



# MARUMEGH

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### PRODUCTION TECHNOLOGY OF OKRA

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**Common name:** *Lady's finger* or *okra* (english), *gombo* (French), *guino-gombo* (Spanish), *Bhindi* (Hindi) and *bamiah* in arabic

**Botanical name:** *Abelmoschus esculentus* (L.) Moench

**Family:** Malvaceae; **Chromosome number:** 2n=130

Okra is cultivated for its tender fruits, used in curry and soups after cooking. It is a good source of vitamin A and B, protein and minerals. Okra is said to be good source of iodine and very useful for the treatment of goitre. Fruits are useful against genito-urinary disorders and chronic dysentery. Fruits are also dried or frozen for use during off-season. Dried fruit skin and fibres are used in manufacturing of paper, card board and fibres. The root and stem are useful for clearing cane juice in preparation of jaggary (Gopalakrishnan, 2007). India is the largest producer of okra in the world. The major okra growing states are Uttar Pradesh, Odisha, Bihar, Andhra Pradesh and West Bengal. Fresh okra is an important vegetable which is exported from India to Middle East U.K., Western Europe and USA (Anonymous, 2015).

**Climate:** It requires warm and humid conditions for good growth. It is susceptible to low temperature. It can be grown successfully under the temperature ranging between 25– 30° C. The okra plants grow taller in the rainy season than in the warm summer. For seed germination optimum soil temperature and a temperature range between 25 C and 35° C is required, with fast germination observed at 35° C. Seeds fail to germinate below 17° C. At temperature above 42° C flower buds in most of the cultivars may desiccate and crop causing yield losses.

**Soil:** Sandy to clay soils, so long as those are well manured, supplied with enough organic matter and with good drainage are fit for okra cultivation. For best yield, soil pH should range between 6.0 and 6.8, because maximum nutrient uptake through roots, in most of the cultivars. However, Pusa Sawani is adopted to larger pH range and has some tolerant to salinity.

#### Important Varieties

Arka Abhay, Arka Anamika, Pusa Sawani, Pusa Makhamali, Pusa A-4, MDU-1, Co-1, Punjab-7, Punjab-8, Punjab Padmini, Parbhani Kranti, Hisar Unnat, Varsha Uphar, Azad Kranti, Harbhajan Bhindi

Hybrids: Co-2, Co-3

**Land preparation:** The land should be well prepared by one deep ploughing and 3-4 normal ploughings. The plant has well developed tap root system and is a heavy feeder and as such the soil should also be made rich in organic matter content. Well rotten farm yard manure should be incorporated at soil preparation. The total amount of phosphorus, potash and half of

nitrogen should be added at the time of final preparation of soil. Level the soil at last ploughing.

**Sowing season and seed rate**

- i. Spring-summer (beginning of February to the end of March) – 18-22 kg/ha
- ii. Rainy season (May- July) – 8-10 kg/ha

**Method of sowing and spacing:** Okra gives little success on transplanting and thus seed is sown directly in the soil by seed drill, hand dibbling or behind the plough. Broadcasting is not recommended due to high seed rate as well as inconvenience in cultural operations and harvesting. Sowing on ridges ensures proper germination, economizes irrigation water during spring summer and helps in drainage during rainy season. It is always better to do seed sowing in a moist-soil than irrigating the field after sowing.

The vegetative growth during spring summer is relatively less, hence a distance of 45 x 20 cm is recommended. For May- July sowing, a distance of 45-60 cm between rows and 25-30 cm between plants is considered the best.

**Seed and soil treatment:** Seed treatment by soaking in 0.2% bavistin solution helps in activating germination process and initially protects seedling from soil borne diseases. Soil treatment with furadan @ 2 kg a.i./ha (20-22 kg product) helps in protecting plants from root knot nematode and other root and shoot pests during initial 4-5 weeks. Soil treatment with weedicides should be done as per directives specific to the chemical being used.

**Manuring and fertilization:** The crop is manured with FYM @ 15-20 tons/ha and N:P:K @ 125:75:60 kg/ha. One third N along with other fertilizers should be given as basal and rest N should be top dressed in two split doses at 30 days after sowing and at flowering.

**Irrigation:** Seed should be sown when the soil is moist. First irrigation is required at the initiation of first true leaf during spring summer and its expansion during *kharif* (rainy) season. After fruit setting, water requirement is critical. Flooding or wilting of plants should be avoided. Drip gives considerable yield increase and saves 70-80 % irrigation water.

