GROWING SNAP BEANS FOR MARKET AND FOR MANUFACTURE

by

A. G. B. Bouquet
Horticulturist (Vegetable Crops)

Federal Cooperative Extension Service
Oregon State College
Corvallis

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Wm. A. Schoenfeld, Director
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The word "snap" as applied to beans is based on the development of the pods in that they will snap or break readily when harvested. There are commonly three stages of development in the bean: snap, green shell, and dry. The word "string" beans, sometimes used to indicate the snap stage, is erroneous and should rightly be "stringless."

Importance of the Crop

Snap beans are grown widely for city markets and for manufacture. In 1938, according to statistics of the United States Department of Agriculture, 170,710 acres of snap beans were grown for city markets and for shipment, and 67,800 acres for manufacture. In Oregon beans are grown quite widely for canning and freezing. In 1938 it was estimated that there were 2240 acres of beans planted for manufacture and the total canned pack was 1,015,553 cases. In addition, 1,509,650 pounds of beans were frozen-packed in Oregon and Washington in 1938.

The acreage of beans grown in the U. S. for shipment was about 50,000 acres in excess of a ten year average of 1927 to 1936, while the increase in acreage for snap beans for manufacture was about 17,000 over the same ten year average.

While the acreage of beans grown for manufacture in Oregon is comparatively small compared with that in New York, Maryland, Wisconsin, and Michigan, nevertheless for the past 15 years or so Oregon has led all states in tonnage per acre. U. S. D. A. statistics show that while the average yield of beans for the United States is 1.75 tons per acre, Oregon is listed with 6.3 tons which is a conservative estimate (see discussion on yields). Possibly with one exception, more money is paid for beans in Oregon than in any other state of the union, the listed price for 1937 being $59.20 a ton with a somewhat lower price since that time.

Varieties

A variety of bean suitable for the open market and for manufacture should have certain definite characters; first, it should be prolific in yield so as to make it profitable to the grower in tonnage; second, it should be of the correct shape, color, and size in order to satisfy the trade; third, it should have good quality and flavor; fourth, the variety should be as nearly stringless as possible.
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Of the tall growing or pole varieties used for canning, the White Creaseback and Blue Lake are most widely produced. The former is a slightly earlier type of bean than the Blue Lake which is a later derivative of it. They are vigorous growers and produce well, often yielding in excess of 12 tons per acre. The pods are moderately straight and long and round, thus being readily handled by canning machinery. When the pods are picked in the proper condition they have excellent quality but may develop stringiness more quickly than some other pole varieties and thus their development for harvesting must be closely watched.

Another valuable pole bean is Kentucky Wonder which is most widely grown for the freezing trade and for city markets. It is a vigorous grower and a prolific producer. The pods are dark green and moderately long, slender, but more curved than those of Blue Lake. The beans will stay longer in the snap stage than many other pole varieties and the edible quality is unexcelled.

Valuable varieties in the striped or mottled pod class are Oregon Giant and Delicious Giant. Both of these varieties produce large pods in prolific quantities.

Of the bush varieties Stringless Refugee is most widely grown for manufacture. This is a productive bean, nearly round and cylindrical but having a somewhat undesirably light green color. The pods are stringless and without fiber. Being borne on a low growing plant they are more laboriously picked. Some strains such as Idaho and Wisconsin Refugee are resistant to mosaic which is a serious disease of the bean. (See diseases.)

Other useful and valuable varieties are Stringless Green Pod, Bountiful, Full Measure and Black Valentine. Tendergreen is a comparatively new sort.

Wax or yellow varieties can be grown in either the bush or pole form, a desirable wax bush bean being the Pencil Pod Black Wax and a useful pole variety being the Kentucky Wonder Wax.

Soils for Beans

Land for growing snap beans should be well drained, fertile, easy to work, retentive of moisture or else be suitable for irrigation. Any friable land that is naturally fertile or that has been built up to a good state of fertility will grow good yields of beans. Sandy loam and silt loam soils are preferred and in some cases beans are grown with excellent yields on organic soils that are well drained. The latter hold moisture well during the summer but the lighter lands must be irrigated in order that the plants produce heavily and bear beans of good quality. Soils that have been used for bean growing for a number of years do not continue to bear heavy yields unless the organic content of the soil is renewed and additional fertilizer is added. Impoverished soil can be detected by the meager growth of vines and the small yield of pods.
Fertilizers

Manure or cover crops are the best materials for adding organic matter and fertility to bean ground. Where manure cannot be obtained in sufficient quantities there should be a definite program of building up the organic matter with cover crops such as vetch, peas, barley, etc. Bean growers now producing high yields of beans consider the green manure program a valuable factor in maintaining good yields. In Extension Bulletin 506 directions are given regarding the type of cover crop to be grown, number of pounds of seed to be planted, etc.

