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FASAI

French Bean

Botanical name : *Phaseolus vulgaris*

Family : *Fabaceae*

Chromosome No.: $2n=22$

Origin : *Southern Mexico and Central America*

Common name : *Kidney bean, Haricot bean, Snap bean, Navy bean*

Description of popular varieties/hybrids

- There are three type of French bean viz., bush type with short internodes, semi-pole type with longer internodes than those in bush type and the pole typed having longer internodes than that of semi pole type. French cultivars are classified into string less type based on the extent of fiber in the pod and into bush type and pole types according to the growth habit.
- There are a large number of French bean cultivars. Thompson and Kelly (1957) classified cultivars are as follows:

Snap beans-for vegetable pods

Green shell beans-used in the green shelled condition

Dry shell beans – used in the dry state(Field beans)

Each group is further divided into climbing (Pole) and dwarf types.

Some of the important snap bean cultivars are as follows:

The flat types are bountiful, plentiful, green ruler, golden ruler

The oval types include Pusa Parvati, Contender, Premier, Tender Green, King Green etc.

The pole type include Blue Lake, Kentucky Wonder.

Bushtype

Contender:

- It is an introduction from USA. It takes about 50-55 days for first picking. Pods are green round, 13-14 cm long, stringless, yields 8 to 9.5 t/ha. Tolerant to powdery mildew and mosaic.

Premier:

- Pods 11-13 cm long, ready for harvest in 55-60 days. Less susceptible to wilt and mosaic, average yield 75-90 q/ha.

Pusa Parvathi:

- Released from IARI, Katrain. It is developed through X-ray irradiation of the American variety 'Wax pod'. Early bearing, stringless, yield 8-8.5t/ha. Resistant to mosaic and powdery mildew.

Arka Komal:

- A pure line selection from IHR-60 (Collection from Australia). Plants erect and bushy, Photo insensitive Flat, green straight pods. Seeds light brown, oblong and large. Good transportation and cooking qualities. Seed yield 1500 kg./ha Duration 70 days. Pod Yield 20 t/ha.

Arka Sharath:

- It has round, string less, smooth pods suitable for steamed beans. Pods are crisp, fleshy with no parchment and perfectly round on cross section. Plants are bushy and photo insensitive and it is suitable for both kharif and rabi seasons. It gives maximum number of pods per plant (44.5) compared to checks. It has high pod yield potential of 18.5 t/ha in 70 days.

Arka Suvidha:

- Suitable to grow throughout the year. Early stringless and first picking 70 days after sowing, yield is about 9t/ha.

Arka Bold:

- Grown throughout the year. Pods are flat 16 cm long, stringless, resistant to rust, ready for picking 70 days after sowing . Yield is about 8t/ha.

Bountiful:

- Introduction from USA. Pods borne in clusters on the main stem. Average yield is 10-12t/ha.

Jampa:

- It is a Mexican variety. Plants are shy in tillering habit. Early variety, pods are flat, smooth, pale green in colour. The seeds are black, smooth and small in size. Yields around 8-9t/ha. Highly resistant to wilt disease and withstand warmer conditions.

V.L. Bauni Bean 1:

- It has been developed by Vivekananda Parvathiya Krishi Anusandhanashala (VPKAS), Almora, Uttaranchal. It produces non stringy, long, fleshy green pods. It does well in the hills but suffers badly from mosaic.

Pant Anupama:

- Released from GBPUAT, Pantnagar. It is recommended for hills of Uttaranchal and UP. Prolific bearer, round, straight and green pods, first picking is done at 55-65 days after sowing. Yields 9t/ha. Moderately resistant to mosaic virus and rust.

Pant Bean-2:

- Released from GPPUAT, Pantnagar. It is cross between Turkish x Brown Contender. Pods are flattish round, non stringy, yields around 9t/ha. Moderately resistant to mosaic and rust.

YCD-1:

- Released from TNAU, Yercard. Pods slightly flat, seeds bold, attractive, dark purple in colour. It is resistant to root rot, rust, YVMV and anthracnose. Yields 9.5t/ha in 105 days.

Arka Anoop:

- It is a pedigree selection from the cross Arka Bold x Arka Komal, plants are bushy, photo insensitive, long pods (17-18cm), resistance to rust and bacterial blight. Yield is 15t/ha.

Phule Surekha:

- Developed at MPKV, Rahuri. Suitable for all seasons, pods are 9-10 cm long, resistance to anthracnose, yellow mosaic and wilt. Yield is 15 t/ha.

Pole types

Kentucky Wonder:

- It was introduced to India from USA. Plants are tall, creeping or viny habit, pods ready for harvesting 60-65 days, 4-5 pods/cluster, pods long, flattish, stringless, seeds light brown yields 100-125 q/ha.

SVM-1:

- It is developed through hybridization between *P. vulgaris* var Contender x *P. Multiflorus* var. PBL 257. Pods are green, round, stringless, 13-14cm long, 5-10 seeds/pod. Ready for harvest at 65-75 days after sowing. Average yield is 105-250 q/ha. Recommended for hill area. Resistant to angular leaf spot.

