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Sustainable Agriculture
Green Manure Crops
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Lablab

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Lablab (*Lablab purpureus*, formerly *Dolichos lablab*), also called hyacinth bean, Egyptian bean, and (in Japan) Fuji mame, is a popular legume vegetable in South Asia, China, Japan, West Africa, and the Caribbean. It is also popular as a nitrogen-fixing green manure to contribute to soil N and improve soil quality. Lablab is a popular choice as a cover crop on infertile, acidic soils, and it is drought tolerant once established. Like other legumes, it can be incorporated into a grazing rotation. Be aware of one important limitation—lablab is susceptible to root-knot nematode infection.

Benefits provided by lablab

Excellent as a cover crop to suppress weeds and provide soil erosion control

Very good N-fixer and green manure to increase soil organic matter and improve soil structure and quality

Tolerates acidic, low fertility soils and drought

Good forage production, nutritional quality, and palatability

Avoid climbing varieties; tends to be invasive

Use in rotation with annual crops including vegetables, herbs, cut flowers, annual ornamentals, and root crops such as dryland taro

Characteristics

Lablab is a climbing or erect perennial herbaceous crop often grown as an annual. It grows up to 40 inches (1 m) tall, with long stems in climbing types extending as much as 25 ft (6 m) from the base of the plant. The leaves are trifoliate, and the flowers are purple or white. It has a strong taproot with many lateral and adventitious roots. It grows rapidly in fertile soil. Both determinate (bush) and indeterminate (vining) varieties exist. It has an approximate growing cycle of 60 days. The fruit is a flat, broad pod, with wavy margins 4–5 inches long. When immature, the pods and their nutritious seeds can be eaten.

Environmental requirements

Lablab can grow in a wide range of soil textures, from heavy clays, if well drained, to sandy soils. It is normally adapted to the same areas as cowpeas. It tolerates acidic soils better than most legumes, growing well when soil pH is 4.5–6.5, and it does well in low fertility soils. Like most legumes, it is intolerant of waterlogged or flooded conditions. Lablab is adapted to annual rainfall ranging from fairly dry (30 inches) to 100 inches (750–2500 mm). Once established, it is fairly drought tolerant and can be grown in rainfed conditions or with minimal irrigation. It is reportedly more drought tolerant than the jack bean (*Canavalia ensiformis*). Lablab is also shade tolerant. In Hawaii, lablab grows year round at elevations ranging from sea level to 3000 ft, according to the USDA Natural Resources Conservation Service (NRCS). Both short-day and long-day varieties are known.

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Cultivars

The lablab cultivar commonly recommended by the NRCS is 'Rongai', an erect bush type with white flowers. The 'Highworth' cultivar has a purple flower but may twine if planted in the summer (long-day period). Newer cultivars may be available with improved traits and disease or nematode resistance.

Establishment

Lablab requires well drained soils for establishment. Unlike other legumes, like velvet bean (*Mucuna pruriens*) or jack bean (*Canavalia ensiformis*), lablab can be mowed nearly at ground level and will regrow, although at a slower pace than when cut higher.

When planting where lablab or cowpea have not been grown before, treat the seeds with a rhizobia inoculant to ensure that the plants develop a nitrogen-fixing symbiosis. The "cowpea-type" rhizobia bacteria (a *Bradyrhizobium* species) is found in most soils, but it may be lacking or in very low numbers in soils of areas receiving <20 inches (500 mm) of rainfall, or in the soil of newly abandoned sugarcane or pineapple fields. After the initial inoculation, the rhizobia will persist in the soil for years, so seed inoculation of subsequent lablab crops is not necessary. Inoculants specific to lablab may also be available from seed suppliers.

Broadcast 70–120 lb pure live seed per acre, or drill 30–90 lb pure live seed per acre. Broadcast and cover, or drill to a depth of 2 inches (5 cm).