**Weed management:** The spring summer crop may need two or three weeding and hoeing but the rainy season crop may need frequent weedings. Proper weed management in okra saves 90 per cent crop losses reported due to weeds. Fluchloralin (Basalin 48 EC) @ 1.5 kg a.i./ha as pre sowing soil incorporation and pendimethalin (Stomp 30 EC) @ 0.75 kg a.i./ha as post emergence is recommended.

**Training/ pruning:** Ratoon crop in kharif from plants of spring-summer sowing by pruning them at 20-25 cm height. Arka Abhay and Pusa A-4 are suitable for ratoon crop as given quick branching after pruning.

**Use of plant growth regulators:** Plant growth regulators affect okra in many ways, such as enhancing germination, early flowering, promoting growth, increasing fruit yield and quality. Spraying the plants with 200 ppm NAA at 30 and 45 days after sowing was effective in increasing fruit yield, while spraying with 400 ppm CCC resulted in early flowering and better chlorophyll content in fruits (Kokare *et al.*, 2006).

**Harvesting and yield:** In general, harvesting every alternate day is advisable. It takes 7-8 days from flowering to picking of fruits. Generally the consumer prefers small tender fruits of 7 to 10 cm long. An average yield of 8 tonnes green fruits per hectare during spring-summer and 12.5 tonnes during rainy season is ideal.

## Plant Protection

### Insect Pests

**Shoot and fruit borer (*Earis vittella*):** Larvae bore into the fruits which become unmarketable and cannot be used for human consumption. The larvae bore into the growing shoot initially and fruits at later stage. It is the major pest of okra.

#### Control:

1. Good management practices, first adopt the preventive tactics followed by curative tactics.
2. Summer ploughing and clean cultivation are also helpful in reducing the pest population.
3. Follow the crop rotation excluding cotton and hollyhock.
4. Regularly remove the attacked fruits and bury them deep into the soil.
5. Spray carbaryl (0.2%) or cypermethrin (0.05 %) at fortnight interval.

**White fly (*Bemisia tabaci*):** The insect do not cause considerable damage to the crop but act as vector to transmit the yellow vein mosaic virus disease.

#### Control:

1. Follow good crop rotation with crops who are not affected by jassids and white flies
2. Use of biocontrol tactics by releasing predators.
3. Prophylactic spray of neem oil-garlic mixture at fortnightly intervals is advantageous for avoiding pest incidence.
4. Spray the crop either malathion (0.1 %) or dimethoate (0.03%) or monocrotophos (0.05%) starting from the attack of insect.

**Jassids (*Amrasca biguttata biguttata*):** Wedge shaped pale green jassids such sap from under surface of leaves causing marginal yellowing, cupping and drying of leaves. Infestation is severe during summer. Control measures are same as white fly.

### Diseases

Yellow vein mosaic virus is often severe in Northern India, while powdery mildew is a serious disease in the southern part of India. Yellow vein mosaic virus disease is almost a limiting factor for successful cultivation of okra in India.

**Yellow vein mosaic:** This viral disease is characterized by yellowing of veins. In extreme cases the entire leaf turns completely yellowing colored. The infected plants remain stunted and bear very few, yellow coloured fruits. The virus is transmitted by white fly (*Bemisia tabaci*).

#### Control:

1. Grow resistance varieties like Parbhani Kranti, Varsha Uphar, Panjab Padmini, Arka Abhay, Arka Anamika etc.
2. Destruction of weed hosts, whenever possible, should also be given importance.
3. Rogue out the diseased plants from the fields as earliest as possible.
4. Control white fly by spraying malathion (0.1%) or dimethoate (0.05%) at an interval of 10-15 days.

**Enation leaf curl:** Small, pinhead out growth (enations) on the undersurface of leaves appear and leaves curl in an adaxial direction. The most characteristic symptoms of the disease are

twisting and bending of leaf petioles. The virus is also transmitted by white fly. Control measures are same as yellow vein mosaic virus.

**Powdery mildew:** This disease is caused by a fungus *Erysiphae chicoracearum* under prolonged humid conditions. White powdery pustules appear on lower surface of leaves resulting in yellowing and death of leaves. Spraying of wettable sulphur (2g/l) or sulphax (0.2%) is recommended for control.

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