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UNIVERSITY OF MISSOURI

COLLEGE OF AGRICULTURE



AGRICULTURAL EXTENSION SERVICE



COLUMBIA, MISSOURI

4-H Club Circular 74

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Growing Soybeans in Missouri

A 4-H Project



Level, fertile land is best for soybeans.

Although soybeans are one of the oldest cultivated crops, having been grown in China for 5,000 years, they appeared in Missouri only about 25 years ago. They are well suited to Missouri climate and soils; produce excellent hay, or grain that is especially needed in wartime; are a good "catch crop" for late planting on land where spring crops were destroyed or after small grain; and, finally, they are a safe crop, being

somewhat resistant to drought and free from serious insect and disease injury. As to their disadvantages, it must be considered that soybeans require planting each year while some other hay crops do not. Also, the hay requires careful handling for a high quality product. When soybeans are grown as a grain crop it is to be understood the grain is generally produced for sale, and it remains to be seen how good a cash

Recommended Varieties		
For Grain		For Hay
Planted at Normal Time	Planted Late or to be Followed With Small Grain	
	North Missouri	
Illini, Dunfield, Chief, Scioto, Manchu, Lincoln	Dunfield, Illini, Lincoln	Virginia, Wilson
	Central Missouri	
Chief, Scioto, Boone, Manchu	Illini, Dunfield, Manchu	Virginia, Wilson
	South Missouri	
Boone, Chief, Scioto, Manchu	Manchu	Virginia, Wilson
	Southeast Missouri	
Ralsoy, Arksoy Boone	Boone	Laredo, Virginia, Wilson

Grain varieties may be planted for hay successfully on very rich land, but they should be sown at heavy rates to insure good quality forage.

Choice and Preparation of Land

Unfortunately, soybeans are thought of too often as a "poor land" crop when they are not. This is especially noticeable when they are grown for grain. On medium fertile lands soybeans usually yield about one-third as many bushels of grain as corn but on good lands they often yield half as many bushels as corn. That is to say, on 30 bushel corn land a soybean yield of 10 bushels can be expected, but on 50 bushel corn land the soybean yield just as likely will fall between 20 and 25 bushels.

Soybeans have often been planted for hay where the land was too thin to grow most other legumes, but certainly the best hay crops do not result from this sort of management. Nor should this be taken as a reason for regarding soybeans as a crop for poor land.

Choice land for soybeans is reasonably level as well as fertile, else erosion is encouraged because soybeans tend to loosen the soil. If they are to be grown on sloping lands, they should by all means be contoured—planted across the slope—and wherever possible followed with fall sown small grain. And, when beans are being planted here for hay they should be drilled solid to help further prevent erosion. The use of terracing along with these other measures will permit growing

this crop on sloping land where otherwise the erosion loss would be too great.

Gumbo bottom lands are good for soybeans. These soils are level; they are benefitted by the loosening effect of soybeans to such extent that small grain can be planted afterward without costly land preparation; and, most important, soybean yields are comparatively higher than yields of most other crops on this type of land.

A good seedbed is one of the most important requirements for a satisfactory crop. The ideal is a seedbed that is smooth and mellow at the surface, firm and moist underneath, and free of weeds. To prepare such a seedbed the land should be plowed or disked six or eight weeks ahead of planting time. Then each time a weed crop sprouts, the land should be disked both to destroy these weeds and to settle the soil. Usually, about three such diskings are desirable. The last one, followed by rolling and harrowing as necessary for a smooth mellow surface, should come just ahead of planting. A seedbed prepared in this manner gives the young beans a head start on weeds.

Soil Treatments

As has been pointed out, soybeans do much better on fertile soil than on average or poor land. The dark-colored fertile lands whether bottom-land or upland regularly produce the most satisfactory crops.

Whether or not the grower has this sort of land to begin with, there are several practices which will generally increase his yield. Liming the land, preferably six

months or more ahead of the soybean crop, usually makes a striking difference. Turning under a good green manure crop like sweet clover or a heavy application of barnyard manure often increases yields one-half or more.

