

Commercial Cultivation Techniques of Rose under Open Field Condition

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ARTICLE ID: 14

Introduction

Rose is one of the oldest flowers in cultivation and most popular garden flowers throughout the world. It is number one flower under cultivation and area. The flowers are available in different attractive colours and look beautiful. It is also known as queen of flowers. It has achieved top most position in the domestic and international market. Its cultivation has developed with the distillation of rose water as mentioned in the Ayurveda by Charaka around 100 A.D. It is used as a cut flower and loose flower both. Cut flowers are mostly used for the decorations, preparations of bouquets, wreaths, floral ornaments and arranged in vases. Loose flowers are used for garland making, extraction of essential oils, attar, distillation of rose water, preparation of some sweets like gulkand, gul-rohan, rose sharbat etc. Rose has some medicinal properties. Rose oil is generally used as a fragrance component of some pharmaceutical products like ointments, lotions, perfumes, soaps and creams. It is also used in some food products like beverages, frozen dairy products, baked foods and sweets. Gulkand is prepared from rose is blood purifier, laxative and hips of rose is the richest source of vitamin C. Rose oil can also be used in the treatment of wide range of stress related conditions and used for the treatment of depression, impotence, insomnia,, frigidity, headaches, nervous tension and stress related disorders. Rose is grown in all over the world. In India rose growing states are Uttar Pradesh, Rajasthan, Gujarat, Maharashtra, Himachal Pradesh, New Delhi, Chandigarh, Haryana, Punjab, Karnataka, Tamil Nadu, Madhya Pradesh, Bihar, West Bengal, Chhattisgarh etc. Rose is a flowering shrubs with prickly stem, leaves are alternate and compound and the fruit of rose is called as hip. Generally Hybrid tea roses are cultivated commercially under open field condition and protected condition for cut flower production.

- **Scientific Name** - *Rosa species*

- **Family** - Rosaceae
- **Chromosome No.** - $n=7$, $2n=14$
- **Origin** - Northern Hemisphere



Different Classes of Rose

- | | | | |
|---------------------|----------------------|-------------------|---------------|
| 1. Hybrid Teas | 2. Hybrid Perpetuals | 3. Floribundas | 4. Teas |
| 5. Grandifloras | 6. Polyanthas | 7. China rose | 8. Miniatures |
| 9. Damask rose | 10. Bourbon rose | 11. Cabbage rose | 12. Moss rose |
| 13. French rose | 14. Albas | 15. Noisette rose | 16. Rogosas |
| 17. Austrian briars | 18. Ramblers | | |

Climate

The production of rose flowers are taken throughout the year and it is cultivated round the year. Rose is a sun loving plant and requires good quantity and quality of sunlight throughout the year but the fluctuation in light may result in petal damage or leaf burn. Temperature range $15-28^{\circ}\text{C}$ and high relative humidity 75% is ideal for quality flower production. Too much relative humidity creates condition favorable for the disease and pest development while lack of it reduced the flower size, leaves and stems.

Soil

Rose is grown in wide range of soil but the sandy loam soil is ideal for rose cultivation. Soil should be rich in organic matter, deep, friable, well drained with pH ranging from 5.5-6.5. Water holding capacity of the soil should be good. Also soil should be free from any kind of disease, pest, nematodes and soil borne fungi.

Land preparation

The land preparation should be done during the summer season one month before planting. So the soil gets exposure to sun and during the rainy season or monsoon the soil will be settled down before planting. The selected area should be cleaned by collecting the weeds, stubbles by digging up to 25-30 cm. All the stones, gravels, bricks, unnecessary materials like plastics should be collected. While pulverizing the soil care should be taken that top soil should be remain on the top.

Beds and Pits preparation

Beds and pits are prepared one month before planting may be in the month of May-June. Required size raised beds should be prepared. The size of the beds are generally 60-75 cm wide and trench of 40-60 cm across is dug 30 cm depth. Pits of size 20-30 cm wide and 30 cm deep should be dug before the rainy season or monsoon.

