TUBEROSE (RAJNIGANDHA)

GENERAL INFORMATION

It is also known as “Rajnigandha”, Nishigandha” and “Sword Lilly”. It is a herbaceous perennial plant which has 75-100cm long flower stalk which bears 10-20 funnel shaped flowers having white color. Cut flowers are used for making bouquets because of its delightful appearance, good keeping quality and sweet fragrance. Loose flowers are used for making Garlands and Veni. They are suitable for growing in pots and beds and used for oil extraction.

SOIL

Loamy and sandy soil having well drainage system is best for the tuberose cultivation. Soil having ph of 6.5-7.5 is ideal for tuberose growing.

POPULAR VARIETIES WITH THEIR YIELD

Single varieties

Calcutta Single: White flower variety. Single spike having length of 60cm gives approximately 40 flowers. They are mainly use as loose or cut flowers.

Prajwal: Released by IIHR (Indian Institute of Horticultural Research), Bangalore. The variety is made by the crosses between “Mexican Single” and “Shrinagar”. It contains slightly pink color flower buds from which white color flowers are born. They are mainly use as loose or cut flowers.

Double varieties

Rajat Rekha: Released by NBRI (National Botanical Research Institute), Lucknow. Its flower contains silvery white color streaks along the middle of the leaf blade.

Pearl double: Pearl double is given its name as it contains red tinged flowers which are known as pearls. They are used as cut flowers, loose flowers and for essential oil extraction purpose.

Vaibhav: Released by IIHR (Indian Institute of Horticultural Research), Bangalore. The variety is made by the crosses between “Mexican Single” and “IIHR 2”. It contains greenish color flower buds from which white color flowers are born. They are used for cut flower purpose.

Other state varieties:

Single varieties: Arka Nirantra, Pune Single, Hyderabad single, Khahikuchi Single, Shrinagar, Phule Rajani, Mexican Single.

Double varieties: Hyderabad Double, Calcutta Double.

Semi-double varieties: Kalyani Double, Suvasini.

Variegated varieties: Swarna Rekha.

Variegated single varieties: Rajat (having white margin).

Variegated double varieties: Dhawal (having golden margin).

LAND PREPARATION

For tuberose plantation, well prepared land is required. To bring the soil to fine tilth, 2-3 ploughings are required. At the time of planting, add FYM @10-12tonnes/acre and mix well in the soil.

SEED

Seed rate:

2100-2500 bulbs/acre are used.

Seed treatment:

Before sowing bulbs are treated with 2gm/kg of Thiram@0.3% or Captan@0.2% or Emisan@0.2% or Benlate@0.2% or Bavistin@0.2% for 30 minutes to prevent them from soil borne diseases.

SOWING

Time of sowing:

March-April month is optimum time for seed sowing.

Spacing:

Planting can be done with spacing of 45cm. Prepare 90cm wide nursery beds.

Sowing depth:

Sow bulbs 5-7cm deep in the soil.

Method of sowing:

Propagation method is used.

PROPAGATION

Propagation is done by bulbs. Bulbs having 1.5-2.0cm diameter and more than 30 gm weights are used for propagation. In singles, I or 2 or 3 or a clump of bulbs are sown per hill. 3 bulbs per hill are planted for one year old crop and 1 or 2 bulbs per hill are planted for more than one year crop duration. In doubles only two should be planted for one year crop.

FERTILIZER

Fertilizer Requirement (kg/acre)

UREA	SSP	MOP
640	250	60

Nutrient Requirement (kg/acre)

NITROGEN	PHOSPHORUS	POTASH
296	40	40

Add 20-25tonnes/acre of FYM at the time of land preparation. Add fertilizer dose of phosphorus @40kg/acre in the form of SSP@250kg/acre and potash@40kg/acre in the form of MOP@60kg/acre at the time of sowing.

At the time of crop growth, add Nitrogen@296kg/acre in the form of Urea@640kg/acre. Half dose of Nitrogen is added before one month of sowing and then rest of the Nitrogen is added in the equal amount at the interval of 1 month till august month. After adding fertilizers, irrigation is required.