Lakshmi:

- It is a cross between Contender x Local (Pole) type. Pods formed in clusters of three, 13-14 cm long, stringless, ready for picking in 65-70 days. Average yield is 120-140 q/ha. Tolerant to angular leaf spot.

TKD1:

- It is a hybrid derivative of a cross between two pole types, viz., Selection and PV118. Green tender pods harvested from 60 days after sowing. Pods are long, flat, low fiber content. Yields 5-6t/ha.

KKL1:

- It is also known as Moringa bean. Developed at TNAU, Kodaikanal. Best suited for elevation 1800-2400m. It has a potential yield of 7t/ha. Pods or 3t/ha of grains.

Pusa Himlata:

- Developed at IARI, Katrain. Pods are straight, 14cm long; light green, stringless with white seeds.

Azad Rajmah-1:

- Developed at CSAUAT, Kanpur. Pods are highly attractive, smooth, stringless. Yields about 7.5-8t/hect.

Climate and Soil

Climate

- French bean requires mild warm weather for good yield. It is a day neutral crop except some few semi-pole varieties which are short day types. It is sensitive to frost and very high temperature. The optimum temperature ranging between 15-25°C. It is also sensitive to high temperature and high RH. The plants shed their blossom or young pods in very hot or rainy weather.

Soil

- French bean is grown in variety of soils ranging from light sandy soils to clay soils but it can withstand water logging. The optimum soil pH is between 5.3 and 6.0. High moisture content and high nitrogen caused delay in maturity.

Season and Cropping system

Season

- There are two main growing seasons for French bean in the plains of India. The first sowing is done during July-September and May even extended up to September. The second sowing is early spring that is between January to February. In hilly regions seeds are sown on the month of March-May.

Cropping system

- Being a leguminous crop, it fits well in any crop rotation. Red kidney varieties are preferred to white seeds in heavy rainfall areas. Such varieties also fit well in crop rotation with wheat. It can also be grown as an intercrop in widely spread cucurbits till the main crop begins to throw veins.

Seed rate

- The seed rate varies considerably depending on the variety, soil and climatic conditions. The rate for bush varieties is 60-65 kg/ha while it is 25-30kg/ha for pole varieties. Inoculation of seed with rhizobium species facilitates quick nodulation on the roots, and help in the fixation of atmospheric nitrogen.

Sowing

- The seeds of bush beans are sown in rows 30-45 cm apart and 10-15 cm away from seed to seed whereas pole beans are in the spacing's of 60 cm to 100 cm between rows and plant to plant 30cm. the depth of the sowing shall be 2 cm. To avoid fungal infection, treat the seed with Rhizobium phaseoli @ 30 g/kg of seed.

Nutrition

- Before sowing, at the time of ploughing apply FYM @ 25 t/ha. Although French bean is a legume, it responds well to the application of nitrogen. Application of 63kg N, 100 kg P₂O₅ and 75kg K₂O ha is recommended. Half of the N along with entire dose of P and K fertilizer should be applied at the time of sowing. Remaining half of N should be applied at the time of earthing up after 3rd week of sowing. Spraying micronutrients improves the quality besides increasing yield.

Irrigation

- Prior to sowing the plots are irrigated and after 2-3 days when the soil is in moist condition seeds are sown along the sides of the ridges. Light irrigation is given after 2nd to 3rd day after sowing. French bean is shallow rooted crop. Water stress has marked influence on yield and quality of pods. About 6-7 irrigations would be required at regular intervals. Depending upon the atmospheric conditions, the amount of irrigation will be decided. The crop should be irrigated at an interval of one week. Excess water reduces nodule formation and ultimately growth of plant.

Weed control

- A pre sowing application of fluchloralin @ 2 l/ha checks the weed growth. At least two hand weedings are required before earthing up. Shallow cultivation during the early stages of crop is necessary to check the weeds and to facilitate earthing up. At the later stages of the crop growth, the weeds are kept under check due to the thick canopy of the crop.

Staking

- Staking is an important operation for pole beans. The bamboo sticks or other wooden sticks or branches which are locally suitable can be used for the support. If the plants are grown in rows, single stick of about 2m length should be fixed near the plant. If the plants are grown in hills, the twigs and branches will give good support.

Use of growth regulators

- Application of growth regulators improves the plant growth, flowering fruit set and pod yield in French bean. Plant regulators like PCPA @ 2ppm, L-naphthly

acetamide or B-naphthal acetic acid at 5-25ppm shown favourable effect on fruit set. GA3 sprayed at 50-200 ppm proved effective in improving the crop growth. Paclobutrazol at 150 ppm can be used for increasing yield and suppressing vegetative growth of pole type varieties of French bean.

Harvesting and yield

- The crop is ready for first harvest in about 45 days after sowing. The green pods are to be picked when they are immature and fully grown but still tender. As the harvest is delayed, the total yield increases but the quality falls rapidly due to over maturity of pods, fiber development and rough surface. The yield of tender pods varies from 8-10t/ha in bush varieties and 12-15 tons in pole types.

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