

FIELD BEANS for MINNESOTA

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SUPPLY AND DEMAND

In the United States from one to one and a quarter million of acres are devoted to the raising of field beans annually. The average yield per acre ranges from 10 to 12 bushels, resulting in a total crop of from 12 to 15 million bushels. Of this crop approximately one million bushels are exported, leaving from 11 to 14 million bushels for use in the United States. This provides approximately 6 pounds of beans per capita each year. On this basis there should be consumed in Minnesota approximately 250,000 bushels of beans annually. Only 100,000 bushels are produced in the state.

Beans are a relatively economical source of a part of the protein in the human ration, and as the population increases larger amounts will be needed to satisfy the demands. New ways of using beans are also being developed which will increase the consumption.

Where Field Beans Are Produced in Quantity

Michigan, California, New York, and Idaho lead in field bean production. Altho Minnesota has considerable areas of land well suited to field bean production, the acreage has increased very slowly. In 1923 and 1924 it averaged 10,000 acres with an average yield of 10.5 bushels per acre. An increase in acreage to 25,000 will provide only what is needed for consumption within the state. Conditions for growing this crop are not so favorable in some of the nearby states as in Minnesota. A good market can probably be found in these states for any surplus produced here.

Field Beans a Good Community Cash Crop

Over a period of years, field beans may be expected to yield approximately one-third as many bushels per acre as corn on the same land—an average of 10 to 12 bushels. On many farms yields of 20 bushels per acre are easily possible.

The cost per acre of producing field beans is approximately \$2.50 higher than that of producing corn, cut, shocked, and shredded. This difference is very largely because of the larger amount of seed necessary per acre for beans; and the old practice of one hand hoeing for beans which was not necessary for corn. Planting in hills and cultivating both ways does away with the necessity for hand hoeing.

The November 15 farm price of beans for Minnesota is not available, but for Wisconsin the three-year average is \$3.66 per bushel as compared with 83 cents for corn.

After local needs have been supplied, field beans can be marketed to advantage only in car lots.

In order to market beans to advantage, they should be produced in communities in quantities that will permit shipping them in car lots. Fifty to sixty acres of beans averaging 10 to 12 bushels per acre are required to produce a carload of 40,000 pounds.

Beans Aid in Diversification and Improvement

The field bean is a leguminous crop and hence can secure from the air a considerable portion of the nitrogen needed in its growth. It is a cultivated crop, and when properly cared for aids in ridding land of weeds and at the same time produces a valuable cash crop.

The crop is harvested in September. Winter wheat or rye may be drilled immediately after if the land has been well kept, without any further preparation for the seedbed. The cost of production of winter wheat or rye following this practice is lower than if fields must be plowed in preparation for seeding.

Varieties to Grow for Market

The small white bean is most in demand on the market, therefore is the best kind to grow for commercial purposes. The best available variety of this type is Robust, which was developed at the Michigan Agricultural Experiment Station. Its high yielding ability is due in part to its comparative freedom from diseases. It is medium early in maturity and ripens very evenly. The seeds are slightly larger than those of other small-seeded varieties, but are not discriminated against on the market. Snowflake and Vermont pea are less productive than Robust and not so resistant to disease. They are somewhat smaller seeded and under some conditions mature earlier than Robust.

For marketing, grow Robust beans. Secure seed that is guaranteed true to variety and free from anthracnose and weevil damage.

There is also a demand for Red Kidney and Brown Swedish beans. Both light and dark types of Red Kidney beans are in demand. The Red Kidney bean is approximately a week earlier than Robust but is usually not so productive. In the Brown Swedish group the round-seeded type is most commonly grown. It matures from ten days to two weeks earlier than Robust and is therefore better suited to planting in the northeastern section of the state.

Varieties for Home Use

In growing beans for home use, high yield is not the only important consideration. Flavor and appearance when cooked or baked may be the deciding considerations. White Wonder is a bean of somewhat better quality than Robust. Yellow Indian, a flattened kidney-shaped bean; Hansen, a mottled purple and slate colored bean; and Black Turtle Soup are brown when cooked or baked, retain their shape well, and offer some variety in flavor and texture. Each of these is worthy of trial on a small scale.

Seed Stocks Important

If beans are grown on a commercial scale the source of seed is important. The best stocks can usually be purchased from reliable seed growers.

