

## **GREEN BEANS**

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### **CLIMATE**

The bean is a warm-season crop which is very sensitive to frost but dislikes hot conditions. It can be grown only during the frost-free portion of the year. Optimum mean temperatures are 15 °C to 27 °C. At temperatures of 5 °C and lower, beans have a poor quality, with short, puffy, malformed pods; this can be a serious problem where beans are grown over winter in the cooler frost-free areas. Temperatures above 35 °C, especially when accompanied by hot, dry winds, may cause excessive shedding of flowers and young pods, resulting in poor yields. Ideal temperatures for germination are 20 °C to 30 °C, when the plants should emerge within 5 to 10 days; the minimum temperature for germination is 10 °C. During the early summer, when periods of cool, cloudy weather encouraging tender leaf growth are followed by hot dry days, the growing leaves are susceptible to sunburn and dieback.

### **SOILS**

Beans can be successfully cultivated on a wide variety of soil types, ranging from sands to relatively heavy clays, provided they are well-drained to at least 400 mm. Sandy-loam to loam soils are preferred. Soils which tend to crust should be avoided, because they may seriously reduce emergence, as well as detrimentally affecting subsequent growth. Green beans are amongst the most sensitive vegetables to brackish conditions and to high boron content in the soil. The ideal pH (KCl) is between 5,5 and 6,0.

### **CULTIVARS**

Bush (dwarf) :	Contendor, Endurance, Espada, Paulista, Nelson, Newton, Sodwana, Tongati
Runner (pole):	Lazy Housewife, Witsa. These cultivars require trellising, and are more popular in home gardens than as a commercial crop.

### **PLANT SPACINGS AND SEEDING RATE**

Dwarf beans are planted 40 to 70 mm apart in rows drawn 450 mm to 600 mm apart. The closer spacings are generally preferred. With runners, a spacing of 100 mm to 150 mm within the rows, and 900 mm to 1000 mm between the rows, is employed. Seed is planted directly in the field, to a depth of 30 mm to 50 mm in sandy soils, and 20 to 30 mm in heavier soils, at the rate of 75 kg to 110 kg per hectare for bush beans, and about 50 kg per hectare for runner beans.

### **LAND PREPARATION**

Prepare the land to a good depth and tilth. Take care not to over-work and pulverise the soil, because this can increase soil capping.

## TIME OF PLANTING

### Climate

Cold	(heavy frost)	Sept to Jan
Warm	(light frost)	Aug to Feb/Mar
Hot	(frost free)	Feb to Sept (discontinue plantings of runner beans one month earlier because of their longer growing season)

## FERTILIZER REQUIREMENTS

**Table 23.**

The approximate absorption of major nutrients by a relatively good crop of bush green beans.

	N	P	K
11 tons/ha pods plants	100 50	10 6	55 45
Total	150	16	100

Bearing in mind that this leguminous crop fixes some of its own nitrogen requirements, and that the plants are almost invariably ploughed back into the soil after harvest, it is clear that the fertilizer requirements are relatively low. Provided the soil phosphorus (P) and potassium (K) levels are reasonably high, the recommended applications would be 70 kg nitrogen (N) and 40 kg P per hectare at planting. A light top-dressing of nitrogen (30 kg N/ha), two or three weeks after emergence, may sometimes be advisable. For runner beans the fertilizer rates could be increased by about 25 %. One or two extra light side dressings of nitrogen would normally be beneficial for pole beans. A general fertilizer programme could be 250 to 500 kg 2:3:4 (30) / ha at planting, followed by 200 to 250 kg LAN 3 weeks later.

## IRRIGATION

Rapid, uninterrupted growth is necessary for good yields. Wet the soil to a depth of 450 mm before planting, and do not re-wet until the plants have emerged, unless the topsoil in which the seed occurs dries out excessively. During the first half of the growing season (about four weeks in most instances), wet the soil to a depth of 450 mm only when the depletion of the available soil moisture approaches 80 %. This allows the development of a deeper and more extensive root-system without normally detrimentally affecting yield or quality. Thereafter, wet the soil to a depth of 600 mm when no more than half the available soil moisture has been utilised. Maintaining soil moisture from early flowering is essential. During hot weather, about 35 mm every 10 to 14 days during early growth, and at weekly intervals from flowering onwards, should meet the crop's water requirements.