WEED CONTROL

To make the field weed free, 3-4 hand weeding's are required. Immediately after transplantation and then after 45 days of transplanting, spraying of Atrazine@0.6kg/acre or oxyfluorfen@0.2kg/acre or pendimethalin@800ml/acre in 200Ltr water as pre-emergence weedicide is done to make the field weed free.

IRRIGATION

No irrigation is required till bulbs sprouting. After sprouting and 4-6 leaf stages it requires irrigation which is given once in a week. Depending upon soil and climatic conditions, 8-12 irrigations are required

DEFICIENCY AND THEIR REMEDY

Nitrogen deficiency: Due to deficiency, they result in deduction in number of spikes and number of flowers/spike. Foliage becomes pale green in color.

Phosphorus deficiency: Due to deficiency of phosphorus, the upper leaves become dark green in color and lower leaves become purple in color. This results in stunted growth and

reduced flowering.

Calcium deficiency: The deficiency results in cracking of the spike. The acute deficiency of calcium results in bud rot.

Magnesium deficiency: Results in interveinal chlorosis on older leaves.

Iron deficiency: Results in interveinal chlorosis on new leaves.

Boron deficiency: Results in stunted flowering, cracking of leaf margins and deformed leaves.

Manganese deficiency: The deficiency results in yellowing of veins on lower surface.

PLANT PROTECTION

- **Disease and their control:**
  Stem rot: Caused by Sclerotium rolfsii. Symptoms are fungal growth on the leaf surface. The spot loses its green color and then results in leaves fall.
  Treatment: Application of Brassicol (20%) @12.5kg/acre in soil to get rid of stem rot.

Botrytis spot and blight: It mainly spread during rainy season. Symptoms are dark brown color spots seen on flowers which ultimately results in drying of whole inflorescence. Treatment: Spraying of Carbendazim@2gm/ltr of water at the interval of 15 days will result to get rid from spot and blight.

Sclerotial wilt: Symptoms are drooping of leaves. Leaves become yellow and ultimately dry up. It gradually affects the whole plant. Thick cottony growth is seen on the infected stem and on the petioles.

Treatment: Drenching with 2gm/ltr water per acre of Zineb@0.3% will help to get rid of wilt.

- **Pest and their control:**
  Aphids: They are tiny insects which feed themselves on flower buds and young leaves. Treatment: Spraying of 3ml/ltr water per acre of Malathion@0.1% at the interval of 15 days will help to get rid of aphids.

Thrips: They feed themselves on flower stalk, leaves and flowers. **Treatment:** Spraying of 3ml/ltr water per acre of Malathion@0.1% is done to cure from thrips.

Weevils: They damage the shoots and leaves of the plant. They feed themselves on edge of the leaf and on roots.

Treatment: Application of BHC dust @10% is done in the soil to protect from weevils.

Grasshoppers: They feed themselves on young leaves and flower buds which will result in damage of foliage and flowers. **Treatment:** Spraying of 3ml/ltr of Malathion@0.1% or Quinalphos@0.05% or

Carbaryl@0.2% 6 gm per ltr water per acre is done to get rid of this pest.

Bud borer: They mainly affects the bud by laying egg on them and then larvae feeds themselves on flower buds which result in holes on buds.
Treatment: Spraying of Carbaryl @0.2% @ 6 gm per acre in per ltr water to protect from bud borer pest.

HARVESTING

Flower harvesting can be done after 3-3.5 months of planting. The peak time for flowering is in the month of August-September. Harvesting is mainly done when lower 2-3 florets have opened. Spikes are clipped worth the help of sharp knife or secateurs. In first year it gives an average yield of 1.4-2lakh/acre of cut flowers and 2.5-4lakh/acre of loose flowers. In second and next years, it gives an average yield of 2-2.5lakh/acre of cut flowers and 4-5lakh/acre of loose flowers. After flower harvesting, spikes should be cut off. And then flowers are place in shade in gunny bag or wet cotton cloth.