



## **Production Technology of Rose in Greenhouse**

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Floriculture is increasingly regarded as a viable diversification from traditional field crops due to increased per unit returns and increasing habit of “saying it with flowers” during all the occasions. Flowers play a cardinal role in human behaviour and culture, bringing tranquillity and peace of mind. Flowers have been associated with mankind since time immemorial, as they have been used for religious offerings and social ceremonies. Especially, the rose is one of the oldest flowers under cultivation and most popular of all garden flowers throughout the world. Greenhouse cultivation in India is of recent origin and is being increasingly practiced for production of quality produce in the off-season for export. In order to ensure consistency in the quantity and quality of production at reasonable cost, it is necessary to adopt latest technologies of greenhouse production.

### **Introduction**

Rose is a leading cut flower grown commercially all over the world. It ranks first in global cut flower trade. This flower has a worldwide consumption of more than 40 billion (Singh, 2009). The rose has not only mentioned its position as the “King of flowers” but also as the world’s most favorite flower. The heavy demand for rose cut flowers in the European markets is mainly from November to March due to the shortage of local production because of severe winter. Fortunately, this is the most congenial condition for successful production of most of the flowers, including roses in India. It is pointed out that buyer at international market prefers a very high quality rose cut flowers. As it is difficult to obtain good quality cut flowers under open conditions throughout the year, the crops should be cultivated under the greenhouse to get good quality produce. Greenhouse are framed structure or inflated structures covered with transparent or translucent material large enough to grow crops under partial or fully controlled environmental conditions to get optimum growth and high productivity. Greenhouse cultivation in India is of recent origin and is being increasingly practiced for production of quality produce in the off-season for export. This technology has been considerable importance in better space utilization, growing crops in extreme climatic conditions and high rainfall areas. The crops grown in the greenhouse remain unaffected with the outer atmosphere and thus optimum and controlled use of sunlight is made. A transparent greenhouse provides plants with optimum sun radiation for photosynthesis. Protected structures are

commonly used to grow off-season flower crops when the conditions are not favorable for their normal growing and protect them from various biotic and abiotic stresses.

### **Advantages of Greenhouse Cultivation**

- Year round cultivation of flowers.
- Helps to grow high value flower crops for export market.
- The crop yields are the maximum level per unit area, per unit volume and per unit input basis.
- The control of the microorganism allows the production of higher quality products which are free from insect attack, pathogens and chemical residue.
- Conserve moisture thus needs less irrigation.
- Income from the small and the marginal land holdings maintained by the farmer can be increase by producing crops meant for the export.

### **Varieties**

The major cut flower varieties suitable for greenhouse cultivation are First Red, Sonia, Kiss, Lambada, Konfetti, Golden Gates, Golden Time, Vivaldi, Grand Galla, Black Magic, Cobra, Mercedes, Noblesse, Starlite, etc.

### **Climate and Soil**

The ideal temperature range for rose cultivation is 15-27<sup>0</sup> C. Most commercial rose cultivars are best grown at 15.5<sup>0</sup>C night temperature. A relative humidity of around 60 to 70 per cent can be regarded as ideal for roses; high humidity particularly in conjunction with low temperature for long periods can causes diseases problems such as downey mildew and botrytis. The ideal soil for rose cultivation should be well drained, medium loam soil with a pH of 5.5 to 6.5. Heavy and saline soils are not suitable for rose cultivation.

### **Propagation**

Roses are generally propagated through T-budding. Normally one-year-old budded plants having at least 3 canes on rootstocks like *Rosa indica* var. *odorata* or *R.canina* or *R.manetti* are most ideal for greenhouse cultivation.

### **Land and Bed Preparation**

Land should be ploughed thoroughly and brought to a fine tilth after removing unwanted materials. Add well decomposed FYM @ 8-10 kg/m<sup>2</sup>. Before preparation of the beds, soil should be sterilized with formaldehyde at the rate of 0.30 per cent. Generally in greenhouse, roses are grown on raised beds to assist in easier movement and better drainage. Beds should be prepared having 30-40 cm height, 90-100 cm width and length as per availability of space in the greenhouse. The path should be 60 cm in between two raised beds.

### **Planting**

Planting of rose should be done in thoroughly prepared beds. At planting time the soil should be neither be too wet and nor too dry. In North Indian conditions, optimal planting time of rose is October-December. The planting density is kept depending upon the varieties and types ranging from 7-14 plants/m<sup>2</sup> that can be planted to cover the population of 50-60 thousand bushes/ha area. Planting should be done preferably in 2-row system.