## HERBICIDES

The following herbicides are registered for use:

Bendioxide (sold as Basagran) is used as a post-emergent, after the first trifoliolate leaf of the bean plant has fully expanded, against annual broadleafed weeds. Some crop damage is sometimes evident, especially when used under low humidity conditions. Basagran may have a slight effect against yellow nutsedge.

Cycloxydim (Focus Ultra), fluazifop-P-butyl (Grasses or Fusilade Super), haloxyfop-R-methylester (Gallant Super, Verdict Super) are all registered for post-emergent use against annual and perennial grasses.

EPTC ( Eptam and EPTC) is used as a pre-plant treatment incorporated into the soil (within 10 minutes) mainly for control of annual grasses and yellow and purple nutsedge.

Fomesafen (Flex) is a post-emergent herbicide registered for use against annual broadleafed weeds. S - metachlor (Dual S Gold 915, Falson Gold 960 and Metagan Gold 960), a pre-emergent against annual grasses and yellow nutsedge under certain conditions, is applied within three days of planting; soil should have a good tilth.

**Common pests**

American bollworm      nematodes  
 Plusia looper            red spider mite  
 Bean fly                    stinkbugs

**Other pests**

Aphids                      CMR beetles  
 Other beetle                seed maggots  
 Thrips

**DISEASES**

There are several registrations for chemical use against bean diseases.

**Common diseases**

rust  
 bacterial blights

**Other pests**

damping off                anthracnose  
 Sclerotinia rot             virus diseases

Copper-based fungicides are used to control bacterial blights, which are favoured by prolonged, wet growing conditions. Dissemination of the bacteria is by rain splatter, and the production of good-quality seed, free of the causal bacteria, has greatly reduced the problem. The incidence of anthracnose has also diminished with the availability of good-quality seed.

A number of preventative and systemic fungicides are registered for control of rust, which gains in importance with the late summer and autumn.

Sclerotinia rot is encouraged by cool, crowded growing conditions. The white fungal growth infects flowers and spreads quickly to all plant parts, especially stems and pods near the ground. Procymidone (sold as Sumisclax) is registered for control of the rot, and is applied twice, commencing at early flowering stage.

**LENGTH OF CROP**

Most bush bean cultivars will reach picking maturity within 50 to 60 days when grown during the warmer months, but cropping may be delayed for up to three or four weeks

under cooler conditions. The crop is usually harvested over a two or three-week period. Runner bean cultivars usually take 10 to 14 days longer to reach maturity, and are harvested over a four- to six-week period.

#### YIELDS ( t/ha)

	Conservative	Likely	Target
Bush beans	5	8	
Runner beans	7	10	12 to 15

#### HARVESTING, PACKING AND MARKETING

Selective harvesting of well-developed but young pods, before the seeds have developed appreciably, is usually practised. Frequent picking, about twice a week under warm conditions, ensures a better quality and, unless the plants are damaged in the process, a higher yield, than when picking is less frequent. Ensure that plants are disturbed as little as possible during harvesting, as rough handling can severely reduce size and quality of later picks.

Pack fairly tightly in green mesh pockets, holding about 10 kg of product, for marketing, but ensure that pods are not damaged in the process. The use of cartons holding about 5 kg, and various other containers, which also protect the product better than mesh products, are generally finding more favour, particularly on the large National markets. The 5 kg cartons, for example, at present account for about 75 % of all bean sales on the Johannesburg market, with nearly 10 % as pre-packs, and only 2 % to 3 % in 10 kg pockets. The preference at market outlets and the cost/return indications should be investigated.

**Table 24.**

Total tonnages for green beans sold on the Durban National Market per year from 1993 to 1997, and mean annual prices (R per ton obtained).

	1993	1994	1995	1996	1997
Tons sold p.a.	796	667	640	493	671
Ave. R/ton	1308	1867	1750	1973	1948