

# FACT SHEET

## VELVETBEAN (*Mucuna pruriens*) PRODUCTION IN SOUTHERN AFRICA



### Written by

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## Introduction

Velvet bean (*Mucuna pruriens* var. *utilis*), also known as Mucuna, is a twining annual leguminous vine common to most parts of the tropics. Its growth is restricted to the wet-season and it dies at the onset of the cold season. It has large trifoliate leaves (i.e. has three leaflets) and very long vigorous twining stems that can extend over 2-3 meters depending on growth conditions. When planted at the beginning of the growing season, flowers normally form at the end of March /early April.



They are deep purple and appear underneath the foliage. Seeds are large, ovoid ( $\pm 10$ mm long) and of different colours, ranging from white, grey, brown, black and mottled.

## Why grow Velvet bean?

Velvet bean is a high yielding leguminous forage crop that is high in nitrogen (N)/crude protein content. It is usually sown as an N-fixing ley crop or as a green manure crop to improve soil fertility. In the sub-humid regions it can be intercropped with maize to improve soil fertility, maximize grain / herbage yields per unit area and provide mixed crop for hay/silage making. Whether it is grown as a single or mixed crop Velvet bean provides early dry season grazing or fodder for hay-making or mixed-crop silage (improving the N content of cereal or grass silage). Its hay and silage can be used as supplementary feed during the dry season as they both improve the digestibility of poor quality roughages, such as maize stover. Mucuna is a prolific seeder and its seed (26 % CP) can be used in home-mixed rations to replace commercial supplements. However, its

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grain is not so useful to non-ruminant livestock. It can only be used for human consumption after reducing this toxin by boiling and discarding the water several times. Velvet bean can be grown for soil fertility, green manure and as a cover crop in Conservation Agriculture (CA).

### **Site selection**

#### *Climate*

Velvet bean performs best in regions with long growing seasons and prefers hot moist areas that receive between 650 and 2,500 mm rainfall per annum. It can withstand long dry spells, especially when established early in the growing season. Therefore, it is increasingly being adopted in semi-arid regions (e.g NR IV and V of Zimbabwe). It will grow well into the dry season until frosted or deep soil moisture runs out. Its seeds mature around May and June.

#### *Soils*

Velvet bean grows well on a wide range of soils, including relatively infertile sandy soils.

### **Cultivation Practices**

#### *Land preparation*

Due to its large seeds the crop does not require a high degree of land preparation. Minimal soil disturbance is encouraged in CA systems using manual or mechanized equipment.

#### *Fertiliser and lime requirements*

Application of 500-700 kg/ha lime (preferably dolomitic lime on sandy soils) is recommended to encourage nodulation and efficient use of fertilizers. Mucuna will thrive on soils where available soil phosphorus (P) is low. Application of 200–250 kg/ha single superphosphate (18.5% P<sub>2</sub>O<sub>5</sub>) is sufficient for optimum herbage and seed production. Alternatively, one can apply 250-300 kg of Compound fertilizer (preferably 7 N: 14 P: 7 K).

Legumes do not normally require N (e.g. Ammonium Nitrate or AN) fertilizer, since they can fix soil N in their root nodules. However, in soils with very low nitrogen level, a single application of no more than 114 AN kg/ha (40N kg/ha) will be necessary to boost plant growth, 3-4 weeks after germination.



### *Planting*

#### a). **As single crop**



Seed is sown at a rate of 35-40 kg/ha in single crops at the beginning of the wet season, using interrow spacing of 0.9 - m and within row spacing of 30-40 cm. A lower seed rate (wider spacing) is advisable in semi-arid conditions, to reduce competition for moisture. Mucuna seeds are large and should be planted at a depth of 3-7 cm.

#### b). **Intercropping with maize / sorghum**

Velvet bean is a very vigorous climber. Therefore, it should be planted in-between the cereals 3 - 4 weeks after emergence (depending on predicted annual rainfall), ideally after the first hand weeding if farmers are not using herbicides. If planted too early and densely, it can choke the cereal, thereby reducing cereal yield.



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Planting velvet bean within the same row as maize and in-between the maize plants facilitates weeding and spraying. However, delaying the planting of legume for more than four weeks after sowing cereals may result in shading by the cereal crop and severe reduction in legume yield. It is advisable to sow one pip per station, at a spacing of 50cm within row.

#### *Weed, Pest and Disease Control*

Farmers are advised to keep the crop weed-free by weeding as soon as they start appearing. This will also reduce pest infestation. Velvet bean is well known for resistance to most pests and diseases. However, there have been reports of complete devastation by leaf-eating caterpillars. Farmers should consult the local extension officer for advice on controlling disease outbreaks or pest damage, including advice on compatibility of crop chemicals when farmers desire to use a mixtures.

#### **Harvesting time and yield estimates**

Mucuna is normally harvested for hay-making once only in the growing season - usually at 50% booting. Its flowers are normally buried in the leaf canopy. Flowering occurs in early March and is triggered by short days and cooler night temperatures (21<sup>0</sup>C). Due to its profuse seeding ability and the high feeding value of its grain, farmers prefer to harvest it when the pods are mature and dry. Then, they can harvest the foliage residue together with the pods. However, this moribund foliage and the mature pods are hairy and itchy, making it uncomfortable to harvest and process.

Mucuna has achieved average herbage yields of 7-11 tons DM/ha in NR II and 4-6 tons DM/ha in NR IV and V of Zimbabwe, when harvested at booting stage. Average seed yields range from 1.5 to 2 and 0.5 to 1 tons in NR II and NR IV, respectively. At booting, its forage contains 10.4 % CP, making it a good source of protein for large/small ruminant livestock, when fed fresh or as hay. Forage collected after pod maturation in local trials averaged 6.8 % CP. Mucuna seed contained 25 to 27 % CP and the pod-

shells 7 to 8 % CP. The seed is high in L. dopa (up to 7 %), an anti-nutritional factor that causes intestinal disruptions especially in non-ruminants when fed in high doses.

### *Fodder conservation*

As already indicated, *Mucuna* should be harvested for hay-making at booting stage. This kind of foliage normally dries to 75-80 % DM content (safe for storage) in 3-5 days. Intercropped forage is best conserved as silage. No sugar additives will be required if the mixed-crop is harvested when the cereal component is in milk dough stage. Such silage will be high in CP content compared to silage from maize only or sorghum only.

### *Seed production*

Pods can be hand-harvested and spread on a clean surface, under a shade, to dry before shelling. Hand-shelling is done by pounding the dried pods with long sticks. Thereafter, clean seed is obtained by winnowing from a basket. Farmers can use shelling machines. *Mucuna* can yield up to 2, 0 t of clean seed per hectare. The shells : grain ratio is normally 1:1 w/w. It is not usually necessary to treat *Mucuna* seed against grain weevils or rodents.