It is very risky to plant beans sold from stores because neither the variety nor the place where they were produced can be known. When a satisfactory variety has been secured and a good crop has been produced, use home-grown seed.

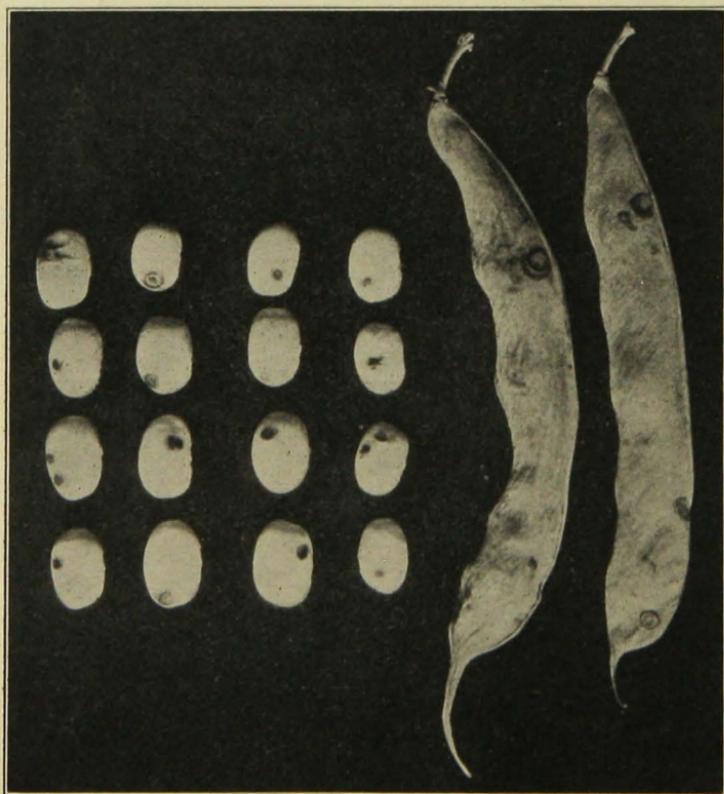


Fig. 1. Bean Pods and Seeds Showing Damage from Anthracnose

Such bean diseases as anthracnose and blight are carried on or in the seed, and appear as brown spots or blotches, as shown in Figure 1. Seed should be secured from fields where the plants are known to be vigorous and practically free from disease. Handpicking in preparation of seed beans for planting is always necessary to obtain uniformity and to eliminate the cracked and unsound seeds.

Weevil damage in seed or market beans is a very serious defect and every precaution should be taken to avoid it. The planting of even a few infested beans in a large lot will result in a very considerable damage in the harvested crop.

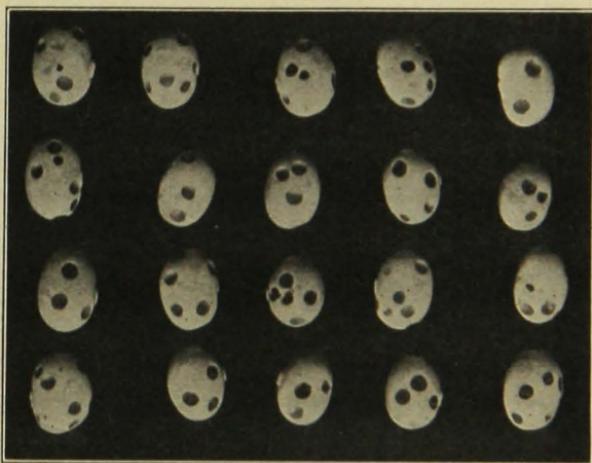


Fig. 2. Beans Showing Weevil Damage

A simple way to insure seed free from weevils is to store the dry seed over winter in a place that has no artificial heat. The cold will kill the weevils.

If the seed has been stored in a warm place and weevils are found in the spring, they may be killed by fumigation. Carbon tetrachloride is not inflammable and therefore is the safest fumigant to use. Forty pounds of carbon tetrachloride is necessary for each 1000 pounds of seed to be fumigated. Place the seed in tight barrels or other tight containers, pour the fumigant into shallow containers and set these on the beans. Cover as tight as possible for twenty-four hours. After the beans have been thoroly aired, no odor or taste of the fumigant can be detected.