It is believed that when commercial fertilizer is used for this crop it should be applied as deep as practical, either by use of an attachment to the turning plow that places the fertilizer in the bottom of the furrow or by first broadcasting the fertilizer then turning it under when plowing the land. From 150 to 200 pounds per acre of 20% superphosphate or if the soil is lacking in potash 0-20-20 or 0-20-10 is the recommended application.

Time, Rate and Depth of Planting

The latter half of the corn planting season generally is the best time to plant soybeans. This gives a range extending from about May 10 to June 10 for the entire state.

With most grain varieties and under good conditions, 25 to 35 pounds of good seed per acre are considered the minimum rate for seeding in rows, and 60 to 75 pounds for solid drilling. For hay, 30 to 40 pounds of the Wilson or Virginia varieties or 20 to 35 pounds of the smaller seed Laredo variety are good rates for row planting. From 60 to 75 pounds of Wilson or Virginia or 40 to 50 pounds of Laredo should be used if the crop is drilled solid.

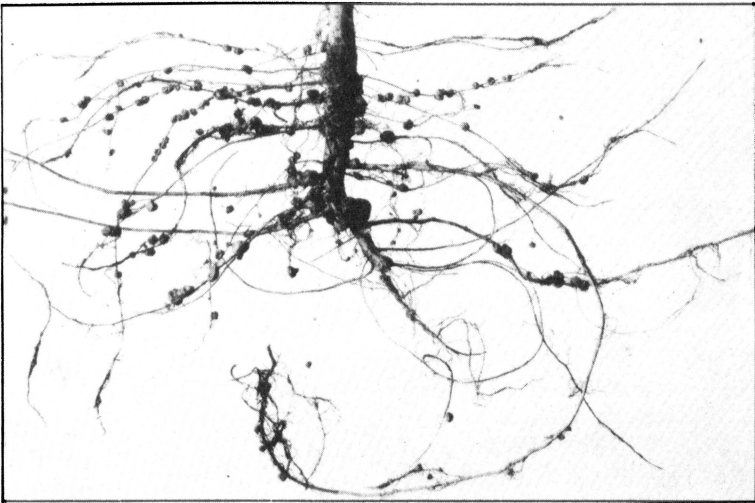
As to depth of planting, the aim should be to plant as shallow as possible, making sure the seed will be in contact with moist soil. Ordinarily, 1 to 1½ inches is a good depth on well prepared seedbeds.

Inoculation

Being a legume, soybeans can draw nitrogen, which is one of the most generally needed plant foods, from the air if provided with the bacteria that form nodules, the knot-like growth on the roots of the plants. Hence, the seed should be inoculated unless it is definitely known that soybeans having abundant nodules on their roots were grown in recent years on the field going to this crop. This means the seed should be treated with the proper bacteria.

Inoculation material (called commercial culture) along with directions for its use can be bought from the seed dealer or the Soils Depart-

ment, University of Missouri at Columbia. Or, culture can be obtained from a field that recently grew inoculated beans. In this case from one to two quarts of soil is used per bushel of beans inoculated. It either may be made into a thin mud and applied to the beans or the beans may be moistened then coated immediately with the dry, sifted soil. In either case, mixing should be so thorough that the beans are well-coated and neither the soil nor the seed, after treatment, should be exposed to direct sunlight because this destroys the inoculation very quickly. Planting should follow soon after treatment.



Bacteria living in nodules on the roots of soybeans draw nitrogen from the air, which is used by the plants. If these organisms are not present the plants take all their nitrogen from the soil the same as corn, wheat, and other non-legume crops.

Row Planting Compared with Drilling Solid

When soybeans are grown for hay on land that is reasonably free of weeds and of moderate or higher

fertility, solid drilling is preferred. On sloping lands, erosion will be less serious if the soybeans are drilled. Rowing of the hay crop is recommended only if the land is

poor or weeds very serious.

With soybeans grown for grain, row plantings is much surer than solid drilling. And weeds make the difference. Solid drilled grain crops will yield as heavily as the rowed crops only if the land is quite free of weeds. The rows should be wide enough to permit good cultivation with the equipment at hand. Soybeans in 36 to 42 inch rows, well cultivated, will yield more grain than beans in rows so narrow that cultivation is faulty. But if cultivators are available that permit planting in closer rows, spacing the rows 18 to 24 inches apart will, under favorable soil and seasonal conditions, give maximum yields.

