ICAR-IIHR ROSE VARIETIES FOR OPEN FIELD

Rose is the most popular flower crop in India and in the world. In India, it is grown for both cut flower and loose flower purposes. Flowers cut with long stalk are considered as cut flower and used in floral arrangements. Flowers cut with only pedicel are popularly known as loose flowers and are traditionally used for garland preparation and for pooja purpose. Fragrant roses are used in aromatic as well as cosmetic industry. Roses are known for their nutraceutical values and fragrant rose petals are ideal for preparing gulkhand and as additive to various food items. Rose water extracted is widely used for adding flavor to various food items. It is identified for its floriferous nature with high yield. Flowers are cut with pedicel and potential yield of loose flowers expected is 30 tons/acre/year. In addition to high yield, it has added advantage of long shelf life of 5-6 days.

Arka Savi: It is a spray category of rose belonging to floriferous group. Flowers are small to medium in size and come under category of button roses in market. Flowers are Purple Pink in colour and are produced in bunches. ‘Arka Savi’, is identified for its floriferous nature with high yield. Flowers are cut with pedicel and potential yield of loose flowers expected is 30 tons/acre/year. In addition to high yield, it has added advantage of long shelf life of 5-6 days.

Arka Parimala: It is a red colored fragrant variety. It is suitable for open field cultivation with multiple utility as loose flower and for cut flowers. Flowers cut with 30-40cm stems can be used in floral decorations that add value to arrangements with its fragrance. Cut or loose flowers have vase or shelf life for 2-3 days. With rich antioxidant content, it has potential for food colour and food flavor. Petals of this variety can be used for preparation of rose tea and gulkhand. It has field advantage of long shelf life of 5-6 days. ‘Arka Nishkant’ is a spray category of rose belonging to floriferous group. It is a red colored fragrant variety. It is suitable for open field cultivation with multiple utility as loose flower and for cut flowers. Flowers cut with 30-40cm stems can be used in floral decorations that add value to arrangements with its fragrance. Cut or loose flowers have vase or shelf life for 2-3 days. With rich antioxidant content, it has potential for food colour and food flavor. Petals of this variety can be used for preparation of rose tea and gulkhand. It has field advantage of long shelf life of 5-6 days.

Soil and climate
Deep loam soil (upto 50 cm) rich in organic matter with pH of 5.5-6.5 is ideally suited for rose cultivation. The growing medium may consist of soil, sand and FYM in the ratio of 2:1:1. Places with day temperature ranging between 25-30°C and night temperature of 15-18°C are suitable for rose production.

Propagation
Rose plants are propagated by budding or top-grafting on rootstocks like Rosa indica, R. multiflora, and R. canina. ‘Arka Nishkant’ is a variety of rose stock without any prickles and easy to bud with high bud uptake. Budding in polybags is ideal for easy transportation of material. Budded plants of 3 months old are used for planting.

Planting
Planting can be taken up in rows with spacing of 2 meter between rows and 1 meter between plants. Depending on the spacing, pits or trenches of 1-2 feet depth are dug to fit roots in the proper position un bent. After planting, it is advisable to provide maximum humidity either with misting or with a hose pipe so that the soil settles around roots with no air pockets. Care must be taken while planting to ensure that the bud union is 2-3 cm above soil. Initial four-six months after planting, plants should be nurtured to build good vegetative growth by continuous removal of buds. Identification and removal of emerging root stocks in its initial growth is very essential as root stocks are vigorous and try to overtake the budded variety.

Nutrition
Organic manure at the rate of 15 kg/m² is added and mixed with the soil at the time of bed-preparation. A fertilizer dose of 400:320:600 kg NPK/ha/year is recommended with basal application of 2 kg Superphosphate, 1 kg Calcium Ammonium Nitrate and ½ kg of Muriate of Potash per 10 m² before planting. Remaining quantity of N and K is supplied through biweekly fertigation with N at 1.92 g/m² and K₂O at 2.88 g/m² per fertigation using water soluble fertilisers. Micronutrient formulations @ 2 g/l or individual nutrients are supplied through foliar spray or fertigation. Regular analysis of soil, water and leaf will be good guide to supply optimum nutrients.

Irrigation
Drip irrigation of 4-6 lt of water/m²/day is optimum. However, depending upon temperature, relative humidity and light conditions this can vary.

Pruning
Depending upon the growth of the plants, pruning can be taken up once in 1-2 years. Pruning allows the removal of old and infected branches, initiating the fresh growth. Cut ends of the branches need to be sealed with paste of copper-oxy-chloride to prevent die-back. It is ideal to prune the plants before the initiation of monsoon.

Harvesting
Harvesting of flowers should be done either in the morning or evening hours. Stage of harvest varies with the variety and distance to the market. Loose flowers are harvested at the initiation of flower opening. Depending upon the demand of market, flowers can be harvested at different stage of petal unfurling. Flowers of Arka Parimala and Arka Sukanya can be covered with bud caps to enhance the flower bud size, for marketing them as cut flowers in local markets.