Forty pounds per acre of small white beans and from 75 to 90 pounds of the larger beans such as Red Kidney, should be planted per acre.

Thin planting and uneven stands result in uneven maturity and low yields. Plant at least 40 pounds per acre of small white beans with a drill that will drop them evenly.

Soil for Beans

All the black loam lands in Minnesota that produce good crops of clover and corn, except those particularly deficient in lime, are suited to field beans. The lands in the west central and northwestern parts of the state are well supplied with lime and particularly well suited to field beans.

Even on slightly acid land they yield well. The climate in the northeastern part of the state averages too cool for commercial bean production, altho by planting early varieties beans can be produced for home use.

The sandy lands of the east central part of the state, many of which are more or less acid, are generally not so productive as the black loams of other sections of the state, but they usually produce one-third as many bushels of beans per acre as of rye or oats. At present Isanti county leads in the acreage devoted to field beans. At least two-thirds of the area of this county is very light sandy land. Ottertail, Todd, Sherburne, and Anoka counties rank next to Isanti in the acreage devoted to field beans and in each there is a very considerable acreage of sandy land.

Beans on sandy land yield well as compared with other crops. However, the yield is better on the more productive black loam soils.

Peat lands properly fertilized produce as good yields of field beans as black loams, but the danger of frost throughout the growing season makes them unsuited to the commercial growing of beans.

Grow Beans in Rotation

Bean diseases live over in the soil as well as in or on the seed. Therefore it is necessary to rotate beans regularly with other crops. Planting beans following a crop that leaves the land mellow and comparatively free from weeds—clover, alfalfa, or corn—makes it easier to keep the crop clean and results in larger yields per acre. High yields per acre without a proportionate increase in cost of production result in a greater net profit.

Preparation of Seedbed

Practically the entire bean seed pushes up through the soil as the young plants appear above ground, hence the necessity of having a more mellow seedbed for beans than is essential for grains or corn. Fall plowing or early spring plowing allows the soil to become firm underneath before planting and time for the necessary cultivation to clear the land of weeds. To keep the field free from all weeds, cultivation should be given each week or ten days or oftener if needed.

Beans are planted from two to three weeks later than corn. This gives additional time and opportunity to clear the land of weeds. It is much easier and less expensive to clear the land of weeds before planting the crop than after.

The disk and spring-tooth harrow are the best implements to use in stirring the soil so that it will mellow more rapidly and in killing

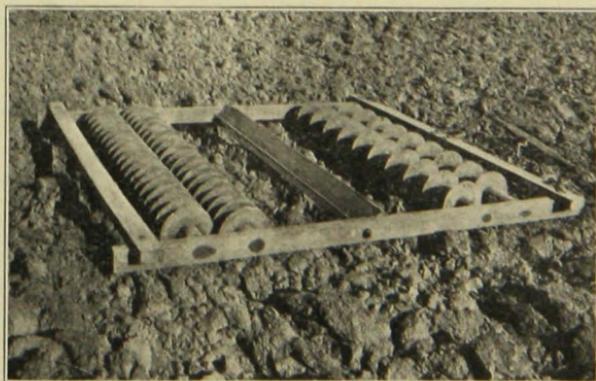
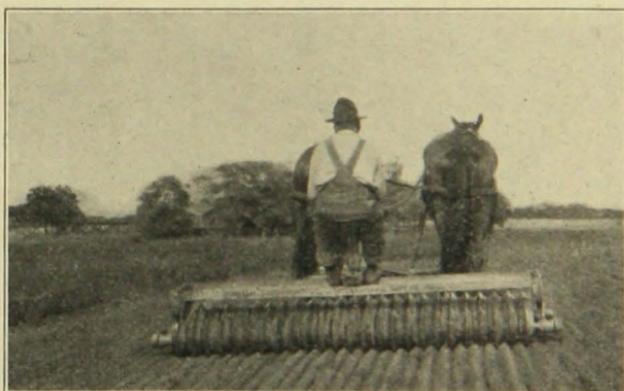


Fig. 3. Corrugated Roller Above. Meeker Harrow Below

weeds as they appear. The corrugated roller and Meeker harrow may be used immediately preceding planting to crush the clods and make the seedbed firm underneath and level and finely pulverized at the surface.

