

University of Nebraska - Lincoln

DigitalCommons@University of Nebraska - Lincoln

---

Historical Materials from University of  
Nebraska-Lincoln Extension

Extension

---

4-1923

## EC121 Soybeans in Nebraska

P. H. Stewart

D. L. Gross

Follow this and additional works at: <https://digitalcommons.unl.edu/extensionhist>

---

Stewart, P. H. and Gross, D. L., "EC121 Soybeans in Nebraska" (1923). *Historical Materials from University of Nebraska-Lincoln Extension*. 2094.

<https://digitalcommons.unl.edu/extensionhist/2094>

This Article is brought to you for free and open access by the Extension at DigitalCommons@University of Nebraska - Lincoln. It has been accepted for inclusion in Historical Materials from University of Nebraska-Lincoln Extension by an authorized administrator of DigitalCommons@University of Nebraska - Lincoln.

17  
AGRI

S

85

E7

#121

THE UNIVERSITY OF NEBRASKA  
AGRICULTURAL COLLEGE EXTENSION SERVICE

April, 1923

Extension Circular 121

# Soybeans in Nebraska



RECEIVED  
DEC 2 1970  
COLLEGE OF AGRICULTURE  
LIBRARY

EXTENSION  
FILE  
AGRI

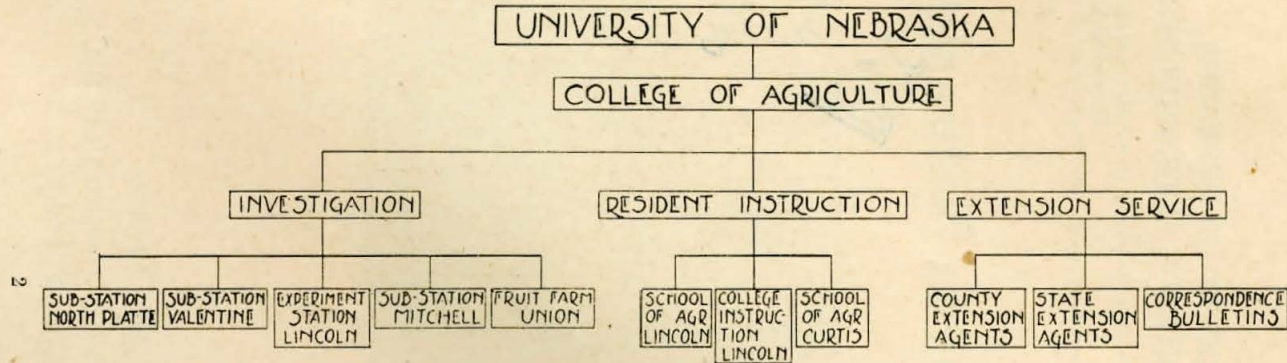
UNITED STATES  
DEPARTMENT OF AGRICULTURE  
COOPERATING

UNIVERSITY OF NEBRASKA-LINCOLN



R02378 94068

## THE COLLEGE OF AGRICULTURE AND ITS ACTIVITIES



This chart shows in graphic form the organization of the College of Agriculture. It is one of ten colleges in the University of Nebraska, but has its own campus and buildings at Lincoln, besides experimental farms in various parts of the State. In addition to the customary instructional work of a college, it is responsible for experimental investigation and agricultural extension work. The instructional work includes instruction of university grade at Lincoln, instruction of high school grade thru the Nebraska School of Agriculture at Curtis. Experimental work and farming investigations are carried on at the main farm at Lincoln, and substations at North Platte, Valentine, and Mitchell, and at the fruit farm at Union. The Agricultural Extension Service represents the intimate contact between the college and the farmers of the State. This includes demonstrations by county and state extension agents, the distribution of bulletins, and practical service to the farmer, such as the answering of inquiries by mail.



# SOYBEANS IN NEBRASKA\*

P. H. STEWART and D. L. GROSS

Soybeans are a relatively new farm crop for Nebraska. The interest in the crop is increasing and has resulted in many requests for information. Reports from a large number of farmers, covering the past three seasons, indicate that the growing of soybeans particularly for pasturing off, may develop into a common practice in eastern Nebraska. Many adverse reports regarding soybeans can be traced to poor seed and unadapted varieties and to the lack of knowledge of and experience with the crop and its management.