Manures and Fertilizers

Rose respond well to the manures and fertilizers. Rose required well decomposed FYM. It requires nitrogen 200-400 kg/ha. This nitrogen is given in two split doses once after pruning and second dose 20 days after pruning. Phosphorus and potassium requirement is fulfilled by adding 150 kg/ha phosphorus and 150 kg/ha potassium at the time of pruning. Foliar spray of urea (1.25 g) and potassium dihydrogen phosphate (1.25 g) mixed in one litre of water is recommended for rose. A weekly spray of urea 30 g/l of water is also recommended.

Planting

Favourable time of planting rose is June-October. Planting is also done during the month of October-November and February-March. Planting is done on the well prepared beds and soil should neither too wet nor too dry. The plants are planted in the center of hole. The earth ball is scrapped properly and easily and gradually lowered in the bottom of the hole and placed at the ground properly. The earth ball around the root pressed properly to remove the air pockets and the pit filled with soil.

Spacing

- Hybrid teas- 75 x 75 cm or 60 x 75 cm
- Cut flowers- 30 x 60 cm
- Miniatures- 30 x 30 cm
- Polyanthas 45 x 45 cm

- Climbers- 2-2.5 m

Propagation

- **Cuttings**

Mainly cuttings are used for the propagation of some species like polyanthas, climbers, ramblers, miniatures, some scented species of rose and used for the preparation of rootstock. Cuttings are collected from the healthy plants generally of pencil size with 15-20 cm long with 3-4 nodes. Cuttings are generally treated with IBA for better rootings. Cuttings takes 3-4 weeks to develop better roots.

- **Budding**

Budding is commercial methods of propagation of rose. Generally hybrid tea rose is commercially propagated by budding. The dormant eye of selected or chosen variety as a scion budded on the rootstock. T budding or inverted T or I budding is generally followed in rose. The plants developed by budding method of propagation build up within less time and produce economic production in less time. The common rootstocks generally used are *Rosa multiflora*, *Rosa indica var. odorata*, *Rosa burboniana*, *Rosa canina* and *Rosa multiflora*.

Irrigation

The frequency of irrigation is depend upon the soil type, weather condition and stage of plant growth. Generally irrigation is given at weekly interval and frequency of irrigation is increased during summer season and in light soil. Irrigation is given at 5-7 days interval in summer and hotter months and 8-10 days interval during winter season. Irrigation should be given immediately after planting and pruning. Over watering is harmful during flowering season. If irrigation is being given by drip irrigation system then one litre of water per day per plant should be given.

Varieties

- **Hybrid Teas-** Abhisarika, Arjun, Arunima, First red, Raktagandha, Priyadarshini, Bhim, Dr. B. P. Pal, Gladiator, Toro, Eiffel tower, Golden gate, Golden time, Kiss of fire, Holiday mutant, Pusa Gaurav, Black Lady etc.

- **Floribunda-** Arunima, Deepshikha, Pusa komal, Pusa Shatabdi, Jantar Mantar, Kum Kum, Suryakiran, Neelambhari, Delhi princess, Akash Nartaki, Sindhoor, Sadabahr, Suchitra, Banjaran, Chitchor etc.

- **Polyanthas-** Swati, Anjani, Rashmi, Nartaki etc.

- **Miniature-** Delhi Scarlet, Windy City, Dark Beauty, Dizzler etc.

Intercultural operations

- **Weeding**

Weeds are the major problem in rose cultivation. Weeding is very essential to keep the field weed free. Manual weeding is found effective to remove the weeds from the field. The incidence of weeds can be reduced by the use of mulching. 2-4 inches layer of organic mulches like wheat straw, wood chips and other organic materials are found effective to control weeds and proper growth and development of plant.

- **Pruning**

Pruning is the removal of unwanted, unproductive, diseased and dead branches from the plant to make the plant vigorous and productive. Pruning is the most important operations in rose cultivation. For production of cut flowers pruning is generally done in the first week of October under north Indian condition and last week of June and again in November in Bangalore condition. The height of pruning is varies from 30-45 cm from the base of plant. Hard to moderate pruning is given to the Hybrid teas. Floribundas requires light pruning. Polyanthas and miniature only requires thinning of overcrowded branches. In climbers only diseased and damaged branches are pruned. In the first year, cut back the shoots to four developed buds remain. In the second year retain all strong shoots and only diseased shoots are removed. At 4-5 buds shoots are cut back. In the third year all the vigourous shoots are cut half on its growth. After 5-6 years plants needs rejuvenation and cut all the main branches of plant 15-20 cm from its base.

