

Modern Cultivation Practices of Rose (*Rosa indica* L.) for Sustainable and Commercial

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Rose (*Rosa indica* L.), commonly known as Gulab-Jo-Gul in Sindhi, belongs to the family *Rosaceae* under the order Rosales. The *Rosaceae* family is one of the largest plant families, comprising hundreds of genera and thousands of species, including trees, shrubs, and herbaceous plants. Rose is an economically and culturally significant ornamental crop with diverse applications. It is widely valued for ornamental landscaping, floral decorations, expressions of love and affection, religious and ceremonial purposes, cosmetic and pharmaceutical products, and as a source of edible products and health supplements. Despite its immense economic and social importance, rose cultivation occupies a relatively small area in many countries. This is primarily due to limited awareness, inadequate access to improved production technologies, and insufficient extension support. Although roses are well adapted to a wide range of climatic conditions and can tolerate several environmental stresses, their cultivation remains underdeveloped. Furthermore, research and development efforts in rose production have received comparatively less attention than many other horticultural crops, resulting in slower technological advancement and reduced commercial adoption. Therefore, the development and dissemination of improved, climate-resilient production

technologies are essential to enhance rose cultivation. Such technologies, combined with effective farmer awareness and training programs, can improve productivity, flower quality, and profitability while encouraging the wider adoption of rose cultivation.

Rose (*Rosa indica* L.), the king of flowers. It is a woody and thorny plant, particularly rose is used as a symbol of love and beauty both in piece and in war. (Horn, 1992) and over 2000 cultivars (Kim *et al.*, 2003). The plant height goes up to 6 m. In Pakistan, mostly roses are planted in gardens as ornamental (PHEDC, 2012). For that, hybrids are considered and propagated because hybrid roses are more attractive. In Hyderabad and Karachi are the major commercial rose-growing regions (Usman *et al.*, 2014). Rose petals are widely used in products such as rose water, perfumes, medicines, jams, flavored beverages, ice cream, and traditional drinks like *Rooh Afza*. Although rose cultivation gained momentum after the Second World War with the adoption of improved production technologies (Ozkan *et al.*, 1997; Sayın *et al.*, 2003; Boran, 2008), its commercial potential in Pakistan remains underexploited due to limited awareness, inadequate resources, and a shortage of skilled labor (SMEDA, 2009). Despite favorable climatic conditions, flower production is largely confined to local markets, with only a

small proportion exported (Leghari *et al.*, 2015). Globally, countries such as the Netherlands, Kenya, Colombia, Japan, Italy,

Importance of Roses

There are so many uses of rose (*R. indica L.*). Rose is a multipurpose crop valued for its ornamental, medicinal, cosmetic, and culinary applications. It is widely cultivated as an ornamental plant, while rose oil is extensively used in the perfume industry and rose water is utilized in cosmetics, pharmaceuticals, and food products such as jams, jellies, desserts, and beverages. Rose petals possess antiseptic and antioxidant properties and are rich in vitamins A, C, D, E, and B3, making them beneficial for skincare and traditional medicine. For skin beauty, rose water is used in face masks for fair skin which maintains skin pH and controls extra oil. If one cup of rose water is used for hair

Israel, and the United States are major rose producers, highlighting the crop's significant economic and trade value (Byczynski, 1997).

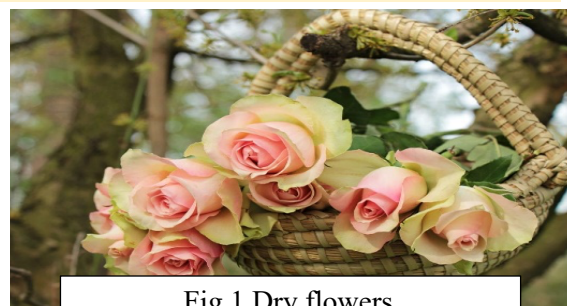


Fig.1 Dry flowers

shining, along shining it produces healthy hairs and in jams, jellies and in soup rose water used. The rose is a sign of love and peace and used as a gift, also for welcome parties, wedding ceremonies, and many religious events.

Cultivation Technology of Rose

Soil Requirements

Rose (*Rosa indica L.*) grows best in **deep, fertile, well-drained loamy to sandy loam soils** rich in organic matter. A **slightly acidic to neutral soil pH (6.0–7.5)** is considered ideal for optimum growth, flowering, and nutrient availability. However, rose plants can also tolerate **slightly alkaline soils up to pH 8.0**, provided drainage is good and salinity is low. Heavy clay soils and waterlogged conditions should be avoided, as they restrict root development and increase the incidence of root diseases.