### Water Requirement

The water requirement of rose plants depends on the types of soil, temperature, humidity and stage of the growth. Generally a rose plant requires 7-8 litres water /m<sup>2</sup> /day. Irrigation is done by drip irrigation system, having emitters at 30 cm apart on the lateral line.

### Fertigation

Fertilizers were applied through drip irrigation which is called Fertigation. It is important to analyze the nutrient status of the media at regular interval for determining the fertilizer requirement of rose plants.

**Table: 1. Fertigation Schedule for Rose under Protected Structures**

Fertigation Schedule	Dose (ppm)		
	N	P	K
Vegetative stage (September-October)	80	50	60
Flowering and harvesting flush (November-March)	100	60	80
Flowering and harvesting normal (April-August)	80	50	80

(Source: Janakiram *et al.*, 2013)

### Special Cultural Practices

For proper growth of rose plant and high production special cultural practices are to be carried out as follows:

**Bending:** It is done to encourage the plant for healthy framework at the bottom and to active more number of side shoots. Bending is also practiced for obtaining quality flowers with long stalk length. The place to be bent should be close to the original bush as possible (maximum 5 cm), without breaking the branches. The buds should be removed from the bended stem in order to check the incidence of thrips and bud rot. Only weak and blind shoots are selected for bending. The first bending is done on 35<sup>th</sup> days after planting and the second bending is done after 2 years to strengthen the plants. Bending is done on 1<sup>st</sup> or 2<sup>nd</sup> five pair of leaves. One can also grow roses in greenhouse without bending by keeping some blind shoots on plants in standing position for extra photosynthesis & uptake of water nutrients.

**Defoliation:** The removal of leaves is known as defoliation. It is done mainly to induce certain plant species to flower or to reduce transpiration loss during periods of stress. Defoliation may be done by removal of leaves manually or by withholding water. The shoots are defoliated after pruning.

**Shoot thinning:** Unproductive shoots and water suckers are to be occasionally removed for getting good quality flowers.

**Pruning:** It is recommended once a year during 2<sup>nd</sup> or 3<sup>rd</sup> week of October.

**Pinching:** Removing the terminal growing portion along with a portion of stem is called pinching. This helps to get good quality flowers and buds and avoids wastage of energy in the development of auxiliary bud if done at right stage and right time. It leads to apical dominance.

**Bud capping:** Bud caps are placed on the flower bud when they are of pea size. This helps to increase the bud size and shape to meet customer demand with required specification.

### Plant Protection

Roses are attacked by many pests and diseases that can lower quality and yields. Among the insect pests, thrips, white fly, red spider mites and aphids are important. The major diseases affecting roses are die-back (*Diplodia rosarum*), graft cancer (*Coniothyrium fuckelii*) and powdery mildew (*Sphaerotheca pannosa*).

### Harvesting

The stage of harvesting depends upon the cultivars, importer's requirement and distance to the market. Generally, rose flowers should be harvested at tight bud stage when one or two petals begin to unfold with the help of sharp secateurs. Red and pink cultivars are harvested when first 2 petals are beginning to unfold and calyx is reflexed below the horizontal line, whereas, yellow cultivars are harvested slightly earlier and white cultivars slightly later than red and pink type cultivars. There should be 1-2 mature leaves (those with five leaflets) left on the plant after the flower has been cut. The reason for leaving these mature leaves is to encourage production of new strong shoots. Harvesting is done preferably during early morning hours.

### Postharvest Handling

Roses cut stems must be placed in a bucket of water inside the polyhouse immediately after harvesting and transported to cold storage (2-4°C). The length of time depends upon the variety and quality of the roses. The rose flowers are graded according to the stem length and the quality of flower bud. Graded flowers are grouped together in bunches of 10, 12, 20 or 25. A bundle of 20 stems is usually preferred. Packing with polypropylene (24 micron) is highly effective storage technique for rose, to maintain post storage quality and vase life (Tak *et al.*, 2012)

### Flower Yield

Approx. 250-350 stems/m<sup>2</sup> is considered to be ideal. Flower yield can be increased by spraying BAP 50-100 ppm before flowering flush. Burning of saw-dust during winter months in the morning hours (7-10 AM) increases flower yield and quality significantly (Misra and Pathania, 2000).

### Conclusion

Green house technology has immense importance in utilization of space as well as creates possibility of growing crops in extreme climatic conditions and high rainfall areas due to unaffected atmospheric condition.

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