Uses

Soil improvement

Lablab produces about 2½ tons of dry matter per acre and about 50 lb of nitrogen per ton of dry matter (NRCS). In some locations, over 100 tons of fresh weight per acre may be obtained, as well as annual foliage yields of 10–40 tons/acre. Lablab is often used to add nitrogen to the soil. In northern California, a 75-day lablab crop was estimated to contribute 65–140 lb/acre of nitrogen. Lablab and other legumes such as mucuna, *Vicia faba*, and *Phaseolus coccineus* have increasingly been adapted by subsistence farmers of Latin America to improve the soil N status in multiple-cropping systems. In Honduras, yields of corn intercropped with lablab were increased by 30–40% in the second year compared to corn that was not intercropped. In the 1960s in Australia, lablab was recommended as an alternative to mucuna and cowpea (*Vigna unguiculata*) for use as green manure in sugarcane. As for all legumes, be sure that the soil has adequate phosphorus, a good balance of micronutrients (iron, sulfur, molybdenum), suitable pH, and good aeration (no compaction or waterlogging) to optimize nitrogen fixation.

The living part of the soil includes a variety of microorganisms such as bacteria, actinomycetes, fungi, protozoa, and algae. It also includes plant roots, insects, and earthworms. A diverse biological community in soils is important to maintain a healthy environment for plants. Incorporating green manures such as lablab into the soil provides a food supply for a diverse group of soil organisms.

Adding organic matter increases the availability of plant nutrients in the soil. When green manures such as lablab are incorporated into the soil, their decomposition makes nutrients available to the next crop in the rotation. Incorporating green manures into the soil also results in nutrient retention in the organic matter component of the soil, reducing leaching losses. Organic matter provided by legume residues is quickly decomposed by soil microorganisms and does not persist for long in the soil. To build up the humus content of the soil, select slowly decomposing, fibrous grasses as green manures, or use grass-legume mixtures in the rotation. Long-term incorporation of annual legumes, such as lablab, will increase the soil humus content, although at a slower rate than if grass cover crops were used.

Lablab as a green manure should quickly provide improvement in the topsoil. Lablab's extensive root system makes soil more friable, improving its tilth and facilitating water infiltration.

Weed control

With its viny habit, fast early growth, and ability to grow with little applied water, lablab can be effective to smother weed growth and quickly provide an effective ground cover to protect the soil from erosion.

Feed

Lablab can be grazed or used for hay or silage. The foliage has a high protein content (15–30 %), with high levels of lysine and about 55% digestibility. In some countries lablab is planted at the end of the cropping (rainy)

season and used as a dry-season pasture. Lablab is among the most palatable of the legumes for animals.

Food

Lablab is popular as a vegetable in India, China, Southeast Asia, West Africa, Japan, and the Caribbean. Dishes are prepared both with its immature pods and the dry beans. When mature, the seeds contain cyanide and must be boiled to remove the toxicity before they are eaten.

Management cautions

Avoid selecting climbing varieties of lablab in neglected fields, as they tend to be invasive and can outcompete native species. In on-farm evaluations of several legume species for use as "living mulch" conducted in Haiku, Maui, the use of climbing lablab varieties was considered undesirable. Lablab should not be used where root-knot nematodes are a problem, as the plant is a host and will build the soil nematode population.

Pest problems

When managed as a green manure crop, lablab generally has few insect pests, but if it is allowed to form pods, they may attract pod borers. Lablab is susceptible to root-knot nematodes. Other diseases that affect lablab include bacterial wilt, *Xanthomonas*, and *Fusarium* root rot. To control disease and nematode problems, lablab should be rotated with crops that are not hosts.

For assistance:

Contact your nearest Cooperative Extension Service office for additional assistance in selecting appropriate cover crops and green manures for your farm and cropping situation. Help can also be obtained from the USDA Natural Resources Conservation Service field offices located on each island.

Visit CTAHR's Sustainable Agriculture for Hawaii Program Website at <http://www.ctahr.hawaii.edu/sustainag> to find additional information about green manure and cover crops. The site also includes references and links to other useful on-line resources.

Sustainable Agriculture in Hawaii . . .

. . . integrates three main goals—environmental health, economic profitability, and social and economic equity. Sustainable farms differ from conventional ones in that they rely more on management practices such as crop diversification and crop rotation, agroforestry, integrated pest management, rotational grazing, and innovative marketing strategies. For further information on Sustainable Agriculture in Hawaii, contact:

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