Fertilizer Needs

Roses are highly feeder, thus requires fertilizer input, however, usually fertilizer is not supplied in good amount. **20–25 t ha⁻¹ of well-decomposed farmyard manure (FYM)** should be incorporated into the soil before planting to improve soil fertility and structure. A recommended fertilizer dose of **200–300 kg N, 150–200 kg P₂O₅, and 150–200 kg K₂O per hectare per year**. N normally involve in chlorophyll formation, thus vegetative growth, P helps in seedling growth and stimulate flowerin and fruit development etc and Potassium increase strength in stem, drought



Fig.2 pH and soil testing

and disease resistance, it has direct role in quality constituent.

Propagation Methods

Rose can be propagated through both **sexual (seed)** and **asexual (vegetative)** methods, although vegetative propagation is preferred for maintaining true-to-type characteristics. The most common methods include **stem cuttings, T-budding, grafting, layering, and tissue culture**. Stem cuttings are widely used for easy rooting and rapid multiplication, while **T-budding on suitable rootstocks** is the preferred commercial method for producing high-quality plants. Layering is mainly practiced for climbing and shrub roses, whereas tissue culture is used for rapid, disease-free mass propagation.

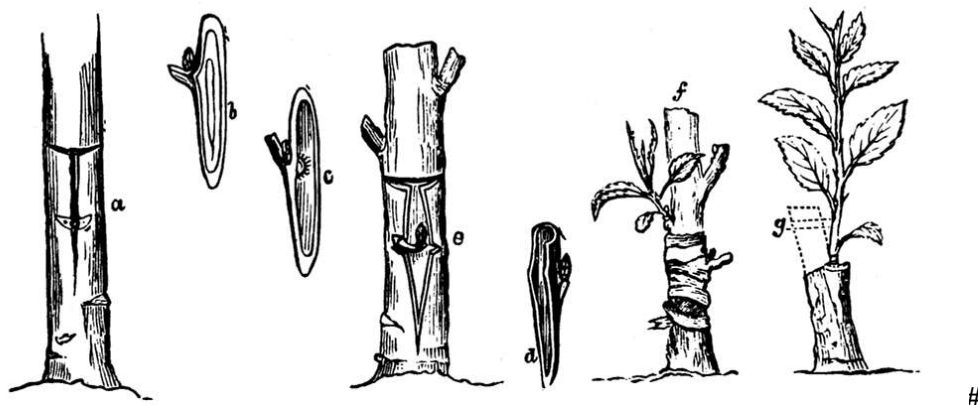


Fig. 3 T budding in Rose

Irrigation Requirement

Rose requires **regular and adequate irrigation** for optimum vegetative growth, flower production, and quality. Irrigation should be provided every **3–5 days intervals** during hot summer and **7–10 day intervals** in winter.

Temperature

Rose (*Rosa* spp.) grows best at a **day temperature of 20–28°C** and a **night temperature of 15–18°C**, which promote optimum vegetative growth, flower bud

initiation, and high-quality blooms. Temperatures **above 35°C** or **below 10°C** adversely affect plant growth, flower size, color, and overall yield, although tolerance varies among cultivars.

Insect Pests and Diseases

Aphids, thrips, powdery mildew, rose rust, curculio beetles, rose wilt, downy mildew leaf-cutting bee, caterpillars, Verticillium wilt, rose mosaic, leaf spot or blast, rose chafer and nematodes, etc., are insect pests and diseases of rose.

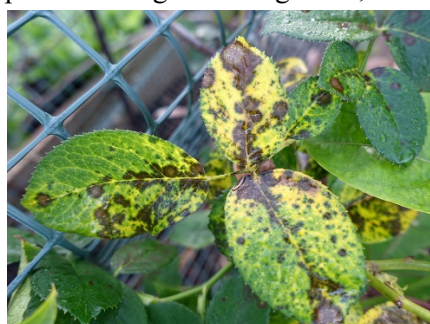


Fig.3 Leaf spot of Rose



Fig.4 Aphid damage of Rose

Harvesting of Rose

Commonly roses are harvested when they fully mature and open, and they are supplied to

market or stored refrigerated conditions until to supply at the sale point.

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