

## Rose under Protected Condition

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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.

**Cultivars:** 'Golden Gates', 'Grand Galla', 'First Red', 'Kiss', 'Konfetti', 'Mercedes', 'Ravel', 'Noblesse', 'Vivaldi' and 'Starlite'.

**Temperature requirement:** The greenhouse temperature is generally maintained from 20°C or 21°C on cloudy days and 24°C – 28°C on sunny days. However, plenty of light, humid and moderate temperature ranging from 15°C to 28°C may be considered as optimum conditions for roses. Ideal humidity – 60-65% and high RH results Powdery mildew and lower RH causes desiccation and reduce flower quality. CO<sub>2</sub> level- 1000-1200 ppm is favorable.

**Growth media:** Well drained soil rich in organic matter and oxygen is good for roses. Organic matter as high as 30 per cent in the top 30 cm of the growing beds is preferred by many growers. The pH of the soil should be around 6 to 6.5 with less EC.

**Layout and Planting:** Raised beds are prepared, 5 beds each of 1.20m width per 8m bay. The width of path could be 0.40m. There could be two rows of plants per bed. The lower number of rows per bed and higher number of paths allow better air circulation. Row to row distance could be 30 cm and plant to plant distance 17cm. Each row of 24m length could contain 140 plants so that planting density of 70,000 plants per hectare (7-13 plants/m<sup>2</sup>). Planting may be done in the months of February to April and/or July to September in a phased manner.

**Manuring:** Organic manures are required to be added so that top 30 cms. of the soil has 30% organic matter content. A dose of 15 Kg. FYM per square metre has been incorporate in to beds.

**Fertilizer Application :** Application of nutrients should be based on analysis of soil and plant.

Nitrogen and Potassium = 200 PPM

No. of applications = Twice a week for 7 months along with irrigation

Phosphorus = Soil application @ 1.8 kg/m<sup>2</sup>

**Irrigation and drainage :** Rose plants require a lot of water, at least 6mm / day i.e. about 60 cum / ha / day. A drainage line may be laid below the beds for disposal of excess water.

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

**i). Initial plant development / mother shoot bending:** If the young plant is allowed to flower immediately after planting there is serious risk that the important structural frame work of the plant will be impaired. The various types of plants require different treatment. First flower is pinched after one month from the date of plantation so that 2 to 3 eyes bud will sprout on main branch to grow as branches and these branches in turn will form buds. When the plant attains this stage of growth, the mother shoot is to be bent towards the direction of path. This cultural operation in rose plants is done to initiate bottom break ground shoot. The

maximum leaf area is required to build up a strong root system. The mother shoot is bent nearer to the bud joint.

**ii). Plant structure development:** To develop more growing points and plant structure development plays an important role. After planting ground shoot will start growing from crown of plant. The weak ground shoots should be bent at ground level, for forming a basic and strong frame work of plant structure for production throughout their life cycle. The strong ground shoots should be cut at 5th five pair of leaves after four and half months from the date of plantation. The medium ground shoots should be cut at 2nd or 3rd five of leaves.

**iii). Bending in roses:** Bending helps in maintaining enough leaf area on the plants. The maximum leaf area is required to build up a strong root system. Leaves are important for producing carbohydrates. The mass of leaves is also known as the lungs of the plant. The growing suckers should be removed in order to check new growth on the bended stem. The buds should be removed from the bended stem in order to check the incidence of thrips and bud rot (botrytis). Only weak and blind shoots are selected for bending. Bending breaks apical dominance of the plant. It is continuous process and hence carried out throughout the life cycle. Bending should be such that the most of the stems lay below horizontal. In summer season it is generally advised not to go for bending as it provides favourable condition for mite's incidence. Bending is done on 1st or 2nd five pair of leaves. One can also grow roses in green house without bending by keeping some blind shoots on plants in standing position for extra photosynthesis and uptake of water nutrients. While bending the stems, the care should be taken that the stem will not break and the leaves will not touch the soil on the bed.

**iv). Disbudding:** Standard varieties are those with one flower on each stem. But as nearly all varieties produce some side buds below the center bud. These side buds have to be removed. The removal of these buds is known as disbudding. It should not be done too early or too late. If done too early it may harm leaves and if done too late then large wounds in the upper leaf axil can take place. When bud attain pea-size and shows slight colour then it is right time to do disbudding. For most spray varieties, the center crown bud is to be removed. Disbudding is generally done on weak stem so that it can convert itself to thick stem and in future cuts can be taken. Bud capping is practiced to increase bus size and for good shape of bud.

**v). Pinching:** Removal of unwanted vegetative growth from the axil of leaf below the terminal bud 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.

**vi). Wild shoot (root stock) removal:** Wild shoots are the unwanted growth that takes place at the union on the root stock. They should be removed at the earliest as these will deplete nutrients and checks growth and development of plant. They should not be cut but removed from its union by pressing it with thumb in order to check its further sprouting.

