable.

GLUE OR SUGAR SOLUTION inoculation is applied by moistening the beans with the solution to make the beans sticky, after which inoculated soil is scattered over them. The beans are then stirred until each bean is covered with soil. This method requires considerably less labor than the soil transfer method.

CULTURE inoculation is recommended in the absence of inoculated soil. Cultures for soy beans can be obtained from most seed companies. The shorter the period of time from the laboratory preparation to use of the culture, the better. It is easily applied according to directions which are always supplied with the culture.

VARIETIES

During the past five years 68 different varieties of soy beans have been compared in the variety tests. Unfortunately, all of the varieties considered were not in test each year, which makes it impossible to rank them definitely as to yield.

SEED PRODUCTION is an important consideration when comparing varieties. Manchu, Black Eyebrow, Chestnut, Minnesota 166, Minnesota 167, Habaro, Early Yellow, Ito San and Elton have given the largest yields of seed in about the order named. These varieties will mature seed in any part of the state in an average season.

HOGGING DOWN varieties are wanted which will produce the largest yields of beans and which will mature about the same time the corn is ready for the hogs. Therefore the above seed varieties are the best which can be recommended. A small percentage of growers prefer the plants to be green with pods nearly filled when they turn in the hogs.

HAY—Medium Green, Wilson, Roosevelt, Peking, Stone's Ensilage, Ohio 7496, Mongol, Medium Yellow, Ebony, Manchu, and Black Eyebrow have given the largest yields of hay in about the order indicated. The highest yielding hay varieties are too late in maturity to be depended upon to ripen a satisfactory seed crop in central Iowa. However, seed is often secured from Medium Green, Ebony, Mongol, and Roosevelt. Manchu and Black Eyebrow, two of the best seed varieties, are also high yielders for hay which makes them good all-purpose beans.

FOR SILAGE AND SHEEPING DOWN those varieties are best which give the largest yields and which have the pods well filled and the leaves beginning to turn yellow at about the time the corn is ready for silage. The hay varieties, therefore, are best for these purposes.

MATURITY is an important consideration when comparing different varieties. The varieties discussed above have been grouped according to maturity and this grouping will be of value when the varieties are considered for different purposes in different parts of the state.

<i>Early</i>	<i>Medium Early</i>	<i>Medium Late</i>	<i>Late</i>
Chestnut	Elton	Medium Green	Wilson
Habaro	Black Eyebrow	Ebony	Peking
Minn. 166	Manchu	Mongol	
Minn. 167		Roosevelt	
Ito San		Medium Yellow	
Early Yellow			

SEEDING

SEEDBED PREPARATION is the same as for corn. Thoro cultivation just before planting to give the beans a start over the weeds is very important.

TIME OF SEEDING, in general, is the same as for corn. Tests made at the Iowa station the past three years, extending from April 18 to July 4, indicate that best results may be expected when soy beans are planted between May 1 and 20. Early planting is apt to give the weeds a start, while late planting is likely to result in poor germination because of drier soil. Soy beans germinate very quickly in a warm and moist soil. Late planting also results in average maturing varieties being caught by frost when grown for seed. They may be planted as late as June 15 with the assurance of a hay crop under average conditions.

METHOD OF SEEDING

Method of seeding tests have been conducted at the Iowa Agricultural Experiment Station during the past three years.

WITH CORN. The beans and corn are planted in the same rows and at the same time. The corn may be checked and the beans either checked with the corn or drilled, or both the corn and the beans may be drilled. Results indicate that on ground comparatively free of weeds the yield of corn is likely to be greater when both the beans and corn are drilled than when both are checked. On account of weeds, check rowing both crops usually will be most satisfactory. Growers are almost unanimous in reporting that they do not get satisfactory stands by mixing corn and beans in the planter boxes and are therefore securing special bean attachments for their corn planters. These may be had for most makes of planters.

FOR SEED OR HAY soy beans may be grown either in rows or seeded solid. The highest yields usually have been obtained with the beans grown in 30 to 42 inch rows. The largest yields have been secured at the Iowa station by planting in 30-inch rows. It is a little harder to cultivate the beans in the narrow rows, however. Planting in 21-inch rows gave high yields but difficulty in cultivation makes this width of row impractical.