The soybean, like the clovers and alfalfa, is a legume. Although the growth habits of plants of different varieties vary somewhat, the typical plant is an upright, branched, bush-like annual, varying in height from 1½ to 4 feet. The seed is produced in clusters of small pods containing from 2 to 4 seeds each. The root is rather short and woody.

## ADAPTATION

*Climatic.* In general soybeans have about the same climatic adaptation as corn. The length of the growing season varies considerably with the different varieties and it is, therefore, important to get suitable varieties for any particular section. The earliest varieties will usually mature even in northwestern Nebraska. Soybeans are rather drought resistant and could be grown more extensively in the drier sections of the state were it not for the fact that rabbits, which are usually more numerous in the western part of the state, are very fond of them and are apt to do considerable damage, especially to small patches. Hot winds occurring at the time the pods are filling usually result in but little seed being formed.

*Soils.* Soybeans do best on good corn soils. They can be grown on heavy clayey soils and also do well on light sandy soils. Trials by farmers indicate that soybeans when grown

\*During the past three years the Agronomy Department of the Agricultural College has supplied approximately 200 lots of soybeans to farmers for trials. This circular is largely based on reports and observations of these trials and data from the Agricultural College.

alone do well on the sandy soils bordering the sand hill region. Because of the large seed it is easier to get a stand of them on such soils than it is of smaller seeded crops. Further tests of this crop should be made in this part of the state.

#### USES OF SOYBEANS

Soybeans are grown primarily for hogging off and for grain, and to a slight extent for silage, soil building and hay purposes.

*Soybeans in Corn for Hogging Off.* The chief object of growing soybeans with corn to be pastured off by hogs or



FIG. 1.—Soybeans grown in rows for grain.

sheep is to balance the ration by supplying the protein feed to supplement the corn. Two general plans may be followed. The soybeans may be planted in the same row with the corn or separately in alternate rows, or in blocks of several rows in different parts of the field. When they are planted in the corn row, they may reduce the yield of corn somewhat, especially during the dry years. The feeding value of the combined crop is probably greater, however, than of corn grown alone. Due to lack of moisture to mature the combined crop, the practice of growing soybeans in corn seems to be best adapted to the three eastern tiers of counties south of the Platte river and to the eastern four or five tiers north of the Platte. It



may be successful also in sub-irrigated valleys or other favorable localities in other counties. When grown with corn in regions producing large stalks, the shading of the corn plants often prevents the soybeans from making a satisfactory growth. Where climatic and soil conditions are such as to produce small stalks, there is less shading but such conditions may prevent a large growth of the combined crop. For this and other reasons discussed later, many farmers find it advisable to grow the soybeans in rows separate from the corn.

*Soybeans for Grain.* Soybeans have averaged 16 bushels per acre at the Nebraska Experiment Station during a long term of years. Occasional yields of as much as 35 bushels per acre have been secured by farmers in the eastern part of the state.

A study of the yields of soybeans compared with the standard grain crops indicate that, on the average, they will not be more profitable as a cash crop than the crops now being grown. Oats are generally recognized as being the least profitable of our grain crops. If soybeans ever replace any of the standard crops, it will probably be oats. In addition to the cash value of the crop, the effect on the soil and following crops must be considered. Since soybeans are a cultivated crop they demand attention at the same time as corn. This is one objection to growing them to any great extent as a grain crop in place of oats. If soybeans should replace oats it would probably be necessary to remove them in time to seed the land to fall wheat. Soybeans are high in protein and it would seem that farmers in eastern Nebraska might well grow a small acreage of soybeans to be used as a concentrated protein feed with corn.

There is a good demand for locally adapted seed and a few men in each locality should find it profitable to grow soybeans to supply this need. Commercial mills for the production of soybean oil and meal are being installed in the corn belt section.

*Soybeans for Silage.* The practice of growing soybeans for silage either alone or with corn is not common in Nebraska. It is practiced to some extent in other states where the longer frost-free season permits them to grow later and taller varieties, and where clover and alfalfa are less readily grown for protein feed. There is some trouble in binding the earlier, shorter varieties of beans with a corn binder when harvesting a mixture of corn and soybeans for the silo. Growing the crop separately and mixing them at the silo at the rate of three parts of corn to one part of soybeans seems better



than growing the two crops together. The soybeans being rich in protein tend to balance the high carbohydrate composition of the corn. Where alfalfa and the clovers are as easily grown as in Nebraska it is doubtful whether it will pay to grow soybeans for ensilage purposes.

