

Arka Nikita – New GMS based okra F₁ hybrid

Arka Nikita is F₁ okra hybrid with dark green, smooth, five ridged fruits; high yield (21.0-24.0 t/ha) and tolerant to YVMV and suitable for both *kharif* and *rabi* seasons. It is well adapted to okra growing regions of Karnataka, Andhra Pradesh, Bihar, Orissa, West Bengal, Tamil Nadu, Haryana, Maharashtra and Andaman and Nicobar Islands. Arka Nikita is F₁ hybrid cross between GMS-4 × IIHR -299-1., and is being evaluated at 11 centres of All India Co-ordinated Vegetable Improvement Project AICRP(VC) and five centres each of UHS, Bagalkot, Zonal Advisory Research Council Southern Zone, Southern Transition zone (Zone-7) and Central Dry Zone-IV of Karnataka. So far around 750 kgs of hybrid seeds were sold and it has covered more than 300 acres of okra growing states in the country. It is a first commercial genetic male sterile based F₁ hybrid from the public Institutions in the country and the world. It is very much suitable for precision farming (Drip irrigation, mulching and fertigation system). It has also come up very well for organic cultivation with palak as intercrop.

THE details relevant to the variety are discussed here.

Soil

It is grown on sandy to clay soils but due to its well-developed tap root system, relatively light, well-drained, rich soils are ideal. As such, loose, friable well-manured loam soils are desirable. A pH of 6.0-6.8 is ideally suited. All soils need to be pulverized, moistened and enriched with organic matter before sowing.

Land preparation

Bring the soil to a fine tilth after 2-3 ploughing and harrowing. Level the land with a leveler. Incorporate well rotten FYM @ 25 tonnes per hectare (10 tonnes/acre) to improve the soil texture and aeration. Prepare ridges and furrows spaced 60 cm apart during *kharif* and 45 cm apart during summer season.

Manures and Fertilizers

Source	Per hectare
Organic manures	25 t FYM
Nitrogen	100 kg (500 kg Ammonium Sulphate)
Phosphoric acid	50 kg (312 kg Super phosphate)
Potash	50 kg (83 kg Muriate of potash)

Before sowing incorporate 25t of FYM per hectare. Open up a deep narrow furrow on one side of each sowing ridge. Apply the fertilizer mixture containing 50 percent nitrogen, full dose of phosphorous and potash, in these

furrows cover the fertilizers with soil and irrigate.

Sowing time

Southern plains: June-July; September; February-March
Northern and Western plains: July-August; February-March

Eastern plains: May-June; February-March

Hilly Areas: April-June.

Spacing

A planting distance of 60 cm × 30 cm, accommodating 55,000 plants/ha is recommended for branching and robust types, while 45 cm × 30 cm accommodating 75,000 plants/ha is for non-branching types. During spring-summer season with less plant growth this spacing is kept at 45 cm × 30 cm or even less. For harvesting smaller fruits for fresh fruit export a group of 2-3 rows at 20 cm distance keeping 60 cm between these groups of rows could be planted allowing 20-30 cm between plants within the rows. This eases harvesting and checks branching.

Seed rate

It is around 6.5 kg/hectare. Higher seed rate could be used if the crop is to start early in summer as it augmented germination loss due to temperature. Higher seed rate and lower spacing could also be opted for summer crop to lower the field temperature and keep fruiting going on under frequent light irrigation.

Sowing of seeds

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 as it increases seed rate as well as causes great proper inconvenience in cultural operations and harvesting. Sowing on ridges ensures proper germination, reduces water requirement during spring-summer and helps in drainage during rainy season. Seed treatment with some protective agents may still help in better germination, good survivability and also better yields. For chemical treatment, seeds can be soaked in Ridomet 0.5 gm/L + Plantomycin 0.5 gm/L + Humic Acid [mixture before sowing].

Irrigation

Irrigate the furrow lightly soon after the seed sowing to ensure good germination. Irrigate subsequently at an interval of 3-4 days depending upon the soil and weather conditions. If temperature goes around 40°C frequent light irrigations are recommended to help proper fruiting. Thus soil should be kept moist and flooding or wilting of plant should be avoided. Drip irrigation saves around 35% water requirement. Moisture stress during flowering and fruit/seed setting causes around 70% crop losses.

Thinning of plants

Thin out the closely germinated plants at one true leaf stage.

Weed control

Proper weed management in okra could save up to 90% crop losses due to weeds. A total of 3-4 hand weedings starting from 20 days after sowing are required till the crop covers the soil surface.

Top dressing

Apply the remaining 50% nitrogen at the base of each channel 30 days after sowing followed by earthing up operation.