- **Pinching**

Pinching is the removal of terminal growing portion of shoots or stems. Pinching is generally done in newly budded plants for increasing or promoting the lateral branches and side shoots.

- **Disbudding**

Disbudding is the removal of buds to control the number of flowers and to increase the size of flowers. In hybrid teas the side buds are removed and the central bud is retain on the plant. Disbudding helps in increasing the size of flowers.

Diseases

1. Die back- This is a serious fungal disease of rose and it can be controlled by soil drenching with 2g/l bavistin, benomyl or demosan. Spraying of 0.2% captan or 0.2% mancozeb or 0.2% copper oxychloride immediately after pruning and then twice at 10 days interval. Also the incidence of this disease can be controlled by planting tolerant varieties like Abhisarika, Arjun, Bhim, First Prize, Priyadarshini etc. of Hybrid teas and Arunima, Jantar Mantar, Delhi Princess, Fantasia, Neelambari, Sadabahar, Suchitra etc. of floribunda varieties.

2. Black spot- Sprays of benlate or bayleton (0.1%) applied just before the appearance of spots can manage this disease. Bavistin (0.1%) is also found effective to control the incidence of disease.

3. Powdery mildew- Some protective fungicidal sprays are found beneficial to control this disease and lowering the humidity at night by using fans and venting or by heating can control the powdery mildew. *Rosa multiflora* is resistant to powdery mildew disease of rose. Varieties which are resistant to powdery mildew are Raktagandha, First Prize, Gladiator, Avon, Montezuma and Eiffel Tower etc.

4. Botrytis blight- Spray of bavistin (0.2%) or rovril (0.2%) or benomyl (0.2%) found effective to control this disease.

5. Rust- Spray of chemicals like saprol (0.2%) and bayleton (0.15%) are effective to manage rust disease of rose.

- **Insect Pests**
- **Mites-** Spray of abemactin (0.5 ml/l) or difenthiuron (Polo) should be sprayed.
- **Thrips-** Malathion is effective to control the effect of thrips.
- **Jassids-** Chlorophyriphos drenching in rose beds or before planting is generally recommended to control jassids.
- **Aphids-** Systemic insecticides like dimethoate (0.15%) is generally sprayed to control the aphids attack.

Physiological disorders

1. Blind shoots

Blind shoot means a stem of plant fails to develop a bud. It is a non-flowering growth of plant and it must be removed for proper growth of plant. Foliar spray of ascorbic acid at 1000 ppm reduces the blind shoots production.

2. Bent Neck

This is a postharvest physiological disorder of rose. In this the flower stems of cut rose bent after harvest. Bent neck affects the quality of flower stems. The incidence of this occurs due to soft growth of tissues, premature bud harvest and excessive loss of water during handling. Use of cobalt nitrate 200 ppm along with 10% sucrose in floral preservative with pH 6.0 found very effective to control this disorder and fumigation with methyl bromide at 50⁰ C reduces incidence of bent neck.

3. Bull head

Incidence of this disorder generally occurs due to low temperature at night. It also occurs due to abnormal production of gibberellins and cytokinins.

4. Balling

The bud fails to open due to excess moisture causing the petals to stick together, known as balling. Its incidence occurs in cool areas and damp nights. Roses with more petals are susceptible to balling.

Harvesting

Harvesting of flowers starts after one year of planting. Rose plants give economic yield up to 2-10 years. For cut flowers, stems are harvested at the time of morning at tight bud stage or two petals begin to unfold. The flower stems immediately after harvesting are placed in a container containing cleaned water to remove field heat.

For loose flowers, which are generally used for making of garland, are harvested at half open or fully opened stage depending upon the distance of market. For extraction of essential oil or rose water, flowers are generally harvested at early morning before sunrise and distilled immediately after harvesting. Flowers are graded according to the size, shape of flower and stem length and then packed in corrugated cardboard boxes after making the bunch of 20 flowers.

Yield

Yield depends upon the variety, density of planting and environmental condition. 10-20 stems plant⁻¹ or 60-70 flower stems/m² depend upon spacing obtained in Hybrid tea roses under open field condition. The yield of loose flowers is 10-50 quintal flowers ha⁻¹ in *Rosa damascena*.

