



The agronomy and use of *Lablab purpureus* in smallholder farming systems of southern Africa

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Introduction

Lablab purpureus, commonly known as lablab bean, is a twining legume native to tropical and sub-tropical areas of Africa. It is a deep-rooted, drought tolerant, summer-growing annual to short-lived perennial. In southern Africa, common cultivars are Highworth, which produces purple flowers and black seeds, and Rongai, which produces white flowers and brown seeds. Rongai has a longer growing season and higher forage yields than Highworth.



Why grow lablab?

In East and Central Africa, as well as parts of Asia, lablab is mostly used as a pulse crop and both the green pods and mature seeds can be consumed by humans. It produces large quantities of forage biomass, with high crude protein content ranging from 10–13 g/kg of dry matter and dry matter digestibility ranging from 55–75 g/kg. It can be grown as a single green manure crop or intercropped with maize or sorghum to improve soil fertility. It can also be grown as a cover crop to suppress weeds or provide nitrogen-rich mulch in conservation agriculture (CA).

When used in crop rotations with cereals, the cereal crop will utilize residual nitrogen fixed by lablab in the preceding season. Both early and late maturing cultivars can be used to provide fresh fodder, or conserved as hay or silage to provide supplementary feed during the dry season. Late flowering varieties/cultivars, such as Rongai, can also provide grazing during the early part of the dry season. Lablab hay or silage improves digestibility of poor quality roughages normally fed to animals in the dry season (e.g. maize stover).



Rongai



Highworth

Site selection

Climate

Lablab *purpureus* grows better in warm conditions but it can withstand moderately cold conditions (>50C), though frost will kill the shoots and stop growth. Once established, it can be very drought resistance, growing

well in areas receiving between 450–1200mm of rainfall per annum, due to its deep rootedness and ability to shift its leaf inclinations, to reduce exposure to direct sunrays.

Soils

The crop establishes in a wide range of soils, from sands to heavy clay, having a pH of 5.0–7.5. Heavy soils are preferred, especially for seed production, to realize maximum yields from the crop.

Cultivation practices

Land preparation for Lablab *purpureus* farming

Land should be ploughed during the early dry season to reduce weed encroachment and conserve moisture. In CA systems, planting stations can be marked by holing-out with a hoe or using ripper tines to disturb the soil.

Fertilizer and lime requirements

Soil analysis is recommended to obtain accurate fertilizer recommendations. General recommendations prescribe the annual application of 500 kg/ha dolomitic lime $[\text{CaMg}(\text{CO}_3)_2]$ on sandy soils and 750 kg/ha on heavy soils until pH is 5.5–7.5. This should be accompanied with 200–250 kg/ha single superphosphate (18.5% P_2O_5) on reverted lands. On depleted soils and sandy soils, application of 250–300 kg/ha Compound D (7N; 14P; 7K) is recommended, in place of single superphosphate.

Sowing

Seed of the Lablab *purpureus* must be inoculated with an appropriate strain of Rhizobium bacteria on the day of planting. This will enable its roots to nodulate effectively and fix high levels of soil N through biological nitrogen fixation. However, inoculation is not usually necessary in fields where Lablab *purpureus* has been grown and inoculated before.



Lablab *purpureus* yields best when planted early, preferably with the first rains. Late planting will reduce seed and herbage yield potential. It is normally sown at 25–30 kg seed/ha, in rows 0.9m apart and with in-row spacing of 0.25–0.30m. Farmers are advised to place two

pips per planting station to ensure good establishment, then thin when seedlings are 2–3 weeks old.

When intercropping with maize (or sorghum), the legume is planted 2–4 weeks after the cereal, depending on predicted seasonal rainfall and legume variety. Highworth is usually preferred when intercropping because it is a less vigorous climber than Rongai. Planting Lablab *purpureus* in the same row with the cereal facilitates weeding and spraying.

Crop management

The field should be maintained weed-free since Lablab *purpureus* easily succumbs to heavy weed infestations. Weedy conditions also increase disease infestations. Even though Lablab *purpureus* is drought tolerant, young plants are prone to aphids if exposed to extended droughts.

Common pests are cutworms, leaf eaters, sap-suckers and pod borers, most of which can be treated with simple pesticides (such as Carbaryl 85% WP). Seed production can be drastically reduced by flower eaters (e.g. Blister beetles—*Mylabris* spp.) and pod-borers (e.g. bollworm).



Harvesting and yields

a) Hay

Lablab *purpureus* is normally harvested for fodder at 30–50% bloom. Local research has shown that when grown alone (single crop), Lablab *purpureus* can yield 4.5–7 tonnes dry matter/ha, in natural regions II and III. Average herbage yields are lower (1–2.5 tonnes dry matter/ha) in the semi-arid regions (NR IV and V). Lablab *purpureus* hay has high crude protein content (10–13%) and dry matter digestibility (55–75) making it a good source of protein supplement for ruminant livestock.

Hay-making is difficult with mature plants that are over 3–4 months old because the thick stalks take long time (4–6 weeks) to dry. It is, therefore, recommended to make hay from young and more nutritious pastures.

Young herbage material can be dried in the sun for 3–4 days, before baling at about 20–25% moisture. It is

recommended to bale the hay as it is easier to handle, store and feed. It is important to ensure that leaves do not shatter before baling, as these tend to dry-off more quickly than the stems. During its curing, the hay must be turned at least once a day to reduce swath resistance, since thick stems take longer to dry. Bales must be kept in a dry airy environment.

Lablab hay bales



Seed cleaning



b) Silage

Fresh lablab can also be used to make mixed-crop silages with either maize or sorghum. The resultant silage will have improved crude protein content (depending on proportion of legume added).

Seed production

Dry pods should be handpicked continuously, before they shatter. Thereafter, the harvested pods can be sundried on wide tent/plastic material to prevent seed getting lost when pods shatter. Highworth is a prolific seeder and yields vary between 0.5 and 1 tonnes/ha. It is difficult to obtain seed from Rongai in its first year of establishment because it starts to flower in mid-May and most pods abort due to lack of moisture. All seeds must be treated with grain protectant and stored in a cool and dry place to avoid damage from weevils.

This text was written by scientists at the International Livestock Research Institute and edited by Barbara Maasdorp at the Crop Science Department of the University of Zimbabwe





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