Time of Planting

Beans require a higher temperature for germination than corn and in the southern part of the state should be planted from two to three weeks later than the average date of planting corn in order to secure a quick, even germination and growth before the surface of the seedbed has become too hard. The best date will vary with weather conditions from May 20 to June 10.

Manner of Planting

Beans are usually drilled in rows from 28 to 30 inches apart with a seed each 2 to 3 inches in the drill row. Of the small white beans, this requires from 35 to 45 pounds of seed per acre. Planting in rows wider than 30 inches will result in lower yields per acre. Beans may also be planted in hills 30 inches apart each way 4 to 6 beans per hill, so that they may be cultivated both ways. This requires approximately 20 pounds of small white beans per acre.

The grain drill with the cups stopped to plant rows 30 inches apart may be used. A 16-cup disk or shoe drill with all but the first, sixth, eleventh, and sixteenth cups stopped will sow four rows at a time. A return marking arrangement similar to that used on a corn planter should be devised and used so that the space between the outside rows of each drill width may be spaced the right distance apart. The corn planter also may be used if the right plates are at hand or can be obtained. Whatever the implement used for planting, it should be carefully regulated before the planting season.

Very even distribution of the seed in order to secure a uniform stand is highly important from two standpoints: (1) higher yield and (2) more even maturity. An uneven stand results in low yields and considerable variation in maturity. Unevenness in maturity means more hand picking in preparing the seed for market.

In a well prepared mellow and moist seedbed, planting the beans an inch or an inch and a half deep is satisfactory and planting deeper will give poorer rather than better results. However, if the seedbed is dry deeper than the usual depth of planting, the beans must be below the dry layer and in the moist soil underneath. An even, quick germi-

nation and growth are desired, and to that end the time and depth of planting should be planned and carried out.

Cultivating the Crop

If a crust is formed on the surface of the seedbed before the beans come through, the harrow with the teeth properly adjusted to pulverize the surface may be used to advantage, preferably in the afternoon of a sunny day. As soon as the rows are visible the first cultivation should be given. It should be deep and as close as possible. Later cultivations should be shallow to avoid root pruning and given as needed to keep the weeds out and the land in good tilth.

Do not cultivate field beans when they are wet with dew or rain, in order to avoid the spreading of diseases.

Harvesting the Crop

The bean harvester is used in gathering beans grown on a commercial scale. This implement is shown in Figure 5. It cuts two rows

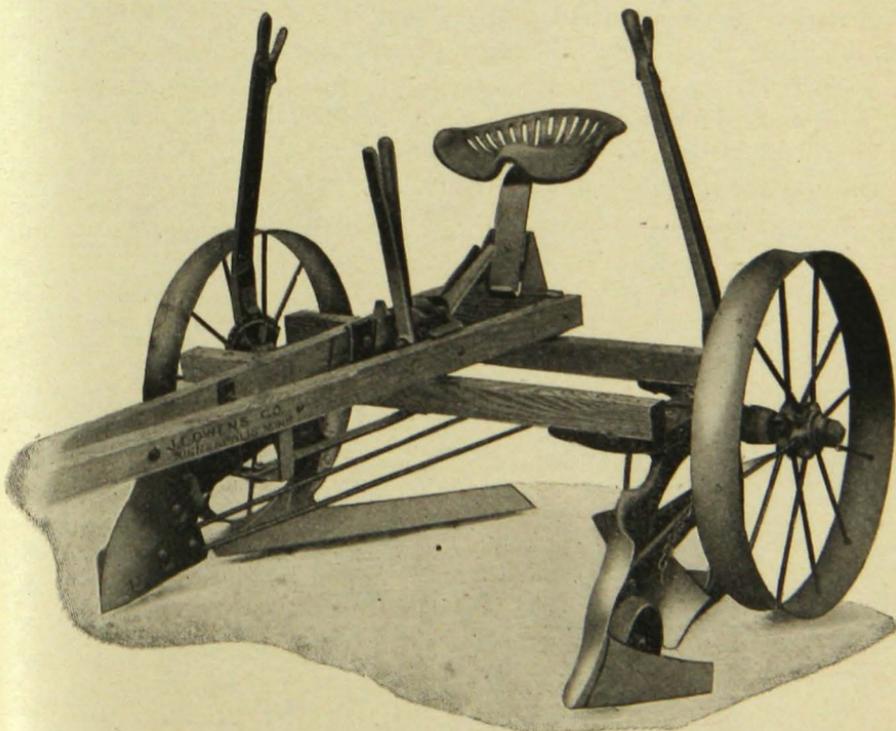


Figure 5. Bean Harvester

This cuts off the plants of two rows at a time just beneath the surface of the ground and leaves them in a single winrow.