Beans do not respond to liming unless the soil is fairly acid. They grow well in a soil reaction from 5.8 to 6.5.

Commercial fertilizers are commonly used to supplement the plant food contained in manure and cover crops. In the use of commercial fertilizer it is important to consider the relative number of units or per cents of nitrogen, phosphoric acid, and potash contained in a complete fertilizer if such is used; also, the materials that are put into the fertilizers, the total amount of the fertilizer applied per acre, and the manner of application.

In some instances, for example, a 4-12-4 fertilizer has been used with profit, being applied a few inches from the row at the time of seeding, in which case about 250 to 300 pounds of fertilizer are used per acre. In row fertilization the material is placed to one side of the seed row and slightly below the seed level. Some growers broadcast the fertilizer before seeding and in doing so apply 500 or more pounds per acre, working this into the ground during the final preparation of the soil. Ammoniated phosphorus 11-48, with or without some potash fertilizer, is frequently used. Subsequent applications of fertilizer may be made following the establishment of the plants and the appearance of the first pods. In view of the constant production of pods on the plants it is no doubt advisable to make some supplementary applications of commercial fertilizer as the season progresses.

In certain bean growing areas fertilizer trials of different materials have been conducted by the county agricultural agent in cooperation with growers. The results of these trials are obtainable in the office of the county agent who is in a position to make suggestions to bean growers regarding the use of various fertilizing materials.

Further details concerning fertilizers for beans and other vegetable crops are contained in Extension Bulletin 524 on "Fertilizers for Vegetable Crops."

Seed and Seeding

The yield and market quality of any variety of bean is very largely dependent on the particular strain of seed of the variety. The seed should come from a field that has been thoroughly rogued for plants and pods of an undesirable type. Flat pods are particularly distasteful to the manufacturer. It is especially important, too, that the seed be free from mosaic which is seed borne.
Bush beans are grown in continuous rows and the field is seeded with a hand seeder using approximately 60 pounds per acre. Distance between rows is usually 28 to 30 inches. The seeds should not be sown too thickly as the plants will produce more and better pods if they stand a few inches apart.

Pole beans are grown with the rows usually four feet apart and groups of plants every 24 inches or so. For this method of seeding about 20 pounds per acre is usually sufficient. Some growers use a combination fertilizer distributor and bean planter. The planting of pole beans for manufacture varies from early May to the middle of June depending upon when it is desirable to have the beans come to a stage of development for harvesting. Sometimes plantings which are delayed until the second week of June may miss hot weather during blossoming time. Ordinarily a period of from 72 to 80 days elapse between seeding and the first harvesting, but this varies according to the weather conditions and the varieties. For the home or market garden, plantings of bean seed may be made up to the 15th of July or so to provide a fall crop. Bush beans are useful in this respect, using Tendergreen, Stringless Green Pod or Pencil Pod Black Wax.

**Thinning and Training**

There will be no thinning in growing bush beans; and plants of the pole varieties are also rarely thinned, but this may depend upon the method of growing the crop. The plants persist in growing anti-clockwise. There are two general methods of training pole beans. In one method stakes, seven to eight feet long, are set two feet apart in rows four feet apart. At the top of the stakes from one to the other is tied a string to which the beans will adhere when they have reached the top of the stakes. In another method stout posts are set at the ends of the rows and between them at certain intervals are set up other posts 50 feet apart to which wire is attached at the top, strings being stretched from the plants themselves to the top wire. Between the posts are placed three props to hold up the wire. Some growers like this method of training the beans rather than the stake method, claiming that they are more readily seen when harvested.

**Maintenance of the Bean Area**

Four important things in caring for an area of land planted to snap beans include: first, cultivation for weed control; second, irrigation; third, insect and disease control; fourth, additional soil fertilization.

**Cultivation.** No more cultivation or soil stirring between the rows should be done than to control weeds and keep the soil in proper tilth during the growing season.

**Irrigation.** The irrigation of a bean field is necessary for the production of a high yield of pods of good quality. Beans are usually irrigated once every five to ten days depending upon the type of soil and weather conditions. Growers use the sprinkling method of irrigation for
an approximate period of 60 days during which the plants are watered. Some fields are irrigated by the gravity system, but most pole beans are watered by the overhead sprinkling method. Many fields in areas of canning beans are watered by rotary sprinklers, the water being distributed through portable or permanent lines of pipe. From 12 to 15 inches of equivalent rainfall are usually provided an acre of beans during the watering season.