Integrated pest and disease management strategies

- During early stage of crop growth insects like aphids,

jassids and white flies can be controlled by spraying confidor 0.3 ml /litre of water.

- To control shoot and fruit borer spray coragen 0.3 ml/litre of water along with 2 ml of sandovit (sticker).
- To control *Fusarium* wilt, drench the soil with bavistin 2 g /litre of water
- Grow maize/sorghum on borders as a barrier/trap crop for the entry of shoot and fruit borer adults.
- Set up yellow sticky traps (4-6 no. per acre of plot for white fly reduction, etc.
- Erection of bird perches @ 10/acre in the field for facilitating bird predation.
- Give two to three sprays of NSKE @ 5% alternating with sprays of pesticides, if needed, for leaf hopper, white fly, mites and aphids etc. Leaf hopper, if crosses ETL (5 hoppers/plant), spray imidacloprid @ 0.50 ml/liter of water. This will be effective in controlling other sucking pests as well.
- Install pheromone traps @ 2/ acre for monitoring of *Earias vittella* moth emergence. Replace the lures after every 15-20 day interval.
- Release egg parasitoid *Trichogramma chilonis* @ 1-1.5 lakh/ ha starting from 30-35 days after sowing, 4-5 times at weekly interval for shoot and fruit borer. Shoot and fruit borer, if crosses ETL (5.3 % infestation), spray cypermethrin 25 EC @ 200 g a.i/ha.
- Rogue out the YVMV affected plants, if any, from time to time.
- Periodically remove and destroy the borer affected shoots and fruits.
- Spray organic 3G (Garlic, Chilli and Ginger) extracts 20 ml/litre of water during morning and late evening hours to control sucking pests of Aphids and Jassids.

Harvesting and post-harvest management

The crop is ready for first picking 50-55 days after sowing. Harvesting the tender fruits can be done in 2-3 days interval depending upon the season. The fruit picking may continue up to 70-75 days after flowering. Early harvesting gives lower yields of tender fruits with

Table 1. Mean performance of okra hybrid Arka Nikita (F₁ hybrid)

Character	Kharif season	Summer Season	Rabi season
Earliness (Days)	33.00	31	34
Days to first harvest	39.00	36	36
No. of branches	4.33	3.8	3.5
Plant height (cm)	169.00	157	162
Fruit length (cm)	12.93	11.10	12.00
Fruit diameter (cm)	1.70	1.65	1.71
Fruit weight (g)	26.5	22.51	25.20
Fruit colour	Dark Green	Dark Green	Dark Green
Yield (t/ha)	25.75	23.37	21.55
Incidence of YVMV	Tolerant	Tolerant	Tolerant
Incidences of powdery mildew	Susceptible	Tolerant	Susceptible
Incidences of <i>Cercospora</i> leaf spot	Susceptible	Tolerant	Susceptible



GMS-4 Female parent



Male parent (IIHR--299-14)



Arka Nikita (F₁ hybrid)



Fruits of Arka Nikita (F₁ hybrid) at marketable stage



Arka Nikita plants with fruits

shorter shelf-life. In general, harvesting on every alternate day is advisable. A cheap hand glove or cloth bag should be used to protect fingers. Harvesting in the morning is convenient for distant markets, harvesting late during evening and transporting during night is also advised. The fruits are graded. For processing industry and fresh fruit export 6-8 cm long fruit are sorted out. Longer fruits are used for fresh market. For local market, fruits are cooled (preferably) and filled in jute bags or baskets, covered or sewed and then water sprinkled over it. This helps in cooling as well as increasing turgidity of fruits, which tightens the pack and saves product from bruises, blemishes and blackening. In air-tight containers the fruits may turn pale during transit due to heat generated by them. For export, suitable size perforated paper cartons are taken, pre-cooled fruits are packed and transported in refrigerated vans. Export market requires tender, dark green, straight, short (6-8 cm) fruits.

Yield

21-24 t/ha. (Table 1)

Salient feature of Arka Nikita

- Yield: 21-24 t/ha
- Green fruits
- Smooth, thin and tender fruits
- 5 ridge and easy to harvest
- Early fruiting : 39-43 days
- Green stem and unique petal base (Purple colour in inside petals)
- Suitable for *kharif* and summer season
- Seed production is easy and save 70% labour cost by avoiding emasculation.
- Rich in Iodine: 33.31µg/kg.
- Rich in mucilaginous substance: 1.08% (FW)
- Rich in edible fiber: 8.85% (DW)

For further interaction, please write to:

Mottaiyan Pitchaimuthu (Principal Scientist), Division of Vegetable crops, Indian Institute of Horticultural Research, Hessaraghatta Lake Post, Bengaluru 560 089, Karnataka. Corresponding author e-mail: m.pitchaimuthu@icar.gov.in