*Soybeans for Soil Building.* Being a legume, soybeans are able to utilize the nitrogen of the air for at least part of their growth and have, in common with such crops as alfalfa and the clovers, a beneficial effect on the soil. Available data, however, indicate that the soybean crop leaves a smaller amount of nitrogen and organic matter in the soil than does



FIG. 2.—For the greatest yield of grain soybeans should be grown in rows and kept well cultivated to keep out the weeds.

clover or alfalfa. Observations of trials indicate that soybeans make a less satisfactory growth on poor run-down soil than do these other legumes. Soybeans on poor land must have the aid of nitrogen gathering bacteria on their roots or otherwise the growth will be small as with non-leguminous crops.

The average moisture limitations in Nebraska are such that it is not ordinarily advisable to seed soybeans for hay or green manure on plowed stubble fields after harvest. This practice is most likely to be successful in Missouri river counties and those in northeastern Nebraska where moisture conditions are most favorable.

*Soybeans for Hay.* Soybeans on ordinary soils will not compete with alfalfa or red clover as a hay crop. The yield is ordinarily about one-half that of alfalfa. When properly cured the hay is excellent forage and about equal to alfalfa and red clover in feeding value. Soybeans may be profitably grown for hay on sandy land and on rented farms where a legume hay is desired, but where there is no productive alfalfa or clover meadow.

#### VARIETIES

There are a great many varieties of soybeans, some of which are known by many different names. Sometimes the same name is applied to different varieties. Varieties for Nebraska must be fairly early maturing. Seed of late varieties predominates on the market and is cheaper, therefore care must be taken in buying seed to avoid substitution of late for early varieties. Although earliness is probably the most important characteristic of desirable varieties, they should also be upright, leafy, and nonshattering. If grown for hogging off purposes, they should produce light colored seed. It is believed that, for hogging off purposes, light colored beans are more readily seen on the ground and therefore are less apt to be lost. For purposes other than for grain, it is also an advantage to have varieties which retain their leaves at maturity. Table I gives the names and characteristics of some of the more important varieties that can be purchased commercially.



TABLE I. *Some Common Soybean Varieties, Their Characteristics, and Best Uses*

Name	Ave. Length of Growing Season in Days	Color of Seed	Growth Habit	Particularly Adapted for
<i>Early Varieties</i>				
Ito San, also known as Yellow, Me- dium Yellow, Dwarf Yellow, Early Yellow and Coffee Berry.....	105	Yellow with black speck at end of hilum	Erect stout bushy	Hogging off, grain or hay in northern sections
Aksarben .....	110	Yellow	Erect leafy stout	Hogging off, grain or hay
Black Eyebrow.....	110	Black with brown saddle	Stout erect	Hogging off, grain or hay
<i>Medium Varieties</i>				
Midwest, also known as Medium Yellow, Roosevelt, Banner, Mongol .....	115	Yellow	Erect stout	Hogging off, hay and grain
Manchu .....	115	Yellow	Erect stout bushy	Hogging off, grain or hay
Wilson .....	120	Black	Slender erect	Especially good in corn for silage, due to height. Rather late
Haberlandt .....	125	Yellow	Stout erect bushy	Good but late for Nebr. ordinarily
<i>Late Varieties</i>				
Morse .....	130	Yellow green	Stout erect	Especially good for hogging down. Pods close to ground makes it poor for silage
Mammoth Yellow.....	145	Straw yellow very large seed	Stout erect bushy	Often substituted for early varieties. Do not plant, too late for Nebr.

## INOCULATION

Soybeans, being a legume, naturally have on their roots bacterial nodules through which they are able to utilize in their growth nitrogen directly from the air. Without such bacteria, soybeans and other legumes take their entire supply of nitrogen from the soil. They will make a good growth on fertile soil without inoculation but will then obtain all of their nitrogen from the soil. Just to what extent soybeans should be artificially inoculated when planted has not been definitely determined for different parts of the state. At the Experiment Station at Lincoln, inoculation has not shown an increase in grain or forage and this is also true of most of the tests out in the state. Some farmers have reported increased yields due to inoculation. It would seem advisable to inoculate, at least a part of the seed, where soybeans are to be grown for the first time and observe the effects.