One grower irrigating 18 acres of Blue Lake beans pumps and distributes the water by means of a 2 inch pump, 10 horsepower electric motor, 4 inch pipe for mains, and 2 inch pipe for laterals. This outfit operates 20 sprinklers at one time which are set at a distance of 66 x 78 feet, the total number of sprinklers covering approximately two acres. These sprinklers usually run about five hours at a setting. Another grower operates with a 7 1/2 horsepower motor, a 2 inch pump, 4 inch main, and 2 inch laterals having the rotary sprinklers set at 50 x 60 feet. An efficient set-up of rotary sprinklers can be obtained by spacing them at 60 x 60 feet on the diagonal.

It is especially important that the soil be well supplied with moisture during the peak of the blossoming season for this may be quite a factor in preventing the young beans from shriveling. In cooler weather blossoms and pods will develop normally contrasted with serious withering which may occur during high temperatures. (See blossom drop.)

Insect Control. There are several insects which do considerable damage to snap beans. First, the twelve spotted beetle is liable to do much early injury by chewing off the tender leaves of the young plants soon after they come through the ground. Later on these insects eat the leaves and pods of the plants. The pod injury is sometimes quite serious as there may be a heavy percentage of the pods with small holes eaten in them thus rendering them unfit for open marketing or manufacturing. When the bean plants are quite small the beetles, if not too numerous, may be held in check by using a pyrethrum dust, nicotine sulphate dust or hydrated lime dust. Later on as the plants get larger and the bean pods form, experiments indicate the following to be of value: leave trap rows, drive the beetle to trap rows by dusting with hydrated lime. Spray or dust these rows with pyrethrum spray or dust. Have about 10 rows between the two or three trap rows.

Black aphis are sometimes very injurious, particularly to pole beans, but usually can be controlled by using Black-leaf 40 spray or nicotine sulfate dust, applying this material as soon as the lice first appear. In warm weather nicotine dust is very effective. Most of the time the aphis are on the under sides of the leaves and the spray or dust must be applied thereto.

Symphylids are small, white, centipede-like animals which are more or less widely distributed through certain bean growing areas. They have caused considerable damage in the past and seem to be increasing in number and in the scope of land affected. Their underground habits make them difficult to control, and up to the present time there is no effective control measure known.
Diseases. Mosaic is a serious disease of the bean and inasmuch as it is seed borne it may appear anywhere. Seed should be obtained from regions where there is little or no mosaic present, or from fields where the plants are thoroughly rogued for the elimination of this disease. Mosaics of red clover, alsike clover and white sweet clover are all transmissible to the bean by means of the bean aphid. There are some strains of beans that have been bred resistant to mosaic, such as certain strains of Refugee. At the present time there are no mosaic resistant strains of Blue Lake or Kentucky Wonder.

Bean rust is common in many bean growing areas. It is a fungus disease which is liable to affect many different varieties of the common bean. As indicated by the name the fungus gives a rusty color, being most numerous on the under sides of the leaves but occurring often on the stems as well. While some varieties have proved somewhat resistant to this disease many of the popular varieties of beans grown commercially are seriously affected. Thus far, no definite control of rust on commercial acres is known.

Harvesting and Yields

The quality of any market variety is very largely dependent upon the time of picking and the development of the pods. It is important to pick beans before they become too large or the seed has started to swell inside of the pod. Some varieties remain longer on the vine without deteriorating than others. Varieties such as Blue Lake must be watched closely in order to have them harvested at the proper time. It is necessary to pick bean pods individually in order to leave on the vines those pods which are not yet large enough to be harvested but at the same time to be sure to pick those that have reached sufficient development. In this way the percentage of lower grades of beans may be reduced to a minimum. In view of the fact that the grower is paid on a graded basis, at least for beans for processing, it is necessary that there be clean and thorough picking of all pods ready to be harvested. In a well-picked field there will not be more than 10% culls.

The yields of beans vary largely according to the variety and type of soil. The bush sorts bear about one-third the tonnage of such varieties as Kentucky Wonder and Blue Lake. The latter yield from six to twelve tons per acre while the bush varieties bear up to three tons. In a crop of pole beans the per cent of number one grade may vary from 8 to 18% for a possible average of 12 to 15%, second grade from 53 to 60%, and the third grade 21 to 32%, or an average of 27%. These percentages will, of course, vary considerably with the season, variety, soil fertility, and moisture conditions.

Costs

These are divided into supplies, labor, and overhead items. Necessary supplies include seeds, stakes, twine, sacks, fertilizer, electric power and miscellaneous seeds, all totalling $50 or so. About five times the cost of supplies is incurred for labor costs including preparation of ground, planting, staking, cultivating, fertilizer application, picking, hauling, and cleaning up fields after the crop is over. Such labor items cost from $275 to $285 per acre. Miscellaneous overhead charges bring the total cost up to $350 or more.

Ten tons of beans per acre, at $50 per ton, should net the grower $100 or more per acre.