The practice of "double rowing" with the corn planter is discouraged even though good yields sometime result on moderately fertile clean land. The fault in this method is that the rows are too close and irregular for good cultivation, yet too wide to keep down weeds.

Cultivation

If rains form a soil crust before the soybeans come up, cultivation should be started before the young plants have come through the ground. A rotary hoe or harrow is the best tool to break and stir this crust. However, if the plants are just breaking through when the crust forms, this cultivation had better be omitted as the plants are too likely to be damaged badly.

After the crop is up to a good stand, use of the rotary hoe or harrow should be continued as the only means of cultivation until the plants reach the height of six to eight inches. This is the best means of

keeping the rows as well as the middles clean. Harrowing should be directed across the rows and delayed until mid-morning when the beans are less likely to break than in early morning.

After soybeans have grown too tall for this sort of cultivation one or two row workings will still usually be needed. Sweeps should be used to make sure the cultivation will be shallow and level.

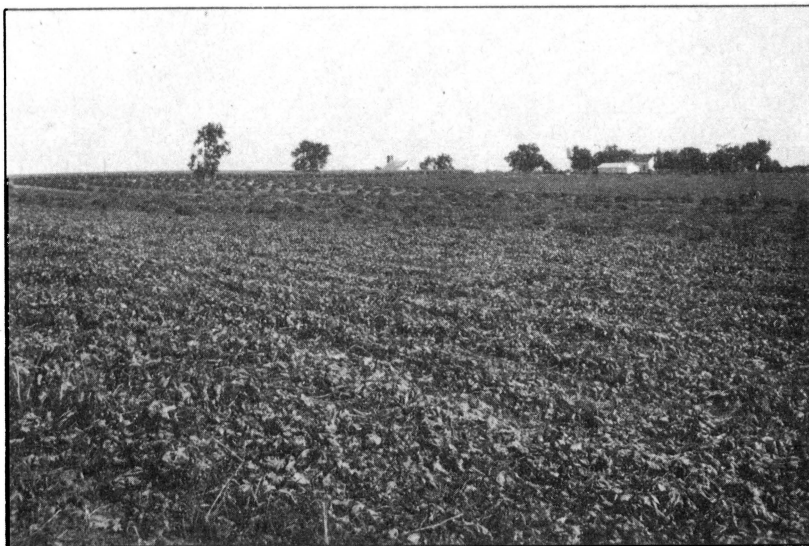
Harvesting

Combining is the all-round most satisfactory method of harvesting soybean seed. Yet the binder-thresher method has the advantage of permitting removal of the crop about two weeks earlier, which in turn permits seeding small grain on the soybean field sooner than if the combine is used.

For combining, the crop should be allowed to stand until the grain is as dry as possible without shattering. If the binder is used the crop need stand only until three-fourths the pods are ripe and most of the leaves have shed. The bundles should be made fairly small, tied loosely and placed in small shocks so drying will hasten.

The cylinder speed of the combine or thresher should be reduced to about 600 R.P.M. and the clearance between concaves and cylinder set wide to avoid splitting the grain.

Since soybeans heat in storage if they contain too much moisture—over 14%—they need close attention for a time following harvest. It is advisable to spread the grain no deeper than 12 to 18 inches on a wooden floor and to stir it at frequent intervals during the first few



The hay crop should be handled in such manner as to preserve the leaves and green color.

days of storage, unless the crop had very favorable conditions for ripening.

To produce green, leafy soybean hay the first step is to cut when the pods are no more than one-third to one-half filled and before the leaves have begun dropping. The hay should be allowed to lie in the swath long enough only to wilt thoroughly, otherwise, loss of color and possibly leaves is likely to result. Usually, the wilted hay is then raked into windrows where curing is completed. The side delivery rake is

particularly useful for this purpose because it forms a loose cylinder of hay in which curing occurs quickly. Also, in the case of rain these windrows can be rolled a half turn to promote drying with least disturbance of the hay.