of bean plants at a time just underneath the ground and leaves them in a single windrow. Only what can be cocked and stacked promptly should be harvested at a time so that no large acreage is lying on the ground at any one time. Less damage results to ripe standing beans when exposed to rain than to those lying in the windrow.

If beans are rained on in the swath, it is highly important to turn them as soon as the surface of the ground dries, to avoid discoloration of the seeds in the pods.

From the windrows the beans are placed in high narrow cocks after a half day of good drying weather. After the beans have dried in the cocks for several days they are hauled from the field and either threshed immediately, if weather is favorable, or stacked, preferably under cover. If stacks are built outdoors, a layer of straw 10 to 12 inches deep should be placed on the ground as a foundation to prevent discoloration of the beans. The tops of the stacks must be carefully covered with straw or hay to prevent water from getting in. Every operation should be timed to avoid undue exposure of the beans to rain, which always results in a high percentage of discolored beans with a consequent heavy expense in hand picking.

Special threshing machines, made in several sizes, are used to thresh the crops. The grain thresher cracks so many beans that it is not practical to use it, particularly for market stock.

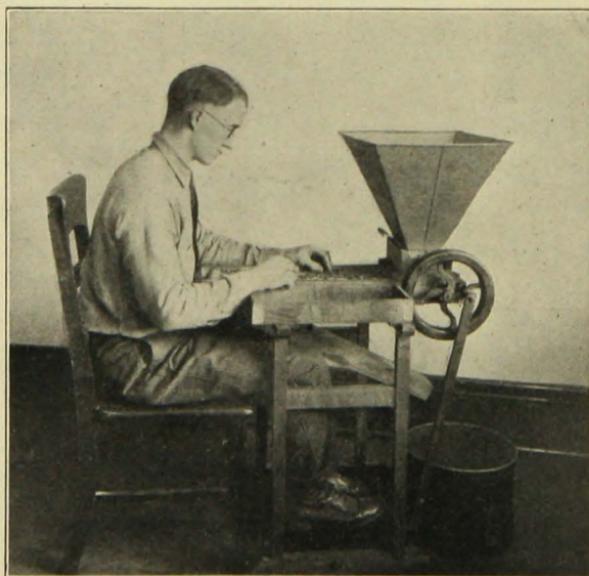


Fig. 5. The Use of this Simple Machine Makes Hand Picking Easy and Rapid

Feeding the By-products

Bean straw is relished by sheep, and cattle will consume small amounts of it. The discolored beans may also be fed. Cull beans may make up one-third of the ration of fattening lambs. Ground cull beans may make from one-tenth to one-fourth of the grain ration of dairy cows. For feeding to hogs, it is necessary to cook the beans for best results.

Marketing the Crop

Beans as they come from the thresher contain on an average 4 or 5 pounds per hundred of broken pods, cracked and discolored beans, dirt, and pebbles. While this is the average condition, every grower should try to handle the crop so efficiently that there will be no discolored beans. To put the average crop in shape for market, all undesirable material must be removed. If beans are grown in large quantities, mechanical pickers remove the small pebbles, but hand-picking is necessary to remove the discolored beans. The hand work is done by persons sitting at machines that convey the beans toward the operator on canvas belts. The rate of movement is under the

control of the operator. The discolored beans are picked out and the sound beans pass into the hopper underneath. Similar machines built on a small scale and operated by foot-power are available. This machine is shown in Figure 5.

Beans containing pebbles, small lumps of soil, or those that are discolored because of immaturity, weathering, or disease bring a low price and are usually produced at a loss.

Clean, sound beans—good prices, profitable production.

Until more country elevators are equipped to clean and pick the bean crop, it will be necessary to ship the machine-run crop to seed houses in the larger cities, where the finishing work may be done.