**vii). Support of the plants:** The support system consists of bamboo / GI pipes / 'L' angles inserted on both sides of bed at the start and end of the bed. Post are placed at intervals of 3m on both sides of the bed, along the sides of bed, fastened at the posts at 30 cm – 40 cm intervals are 14 gauge GI wires or plastic string to support the plant. Between the wires across the bed, thin strings can be tied to keep the width of the bed constant. Support system makes intercultural operation easy and protects the buds from being damaged by not allowing the stems bend into the path.

**viii). Pruning:** Stems are cut back leaving 4-5 nodes on the basic stock frame, removing all weak shoots and redirecting the wayward ones. This may be practised in a phased manner so that flowering takes place from September to March. Generally, flowering takes place 45 days after pruning.

**Harvest:** The post-harvest management of roses starts with their harvest. Roses should attain the right stage for harvesting. If cut too early, flowers miss reserve food and therefore, may not develop into full flowers. If cut too late, longevity diminishes. As such, roses should be cut just as the buds are opening, after the sepals have almost fully curled up and the colour is fully visible. In small flowered varieties and Floribundas, the flowers are cut just when they



begin to open the cluster. The cutting may be done in the evening or early morning with long stem. The lower end of cut stems are immediately placed in clean plastic buckets containing a clean solution of 500 ppm citric acid or in chrysal - RVB. Thereafter, the buckets containing cut roses are brought to the grading and packing Shed/Hall. Flower yield of 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.

**Hydration:** Ideally, roses immediately after harvest should be graded, packed, precooled and despatched by refrigerated vehicle. In case of delay in grading and packaging flowers are shifted to the cold store. Before shifting to the cold store, it is advisable to re-cut the stems, about 2 cm above the previous level without removing lower leaves/thorns and again place them in clean containers in clean warm (40-48<sup>0</sup>C) water, adjusted with citric acid to pH 3.0-3.5. This treatment will prevent vascular blockage and hence neck drop.

**Preservatives:** The followers are removed from the citric acid after 30-60 minutes (or when the leaves and petals are fully turgid) and put in the preservative solution. Thereafter, the flowers are shifted to the cold storage at 0 to 20C. Roses may be kept for 4-5 days in a preservative solution in cold store.

**Packing:** Packing comprises three steps : bunching, wrapping and packing. The heads of roses are evened up and their stem tied with a rubber band into bunches in 10s, 20s, 25s, or 50s depending on the ultimate market. They are cut so that all the stems are of the same length. The bunches are placed in preservative solution and may be shifted to the cold store. They are brought back to the packing hall and the buds are wrapped and the bunches are sleeved in polyethylene. The wrap is a 15-20 cm. wide plastic strip which acts as a cushion for the buds. Many different cardboard boxes are used for packing. For long term transport it is best to use telescopic style boxes made of corrugated fibre board. The size could be 100 cm x 45 cm x 22 cm. There may be 400 to 1000 stems per box and weight may vary from 14 to 18 kg/box. Depending on the market, the box is either filled with one variety, one grade, or mixed colour one grade.



Planting



Bending



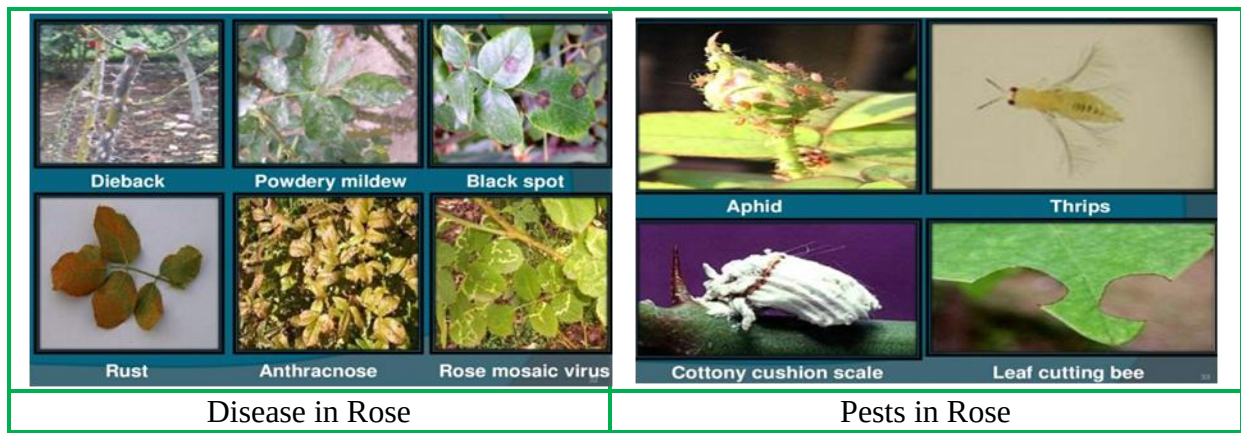
Bud capping



Pulsing



Bunching



## Reference

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