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PACKAGE OF PRACTICES FOR TUBEROSE CULTIVATION IN TRIPURA



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ICAR-RC-NEH

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Tripura**

PACKAGE OF PRACTICES FOR TUBEROSE CULTIVATION IN TRIPURA

Tuberose (*Polianthus tuberosa* L.) Rajnigandha has gained considerable importance in society as well as growers of tropical region of Southeast Asia. Now a day's farmers of Tripura are also growing commercially. Among the flowers tuberose plants which are valued much by the aesthetic world for beauty and fragrance of their flowers, the Rajanigandha occupies a vary selective and special position to flower loving people because of their prettiness, elegance and sweet pleasant fragrance. It has a great economic potential for cut flower trade and essential oil industry.



Full bloom of flower cv. single

The flowers remain fresh for pretty long time and suitable for long distance transportation and fill a useful place in the flower market. They are used for artistic garlands, interior decoration, floral ornaments, bouquets and buttonholes. The long flower spikes are excellent as cut flowers for table decoration when arranged in bowls and vases. The variegated type with golden spiked leaf margins is very attractive and suitable for beautification of gardens. The flowers emit a delightful fragrance and are the source of tuberose oil. The natural flower oil of tuberose remains today is of the most expensive of the perfume's raw materials. The most common constituents of tuberose concrete are geraiol, methyl benzoate, methyl salicylate, eugenol and methyl anthranilate. In India the commercial cultivation of tuberose was confined mainly to West Bengal, Karnataka, Tamilnadu, Kerala and Maharashtra. However, it is also gaining popularity in North Eastern part of country and Tripura as well.

Soil

Tuberose can be successfully grown in a wide range of soils even in the soil affected by acidity or salinity or alkalinity to some extent. Loam and sandy loam soil having pH range from 6.5 to 7.5 with proper aeration and drainage is essential for better harvest. The Soil should be rich in organic matter and retain sufficient moisture for proper growth. The soil of Tripura is very much suitable for tuberose cultivation. The soil moisture should be maintained after planting of bulbs before monsoon.

Climate

It is a tropical flowering plant and grows well throughout the year under climatic conditions of Tripura. The commercial cultivation of tuberose mainly confined in warm humid areas with average temperature range from 18 to 32°C. The ideal temperature for growth of plant ranged 26 to 30°C to accumulate photosynthates for flower production. It prefers sunny situation and high relative humidity; shades of trees reduced the flower production. The spike production comes down up to a great extent along with quality of flower during December-January except double varieties of tuberose.

Selection of sites

For harvesting of good yield and quality of flowers, it is preferable to select a

plot having plenty of sunlight. If there is much shade, the plants grow tall and lanky and the flowering is adversely affected. Tuberose is very sensitive for water logging even for a short period of water stagnation damages the root system and affects the growth and flowering.

Varieties

Single: single with one row of corolla segments, & pleasant scent, semi double bearing of flowers with two to three row of corolla segment & doubles with more than 3 corolla segments. Often florets of the double tuberose fail to open completely. The commercial varieties of single tuberose are following. One whorl of corolla, Calcutta single, Mexican single, Royal Rehab.



Spike of Tuberose cv. single

Propagation

Tuberose is commonly propagated asexually through bulbs. The bulbs 1.5 to 2.5cm are considered as suitable size. Division of bulb is also in practice, where bulbs of 2-3 cm in diameter are cut vertically into 2-3 sections in such a way that each segment contains a bud.

Field Preparation

The land preparation is very important for the cultivation of Rajnigandha. Deep ploughing is helpful in bringing the soil to a fine tilth and eradication of weeds, 12-15 tones FYM/cow dung manure should be incorporated into the soil before three weeks of planting. Weeding should be done before planting of bulbs. Selection of Bulbs

Bulbs taken for planting should be taken from storage on one season old, if fresh bulbs planted produce lesser number of flowers. So, bulbs should always be kept in store for a month or more to ensure better production of flowers. Larger bulb cause early flowering and higher yields. Bulbs should be treated with 0.2% Bavistin for 30 minutes.

Bulb size and time of planting

The bulbs 1.5 to 2.5cm are considered as suitable size. Division of bulb is also in practice, where bulbs of 2-3 cm in diameter are cut vertically into 2-3 sections in such a way that each segment contains a bud. The best time of tuberose planting in tripura is second to last week of March, whereas it is April-May in the hills. Planting depth of bulb also influenced the growth and production of early flower and yield as well. It may vary 4-7cm depending of size of bulb, type of soil. However, 4-5cm depths are ideal for bulb planting in tripura. Deep planting of bulb delay the appearance of shoot and flowering also.

Planting Distance

Plant population affects the yield and quality of flowers and bulbs obtained per unit area. The higher plant density has been found to produce greater yield of spikes, flowers and bulbs. Planting of bulbs at a distance of 15*20 cm with a population of 3,33,000 plants per hectare gave



Tuberose plants in different plots

the highest yield of spikes, flower and bulbs over a period of two years. Although the highest number of spikes per plant was observed at a distance of 20*25 cm. Tuberose crop can stand well for 3 years in the same field. But replanting after 3 years is a necessary practice otherwise it invites pests and diseases with reduction in crop yield and quality of flowers.

