

Lima Beans

THE LIMA BEAN, generally known as the butterbean, is of importance because of the many forms in which it is used, its high food value, and the ease with which it may be grown. It is used fresh, as a canned product, in soup mixtures, and as a dried product. As a food it is relatively low in fat, but relatively high in protein, carbohydrates (sugars and starches), and minerals, such as calcium, iron, phosphorus, and potassium. It also contains important vitamins.

The percentage of each of these foods and the vitamins in the lima bean are indicated below:

	Fat	Protein	Carbohydrates	Calcium	Iron	Phosphorus	Potassium	Vitamins
Dried beans	1.5	18.1	65.9	.071	.007	.338	1.741	A, B
Green beans	.7	7.1	22.0	.028	.002	.133	.613	A, B, C

VARIETIES

There are many varieties and strains of both bush and pole lima beans, but under Alabama conditions the small- to medium-seeded varieties produce approximately twice as much as the large-seeded varieties. Four plantings of bush limas per year for four years, at Auburn, on soil of low to medium fertility made an average yield (green in the pod) of 4,500 pounds for the small- to medium-seeded varieties and 2,000 pounds for the large-seeded varieties. It is difficult to obtain a stand with the large-seeded varieties; the plants grow well and bloom profusely but set few pods. Many of the pods that set fail to develop seed.

Colored varieties, especially some of the colored pole varieties not commonly catalogued, tend to produce high yields as compared with the white varieties. The Henderson and Woods Prolific (white) and Jackson Wonder (colored) are good bush varieties. Carolina Sieva, Willow Leaf, and Yopps are good white-seeded pole varieties. The Florida Speckled is also a good pole variety.

The small-seeded varieties compare well in quality with the large-seeded varieties. The colored varieties are not considered to be as high in quality as the white-seeded varieties, mainly due to a rather strong flavor, a slight astringency, and a tendency toward a granular product.

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SOIL AND CULTURE

The lima bean makes its greatest yield on a moderately heavy, fertile soil, although it fruits a little earlier on light sandy, well-fertilized soil. The plants are not so easily injured by frost as plants of the snap bean, but the seeds germinate slowly, or not at all, when planted in a cold soil; therefore limas are usually planted a week or ten days later in the spring than snap beans. They should be planted as early as practicable because the earlier plantings usually produce much more than late plantings. The cotyledons (enlarged parts of the seed) push through the ground with the young plant, and for this reason it is necessary that the seed be planted in soil that has been thoroughly prepared.

Seeds of bush limas are usually planted in rows $2\frac{1}{2}$ to 3 feet apart and covered 1 to 2 inches deep. Pole varieties require more space; the planting distance is determined by the method of staking that is to be used. It requires approximately 1 bushel of seed of the small- to medium-seeded varieties for 1 acre or 1 pint for 100 feet of row.

Setting of the pods is favored by a high degree of moisture in the air during the period of bloom and early pod formation; foggy nights are especially favorable to the development of the pods and beans. The lima bean has a deep root system and can withstand periods of drouth, provided the soil contains moisture within reach of the deeper roots.

If the soil has been thoroughly prepared before planting, the weeds may be easily controlled with shallow cultivation. Cultivation should be practically, if not entirely, discontinued from the time plants are blooming well until the first or main crop has been harvested. During the development of the first crop the plants slow down in growth and often drop some of the foliage. This permits weeds and grass to start in the middles and in the drill just about the time the bean plants are starting a second growth and bloom period. At this time the weeds and grass should be killed in the middles with shallow cultivation, and those in the drill should be pulled out.

FERTILIZERS

The lima bean responds well to a liberal application of fertilizer. In soil of low fertility at Auburn, an application of 1,000 to 1,500 pounds per acre of a fertilizer analyzing 4-8-4 has given good yields. Very good yields have been obtained also by applications of 6 tons of manure. It is advisable to apply the fertilizer in the drill 10 days to 2 weeks before planting because good stands will be prevented if the fertilizer comes in very close contact with the seed. A portion of the nitrogen may be with-

held and applied as a side dressing after the beans have started growth.

HARVESTING

Bush varieties produce beans large enough for use as green beans in about 80 days from planting. The harvest period of green beans extends over about 50 days. Pole varieties come into bearing about 10 days to 2 weeks later and continue to bear over a longer period than bush varieties.

Beans which are to be used green, canned, or as dried-green beans should be harvested after they have reached maximum size but before they have changed from green to white. Plants bear over a longer period and make greater yields if beans are not allowed to mature before harvesting. Dry beans should be harvested at 2 to 3 week intervals as they mature throughout the season. This is especially necessary with the small-seeded varieties because the pods open and the beans shatter if not harvested soon after they mature. Large plantings, whether grown for use as green or dry beans, are harvested with bean cutters.

Green beans keep better after harvest if left in the pods; however, beans in pods are likely to heat and become damaged quickly after harvest unless kept well ventilated or at a low temperature. They shell better if the pods are allowed to wilt slightly after harvest. Green beans that are to be kept for any considerable length of time should be spread out for a short time after they have been shelled so that the surface of the beans may become dry, otherwise they will be injured by mildew.

INSECTS AND DISEASES

The flea beetle, bean leaf beetle, and Mexican bean beetle are the insects most likely to damage lima beans. In the order named, they range in size from insects so small that the grower usually does not see them to insects about half the size of a cowpea. The flea beetle and the bean leaf beetle are more likely to damage the young plants, while the Mexican bean beetle is more likely to damage the older plants and pods.

The best control may be obtained by cleaning up hedges, rubbish, and other places where the insects winter, by destroying vines as soon as the beans are harvested, and by thoroughly covering both sides of the leaves, especially the underside, with an effective spray or dust.

The flea beetle may be controlled by the use of Bordeaux mixture to which has been added arsenate of lead. Fifty gallons of liquid Bordeaux is equivalent to eight pounds of powdered Bordeaux. It will require 1 to 1½ pounds of powdered arsenate

of lead with either of these. The other insects may be controlled by dusting with a mixture of 1 pound of ground Derris root containing 4 to 5 per cent rotenone and 8 pounds of talc. Dusting sulphur may be substituted for the talc. The sulphur aids in the control of red spider, leaf hopper, and certain diseases.

The nematode, a very small worm responsible for the numerous knots that appear on the roots of many plants, often causes serious damage to lima beans, especially on sandy soils. Serious damage may be avoided by rotating beans with corn or with nematode-resistant varieties of cowpeas, such as California Black Eye, Conch, Brabham, Iron or by planting resistant selections and saving seed from those for future planting.

Diseases seldom seriously injure lima beans but it is well to practice rotation and use disease-free seed. If necessary, plants may be dusted with powdered Bordeaux or dusting sulphur.

DEPARTMENT OF HORTICULTURE AND FORESTRY