Inoculation may be made by scattering 300 to 400 pounds per acre of soil from a field which has grown inoculated beans. The soil should be transferred during a cool cloudy day and harrowed in immediately since the bright sunlight is injurious to the bacteria. Another soil method equally efficient is the thorough mixing of a bushel of beans with about one gallon of finely sifted inoculated soil. After soybeans have been grown on one field on the farm, soil from this field can be used to inoculate other fields.

Limited amounts of special cultures for inoculation may be secured free from the U. S. Department of Agriculture. Inoculating material may also be purchased from commercial firms. Directions for application accompany the material.

## SEED BED PREPARATION

In general, the seed bed preparation for soybeans grown alone or with corn is the same as that for corn. Soybeans start rather slowly and, when grown alone or in corn, are apt to be bothered considerably by weeds. Fields that are to be planted to soybeans should be worked early and often enough to sprout and kill as many weeds as possible. It is not advisable to plant soybeans on land that is very foul with weeds.

## TIME AND RATE OF PLANTING

In general, from May 10 to June 1, about the usual time for planting corn, is satisfactory for planting soybeans. If they are planted too early they may be damaged by late spring



frosts, while if planted too late they are not apt to mature. Planting while the soil is still cold may result in the beans germinating slowly. Consequently there will be more trouble with weeds.

Where soybeans are planted with corn, 6 to 8 pounds of beans are seeded per acre with the corn planted at the usual rate.

When planted in rows for grain, from 25 to 40 pounds of seed per acre is required, the amount depending on the size of seed and spacing of the rows. The plants should be spaced every 2 or 3 inches in rows that are about 35 inches apart and probably should be somewhat closer when the rows are 42 inches apart. When soybeans are planted in close rows as for hay or green manure as much as 80 pounds per acre should be used.

#### METHODS OF PLANTING

Various methods of planting are used, depending on the use that is to be made of the crop.

When planting soybeans with corn for hogging off the use of the corn planter with a special bean attachment is probably the best method. Satisfactory bean planting attachments costing from \$10.00 to \$20.00 can be bought for nearly all makes of corn planters. Many farmers report having used an ordinary corn planter by mixing the beans with the corn. Very few have found this method satisfactory since the beans, being round, soon work to the bottom of the box and crowd out the corn.

A popular method of planting a mixed field of corn and soybeans is to list the corn alone and follow by drilling the beans into the lister furrows with a corn planter. This plan is facilitated when a wide tread or two-row lister is used. Unless the land is level and the lister furrows straight and evenly spaced, the beans put in by the planter may not coincide exactly with the corn row, thereby causing trouble in cultivation.

The plan of planting rows of soybeans and rows of corn alternately or in blocks of several rows each is favored by many farmers who have tried it. When the rows are alternated the corn and soybeans are put in separate corn planter boxes which would make two rows of corn and two of soybeans for each round. With average yields it is estimated that for hogging off purposes there should be approximately

20 rows of corn to 4 rows of beans. The chief advantages of this plan are that the soybeans are not shaded so much by the corn and that weeds may be controlled more easily by cultivation as a result of having the corn and beans in separate rows. No extra machinery is needed in handling the crops in this way.

Soybeans for grain may be planted with a corn planter or a grain drill in which part of the holes are closed. The oat feed of the drill should be used. Most modern corn planters have special plates that can be used, or such plates can be prepared for planting soybeans. One objection to the corn planter is that the rows are rather far apart for maximum production. From the combined standpoints of both yield and ease of cultivation a spacing of 35 inches between rows is considered most practical.

Due to their manner of growth the cotyledons or seed halves are brought to the surface as first leaves, soybeans should not be planted very deep. They should be covered one or two inches deep in ordinary soil and somewhat deeper in sandy land. When soybeans are planted in lister furrows, heavy rains sometimes wash in considerable soil, burying the beans too deep.

It is not a successful practice in Nebraska to plant soybeans in corn at the time of the last cultivation.

#### CULTIVATION

If the soil should crust or bake after soybeans are planted and before they are up, harrowing with teeth set rather flat is advisable. Soybeans usually require three and sometimes four cultivations. Unless the land is clean and the weeds well under control, it may be necessary to hoe or weed by hand in addition to the cultivating. Extra care is necessary in cultivating soybeans planted with corn. The beans start somewhat slower than the corn and therefore, less dirt can be thrown at the first cultivation than when corn is grown alone. However, farmers report that this is not a serious difficulty and that on average land the weeds can successfully be kept down.