Nutrition Requirement

The requirement of manures and fertilizers for tuberose is quit high under climatic condition of Tripura. During the preparation of soil a basal application of farmyard manure at the rate of 10 tones per hectare should be done to ensure better growth and flowering. After application of FYM/cow dung tuberose require good quantity of major and micronutrient as well. After several experiments the maximum yield was obtained with 200 kg Nitrogen, 200 kg Phosphorous, 150Kg Potash per hectare.

The full amount of P, $\frac{1}{2}$ K and one third of N should apply in the form of basal dose and rest in four-split doses as foliar feeding after 45 days planting at 25 days interval. The foliar feeding of K and N has produced more number of flowers with better quality flowers. The 8kg ZnSo₄, 2kg Boron and 1kg sodium molybdate enhance the quality and quantity of flower.

Weeding

Weeding should be done after a fortnightly especially in initial stage of bulb sprouting and growth of plants. Hand weeding is ecofriendly but expensive. For chemical control Atrazine 1.2 kg a.i. /acre as pre emergence application. Although experiments show that close planting 15*20 reduced the weed population in field.

Mulching

The black polythene and *Gliricidia* leaves found most suitable mulches for tuberose cultivation. The 5 kg green leaves of *Gliricidia* are sufficient for 1*1 metre plot to harvest bumper yield and quality of flower and spikes. The size of spike and fragrance is better than the black polythene mulches plots. The leaves of *Polyalthia*, *Leuceana*, *Litchi* and Paddy straw could also be used for mulching in tuberose to conserve the soil moisture and reduced the weed population upto great extent.



Mulching by black polythene

Water Management

Soil moisture is also very important factor affecting the growth; flowering and bulbs yield of tuberose. Field should be irrigate before planting of bulbs and further irrigation should be avoided until the sprouting of bulbs. Under prevailing condition of soil and climate in Tripura plot should irrigate at weekly interval if there is no rainfall. Mulching reduced the water requirement up to some extent. However, irrigation should be avoided at maturity stage of bulbs

Plant Protection Measures

Since the tuberose is hardy plant, disease and insect pests are not so serious like other crops.

Stem Rot

It is soil born diseases caused by *Sclerotium rolfsii* and can be identified with symptoms like appearance of prominent coarse mycelial masses on leaf surface at or near the soil level. Infected leaves loose green colour due to rotting, which extend and cover whole leaf and detached from plant.



Tuberose plants severely damaged by stem rot

Management

Spraying of Redomil/Bavistin @2g/litre of water as soon as symptoms appear in any plant. Destroy or burn the infected plant debris to check the further infection.

Flower bud Rot

It is bacterial diseases caused by *Erwinia spp.* The disease appears mainly on young flower buds and results in dry rotting with brown scorched necrotic discoloration of peduncles. In advance stage buds shrivel and become dry. The disease spread by a pest known as thrips.

Management

The segregation of plants and spraying of rogor 0.1 per cent twice at weekly interval. Destroy or burn the infected plant debris to check the further infection.

Thrips

Thrips feed on leaves, flower stalk and flowers. They suck sap from these parts and ultimately damage the whole plant. Sometimes they are associated with a contagious disease known as bunchy top where the inflorescences is malformed. Thrips can be managed by spraying the plants with 0.1% rogor twice at ten days interval.

Harvesting of Flowers

Tuberose is harvested by cutting the spikes from the base for table decoration or the individual flower is picked from the spike for making garland. The picking of flower should be done in the morning hours in hot humid climate of Tripura. Harvesting of flowers in evening and marketing next day morning should be avoided to prevent weight loss. When spike attain 85-110 cm length creamy white floral bud on one floret open spike. The flower spike should be cut with small clasping leaves on the flower stalk when the first pair of flower fully open, with a secature/sharp knife and placed immediately in cold water.

Packaging of Flowers

Loose flowers are picked in bamboo basket and covered by cloth and are transported to the nearby wholesale market where they are sold by weight. The spikes are graded as per length of spike, length of flowering zone and quality of individual flower. To avoid any loss during transition flower bud

bundle should be wrapped in soft tissue paper or polythene or packed in cardboard boxes.

Flower yield

Flower yield varies with variety, plant density, bulb size at time of planting and crop management. After a two-year experiment with tuberose cv. single recorded flower yield of 15,000 kg per hectare or 2,75,000 spikes during first year. The average yield of first ratoon crop was obtained 18,500 kg or 3,25,000 spikes per hectare.

Vase Life

Several preservatives solution can be used to increase the longevity and keeping quality of tuberose flowers. The vase life of cut flowers can be enhanced by putting in 8% sucrose or 50ppm (Al_2SO_4)₃ or 250ppm boric acid or 50ppm silver nitrate as holding solution or by spraying of Ga₃ (50-100ppm) as growth regulator.

Harvesting & Yield of Bulbs

Harvesting of tuberose bulbs at proper stage of maturity is important for storage of bulbs and their growth. The bulbs reach maturity when the flowering is over and plant growth ceases. At this stage the old leaves becomes dry and plant growth ceases. At this stage the old leaves becomes dry and bulbs are almost dried. 200 quintal bulbs per hectare can be harvested.

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