Higher quality hay can be expected if it is brought together into narrow high shocks from the windrow when about three-fourths cured. However, this involves considerable extra work. When soybean hay is stacked it should be covered suitably else spoilage is likely to result.

RECORD BOOK

For Members in the 4-H Soybean Project



Name _____ Age _____

Address _____ County _____

Name of Club _____

Project Leader _____

Date Project Started _____ Date Completed _____

Requirements

Grow five or more acres of soybeans for hay or grain.

Summary of Club Activities

I attended _____ community club meetings

I attended _____ project meetings.

My club carried the following Supplementary Activities:

1. _____
2. _____
3. _____

I demonstrated at local _____, county _____, state _____ events.

I exhibited at local _____, county _____, state _____ events.

I attended County Achievement _____, District or State Round-up _____.

I improved my health habits as follows: _____

I helped with activities helpful to my community as follows: _____

My Production Goal

I hope to produce _____ bushels of grain soybeans or _____ tons of high quality soybean hay on _____ acres of land.

Practices to Use

I shall check in the left hand column below the practices I expect to follow in growing this crop. I shall check in the right hand column those that I did follow.

I expect to:

Fertilizing -

I did

- Test a sample of soil taken from my soybean field to determine the lime requirement
- Apply the amount of limestone needed before the ground is plowed...
- Apply the limestone needed on the plowed ground before planting
- Broadcast 200 pounds of mineral fertilizer (0-20-20, 0-20-10 or 0-20-0) to the acre and plow under.....
- Drill deep 200 pounds of mineral fertilizer after the land is plowed .
- Broadcast or drill 150 pounds of fertilizer to the acre and apply an additional 50 pounds to the acre in the row.....

Preparing Seedbed -

- Plow six or eight weeks ahead of planting time
- Disk two or three times before planting to control weed growth
- Roll and harrow just ahead of planting.....

Planting -

- Inoculate the seed.....
- Plant seed during last half of the corn planting season.....
- Plant Wilson, Virginia or Laredo varieties for hay.....
- Plant for grain one of the varieties recommended for this section of state by the Missouri College of Agriculture
- Plant in rows 36 to 42 inches apart or 18 to 24 inches if cultivator permits
- Drill solid at the rate of 60 to 75 pounds to the acre
- Plant in rows at the rate of 25 to 35 pounds to the acre or more
- Plant Laredo for hay at the rate of 40 to 50 pounds to the acre
- Put the seed 1 to 1 1/2 inches deep.....
- Plant rolling land on the contour.....

Cultivating -

- Break crust with rotary hoe or harrow if rain causes a crust to form before the plants come up
- Refrain from cultivating when the plants are breaking through the ground
- Cultivate with harrow or rotary hoe as often as necessary to control weeds until the beans are 6 to 8 inches tall
- Give one or two shallow cultivations with a cultivator after the beans are 8 inches high.....

Harvesting and Storing -

- Combine for grain when pods are dry but before seeds shatter
- Cut with binder when one-half the pods are ripe
- Store on wooden floor not deeper than 18 inches and stir frequently for the first few days
- Cut for hay when the bean is about one-third developed in the pod and before leaves drop
- Rake hay beans into windrows as soon as the plants are wilted
- Shock in high narrow shocks when the plants are about three-fourths cured.....
- Provide suitable cover if hay is stacked

I expect to:

I did

Protecting Soybean Stubble Land -

___ Seed stubble land without plowing to a fall sown crop ___

Using the Crop -

___ Feed the hay crop to _____

___ Sell the grain for commercial purposes.....

___ Sell grain for seed.....

___ Save _____ bushels of grain for seed.....

___ Make use of threshed soybean stems for feed and manure

Summary

Variety grown _____

Bushels produced _____ Value _____

Tons of hay produced _____ Value _____

Cost of seed _____, limestone _____, inoculation _____, fertilizer _____

Other cash expense _____. Total expense _____.

Some Things I Have Learned About
Growing Soybeans

Signed _____
(Member)

Approved by _____
(Leader)

UNIVERSITY OF MISSOURI COLLEGE OF AGRICULTURE AND THE UNITED
STATES DEPARTMENT OF AGRICULTURE COOPERATING

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