

## *Phaseolus vulgaris*

It is an important cool season legume vegetable grown for its tender pods, shelled green beans and dry beans (*Rajmah beans*). In western countries, processed pod consumption is quite high. 100 g of green pods contain 1.7g protein, 4.5 g carbohydrates, 221 I.U. vitamin - A, 11 mg vitamin-C, 50 mg calcium etc. Dry beans are rich in protein.

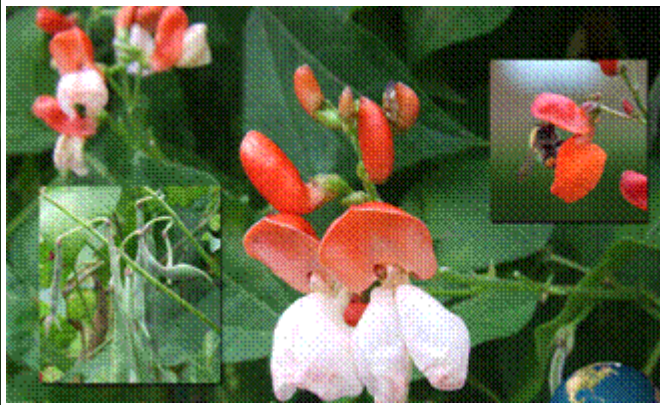
### **Origin and Taxonomy**

Genus *Phaseolus* originated in New World. Following four species are under cultivation in New World:

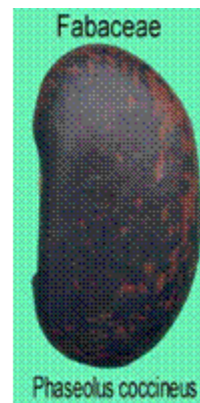
1. *Phaseolus vulgaris* – French bean
2. *P. coccineus* – Runner or Scarlet bean
3. *P. lunatus* – Lima bean, Butter bean or Madagascar bean
4. *P. acutifolius* var. *latifolius* – Tapery bean

All the given species are diploids with  $2n=22$  and self-pollinated except *P. coccineus*, which is cross-pollinated. French bean, the most important species under *Phaseolus*, is originated in central and South America (Kaplen, 1981)

### *P.vulgaris*



### *Phaseolus coccineus*

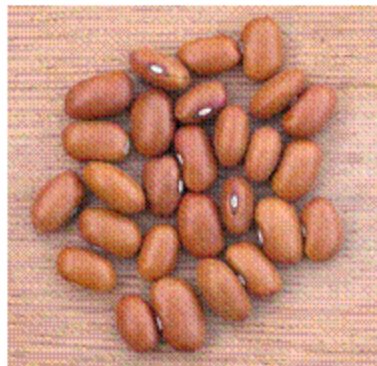
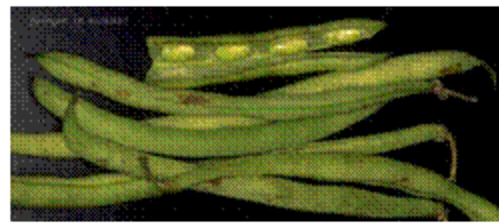




**White Tepary Beans**

### **Botany**

French bean has tap root system with poor nodule formation. Leaves are trifoliate. Though a self-pollinated crop, French bean offers wide variability for plant growth (bushy / climbing), colour of pod (green / waxy coloured), cross section of pod (flat / oval / round), pliability (stringed / string less) etc.



### **Climate**

French bean is a day neutral cool season vegetable and tolerates high temperature better than peas. Optimum monthly temperature for cultivation of French bean is 15-25oC compared to 10-18oC for peas. It is sensitive to high rainfall, frost and high temperature. Pole types tolerate high rainfall better than bushy varieties

### **Soil**

Soil requirements are same as that of pea. Ideal soil pH for growth of French bean is 5.5 – 6.0

### **Season**

Sowing is done from March to May.

## **Land preparation and sowing**

Land is ploughed to a fine tilth and divided into plots of convenient size. Ridges and furrows are prepared by ploughing after a basal dose application of farmyard manure. Field is irrigated once and seeds are sown under optimum moisture condition on side of ridges 2-3 days after irrigation. Spacing and seed rate vary with varieties. Early varieties are sown at a spacing of 45-60 cm x 10-15 cm and seed rate required is 80-90 kg / ha. Pole types are sown at 1.0 m apart in hills @ 3-4 plants / hill and seed rate is much less (25-30 kg/ha.).

## **Manure and fertilizers**

French bean responds well to application of lime and fertilizers. In addition to 20-25 t. of farmyard manure, 50 kg N, 75 kg, P<sub>2</sub>O<sub>5</sub> and 75 kg K<sub>2</sub>O are recommended. Half of N along with full P and K should be applied as basal dose at the time of making ridges and furrows or one or two weeks after germination. Apply remaining dose of N, one month after first application.

## **Application of fertilizers in Tamil Nadu**

Apply FYM 25 t/ha at the last ploughing. N 90 kg and P 125 kg/ha should be applied on one side of the ridges. For rainfed conditions of Shevaroy hills, apply as a basal dose of 62.5 kg/ha of Phosphorous as super phosphate and with another half of 62.5 kg/ha Phosphorous as FYM enriched super phosphate.

## **Intercultural operations**

French bean is a shallow rooted crop and only light inter-cultural operations are practiced. During early stages of crop, weeding followed by fertilizer application and earthing up can be synchronized. A pre-sowing application of Fluchloralin @ 2.1 /ha checks weed growth for 20-25 days. Water stress influences yield of French bean and crop is most sensitive at flowering and fruiting stages. 6-7 irrigations are required during growing season.

Staking is an important operation for pole types and bamboo sticks or any locally available materials should be erected when plants start vining. Individual vertical stakes and horizontal canes at 40 cm distance are erected for encouraging growth and spread of plants.

Application of plant growth regulators like PCPA (2 ppm) and NAA (5-25 ppm) has favourable effect on fruit set and yield.

### **Harvesting and yield**

Pods are harvested at full grown stage but immature and tender. Pods are ready for harvest 7-12 days after flowering depending on varieties. In bush varieties, 2-3 harvests and in pole types 3-5 harvests are made. Quality of beans varies with harvests and best quality fruits are obtained in initial harvests compared to later harvests. Loss of crispness during storage and in last harvest is attributed to loss of water and increase in water soluble pectin. Seed weight is a major indicator of green bean harvest maturity. Yield of tender pods varies from 8-10 t/ha in bush varieties and 12-15 t/ha in pole types. Dry beans are harvested when majority of pods are fully ripe and colour turns yellow. Seed yield varies from 1250 to 1500 kg / ha.

### **Pests and diseases**

Crop is affected by pests like stem fly, thrips, mites, bean beetle, bean weevil, aphids etc. Yellow mosaic, anthracnose, powdery mildew, rust, root rot and wilt and leaf spot are common diseases affecting French bean.