On well drained soil free from weeds higher yields have been obtained when the soy beans were drilled like small grain and cultivated with the weeder or harrow, than when they were planted in cultivated rows. Drilling has given somewhat higher yields than broadcasting. Beans drilled in 8-inch rows have yielded about the same as those drilled in 16-inch rows. Drilling like small grain is usually advisable for hay production because the crop can be cut and cured much more easily. When in cultivated rows soil is picked up with the rake and also the hay is difficult to cure on the loose, bare ground.

RATE OF SEEDING

Rate of seeding tests for soy beans in corn or alone for hay or seed have extended over a 3-year period at the Iowa Experiment station.

IN CORN the indications are that the beans should not be seeded thicker than at the rate of 4 beans per three stalk hill of corn, while 3 beans may be better. Heavier rates of planting are likely to seriously reduce the yield of corn. A three-bean per hill rate of seeding requires from 3 to 5 pounds of seed per acre.

IN ROWS for hay or seed as much as one bushel (60 pounds) of average sized beans may be seeded per acre profitably. This rate distributes the beans about one inch apart in the row and with good seed and average conditions for germination the plants will average about 1½ inches apart. From 30 to 45 pounds of seed per acre is the rate usually recommended and with seed costing six to eight dollars per bushel it is hardly advisable to seed heavier.

DRILLED LIKE SMALL GRAIN for hay or seed the use of less than one bushel of seed to the acre is not advisable. A profitable increase in yield has been secured when seed has been sowed as heavily as two bushels per acre when beans were grown for seed.

DEPTH OF SEEDING varies with the kind of soil and moisture present. Soy beans should not be seeded deeper than one inch unless the soil is of a sandy nature or the ground is dry. It is difficult for the young plants to push thru the ground if planted too deeply. Shallow planting when the soil is just dry enough to work nicely results in the best stands.

CULTIVATION

IN ROWS the crop is cared for in a manner similar to corn. The importance of a weed-free seedbed can not be over-emphasized. Harrowing before the beans come thru the ground is strongly recommended. It is advisable to run a weeder or harrow crosswise of the rows while the beans are between three and six inches high. Few will be broken if this work is done in the afternoon when the plants are least brittle. Harrowing when the plants are just coming thru the ground breaks off too many.

DRILLED LIKE SMALL GRAIN, the same treatment is required except that more harrowings or weedings are necessary to take the place of the row cultivation. Success with this method lies in starting with a weed-free seedbed and keeping the field free from weeds.

HARVESTING

FOR SEED, the beans may best be cut and bound with the grain binder when the pods are nearly ripe. At this stage about three-fourths of the leaves will have fallen from most varieties. The beans are easily shocked and are not injured by the ordinary seasonal rains. As the crop shatters rather easily it is a good plan not to delay cutting until the beans are dead ripe. Shattered beans may be cleaned up by turning hogs into the stubble.

FOR HAY, the beans are cut and handled similarly to other hay crops. When seeded in cultivated rows some difficulty is usually experienced in cutting, raking and curing because of having loose, bare ground on which to work. A bunching attachment for the mower is a help. When seeded solid these difficulties are eliminated except that the hay is a little more difficult to cure than ordinary hay crops because of its rather high moisture content.

Soy beans are best cut for hay when the leaves begin to turn yellow. At this stage the pods will be nearly filled. Earlier cutting gives a lower feeding yield per acre, while cutting later results in woody stems. Raking and cocking before the leaves are quite dry prevents loss of leaves which are by far the most valuable part of the hay.

THRESHING

Soy beans can be threshed with the grain separator by removing the concaves and reducing the speed of the cylinder one-half, while the rest of the machine is run at the regular rate of speed. This requires two extra pulleys and most threshing machine companies can supply these.

A home-made bean thresher which may be used satisfactorily to handle several acres can be made out of a box and a manure spreader beater at a cost as low as \$15. The Agricultural Engineering section will be glad to furnish blue prints and specifications for a more durable machine which will not cost over \$30.

Small bean and pea threshers with a capacity of ten bushels an hour can be bought for as little as \$115. The crop threshes very easily and an acre or two could be flailed out in a short time.

COW PEAS

Cow peas have been grown at the Iowa Experiment station every season for the last ten years. The crop is not suited to the climate of this state and cannot be grown profitably. For hay or forage of any kind they are greatly surpassed by soy beans.