Insect pests and Disease management

<table>
<thead>
<tr>
<th>Insect pests</th>
<th>Symptoms</th>
<th>Management practices</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thrips</td>
<td>Thrips suck cell sap from tender leaves, buds and flowers. Curled leaves with brown marks and deformed buds with burnt margins are the main symptoms of damage. Young shoots and buds get severe infestation.</td>
<td>Spray Acephate 75 SP (1 g/l) or Fipronil 5 SC (1.5 ml/l) or Imidacloprid 17.8 SL (0.5 ml/l) in rotation. Spray Spinosad 45 SC @ 0.3 ml/l if the incidence is severe. Drench the beds with chloropyrifos 20 EC @ 5 ml/l for killing resting pupae in the soils.</td>
</tr>
<tr>
<td>Mites</td>
<td>Adults and nymphs suck sap from tender buds and leaves resulting in discoloration, bronzing and drying of affected leaves.</td>
<td>Spray Dicofol 18.5 EC (2.5 ml/l) or Abamectin 1.9 EC (0.5 ml/l) or Azadirachtin 1% (3 ml/l)</td>
</tr>
<tr>
<td>White fly</td>
<td>Both nymphs and adults sucks the plant sap devitalizing the plant. Sooty mould develops on the infested plants.</td>
<td>Install yellow sticky trap to attract and kill adults. Spray Methomyl 40 SP (2 g/l) or Difentrifuron 50 SP (1 g/l)</td>
</tr>
<tr>
<td>Aphid</td>
<td>Both nymphs and adults suck cell sap and devitalize plants. High humidity and cloudy weather (October - November) favors rapid buildup of aphids. Affected leaves get deformed while buds retard in growth.</td>
<td>Spray Acetamiprid 20 SP (0.25 g/l) or Dimethoate 30 EC (2 ml/l) when infestations begin. Spraying of neem or pongamia oil 1 % also gives effective control. In case of severe infestation, spray Imidacloprid 17.8 SC @ 0.5 ml/l. Spray of Lecanicillium lecanii at 3g/l also effective against aphids.</td>
</tr>
</tbody>
</table>
**Bud borer**

Female moth lays cream coloured eggs on young buds. Hatched larvae bore into buds by making holes and feed on petals. Collection of mature larvae reduces borer population. Spray indoxacarb 14.5 SC @ 0.75 ml/l or Thiodicarb 75 WP @ 1.5 g/l. Spraying of Ha-NPV @ 250 LE per ha is also effective.

**Disease management**

<table>
<thead>
<tr>
<th>Disease</th>
<th>Symptoms</th>
<th>Management practices</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black spot</td>
<td>The symptoms on leaves appear as coal-black, circular or irregular spots with fimbriate margins and yellow haloes. The symptoms first appear on leaves followed by branches.</td>
<td>Spray Mancozeb 75 WP (2g/l) as preventive spray and Kresoxim methyl 44.3 SC (1g/l) or Trifloxystrobin + Tebuconazole 75 WG (1 g/l) as curative spray.</td>
</tr>
<tr>
<td>Powdery mildew</td>
<td>Powdery growth appears on upper surface of young leaves.</td>
<td>Spray Azoxyostrobin 23 SC (0.5g/l) or Tebuconazole 25 EC (1g/l) or Hexaconazole 75 WG (1g/l)</td>
</tr>
<tr>
<td>Downey mildew</td>
<td>The fungus causes chlorotic blotches on the upper surface of the matured leaves, which ultimately become necrotic. The infection on flower buds occurs very early and leads to total drying of flowers. The infected flowers get malformed and fail to open.</td>
<td>Spray Metalaxyl 35 WS (2g/l) or Metalaxyl + Mancozeb 72 WP (1g/l) or Dimethomorph 50 WP (1g/l)</td>
</tr>
<tr>
<td>Botrytis blight</td>
<td>On leaves Botrytis causes water soaked lesions, which spread very fast. On flowers the infection occurs as small water soaked spots resulting in immature fadding and drying of petals, which drop ultimately.</td>
<td>Maintaining hygienic conditions in the polyhouse and reducing free occurrence of moisture on plant parts mitigates the disease. Preventive sprays with Mancozeb 75% WP (2 g/l) or Chlorothalonil 75 WP (2g/l) and curative spray with Carbendazim 50 WP (1g/l).</td>
</tr>
</tbody>
</table>

**Crown gall**

Galls are also formed on roots and on stems wounded due to harvesting, pruning and other cultural operations. Use of disease - free planting material and destruction of infected material.

**Die-back**

The infection occurs at the pruned ends of stems or through wounds caused due to harvesting of flowers and other operations. The infected stems dry from tip downwards often extending to the main stem and thus killing the entire plant. Copper fungicides as paste to cut ends immediately after pruning.

**Mosaic disease**

Foliar symptoms include mosaic pattern and mottling. Often the symptoms are very faint and confined to a few leaves only. Clean nursery stock of mother plants. Usage of seedling root stocks as the seedlings are known to be free from viruses.

**Nematodes**

Nematodes induces galls on the roots blocking the transport of water and nutrients within the plant. Heavily infested plants are often dwarfed with smaller leaves and appear paler than normal. Apply Carbofuran 3G (20 g/m²)

---

**Published by:**
Director, ICAR-IIHR, Hesaraghatta Lake Post, Bengaluru-89

**Compiled & Edited by:**
Tejaswini P., Sridhar V., Priti Sonavane and G.R. Smitha

**For further information and planting material contact:**
Ph: 080-23086100, 080-28466420 Extm 230/252/260; director.iihr@icar.gov.in / floriculture.iihr@ icar.gov.in / seeds. iihr@icar.gov.in