#### HOGGING OFF SOYBEANS

Early varieties of soybeans planted with a medium early variety of corn will ordinarily be in the right stage for pasturing off with hogs or sheep when the corn is well dented.



The soybeans should be in the dough stage with the leaves still retained when the animals are turned in. Some of the beans normally shatter but these, together with lost corn are picked up by the hogs after the field is pretty well pastured off. The majority of reports received from farmers indicate that the planting of beans in corn for hogging off is a good practice. This is particularly true when pastures of alfalfa and red clover are not available.



FIG. 3.—A group of Richardson county farmers investigating soybeans grown in blocks of several rows to be pastured off with the corn.

#### HARVESTING SOYBEANS

Soybeans grown for hay may be cut with a mower and cured in the swath and cock. They should be cut when the pods are fairly well filled and before the leaves begin to turn yellow and fall.

When grown for seed, they may be harvested with either a mower or a binder. If cut with a mower the use of a side delivery attachment will prevent the tramping out of beans on the next round. Where the acreage is small the plants may be forked aside by a man following the mower. An ordinary grain binder may be used successfully where upright varieties are grown. The seed crop is usually cut when the pods are a brownish black and most of the leaves have fallen. Some previous experience is necessary in order to

know just when to cut beans with a minimum loss by shattering.

### COMPOSITION OF SOYBEANS

Soybean hay and grain are both rich in protein and high in feeding value. Table II gives the digestible nutrients of soybeans as compared with some other crops and feeds. Soybean hay compares favorably in composition with that of alfalfa and the clovers. Recent feeding experiments at the Indiana Experiment Station have shown that soybeans and corn when fed to hogs along with a mineral supplement of 10 pounds of 16 per cent acid phosphate, 10 pounds of wood ashes and one pound of salt is equal to corn and tankage from the standpoint of cost and amount of gain. It has been proven in livestock feeding that the addition of a protein supplement adds greatly to the amount and cheapness of gain

TABLE II. *Relative Digestible Nutrients in Soybeans as Compared with Some Other Feeds*

Feed	Protein	Carbo- hydrates	Fat	Ash
	Percent	Percent	Percent	Percent
Soybeans (grain).....	30.7	22.8	14.4	5.3
Oats (grain).....	9.7	52.1	3.8	3.5
Corn (grain).....	7.5	67.8	4.6	1.5
Wheat bran (winter).....	12.2	40.9	2.9	6.3
Wheat shorts (standard).....	13.4	46.2	4.3	4.4
Oil meal (new process).....	31.7	37.9	2.8	5.6
Tankage (60 percent).....	58.7		12.6	10.5
Cottonseed meal (choice).....	37.0	21.8	8.6	6.2
Soybean hay .....	11.7	39.2	1.2	8.6
Clover hay (red).....	8.1	38.8	1.8	7.4
Alfalfa hay .....	10.6	39.0	0.9	8.6
Sweet clover hay.....	10.9	38.2	0.7	7.2
Timothy hay .....	3.0	42.8	1.2	4.9

(Data compiled from FEEDS AND FEEDING by Henry and Morrison.)

as compared to corn alone. In raising hogs the protein part of the ration can be supplied cheaply during the summer months by such crops as alfalfa, sweet clover and red clover pastures. In winter, these crops may be fed as hay to hogs being fattened for market but ordinarily this is not a common practice. Tankage, and other protein feeds are expensive and often are not purchased even though they would be profitable. It would, therefore, appear to be a good practice to



raise at least a few acres of soybeans for grain to be used as a supplement to corn in hog feeding. The Iowa Station also reports that ground soybeans are worth one-third more than oil meal as a supplementary feed for dairy cows.

### THRESHING

The usual way of threshing soybeans is with the common grain separator. In order not to crack the beans the cylinder should be slowed down about one-half and part or even all of the concaves removed with blanks substituted. The steam engine is usually more satisfactory than the gas engine as motive power since it can more easily be throttled down to slower speeds.

If beans are damp when stored, special care should be taken to see that they do not heat. Soybean seed loses its vitality rapidly after the first year. If the crop is to be used for seed purposes the split and cracked beans removed by a mill make excellent hog feed. The straw makes fairly good roughage for livestock.

Distributed in furtherance of cooperative agricultural extension work. Acts of May 8, 1914, and June 30, 1914. Extension Service of The University of Nebraska Agricultural College and U. S. Department of Agriculture cooperating. W. H. Brokaw, Director of Extension Service.

(April, 1923—10 M.)