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FACULTY OF AGRICULTURAL SCIENCES AND ALLIED INDUSTRIES

Scented geranium -Importance, chemical composition, origin, distribution, area, production, climate and soil requirements, varieties, propagation techniques, planting and after care, nutritional requirements, plant protection, harvesting and distillation of oil

Importance and chemical composition

Scented geranium (*Pelargonium graveolens* L.Herit.) is one of the important aromatic crops, yielding an essential oil which is highly priced for its very profound and strong rose-like odour. The plant is also known as rose Scented geranium. The chief constituent of the oil are geraniol and citronellol. The pure scented geranium oil is almost a perfume by itself and blends well with all other perfumes. It is widely used in scenting soaps and for the isolation of rhodinal which forms part of most high-grade perfumes. India is importing more than 20 t of this oil from other countries to meet the local demands of the Indian perfumery industries, in addition to an indigenous production of only about 20 t of oil annually.

Types/varieties

1.Algerian or Tunisian

This type of Scented geranium is slender with flowers of a dark pink colour. It is being grown in the Nilgiris and is unsuitable for wet conditions. This variety yields 50-60% more oil with a more delicate odour than that of the Reunion type.

2.Reunion or Bourbon

Grown in the Nilgiris and Anamalai hills, the plant is sturdier with light-pink flowers and more suitable for wet conditions. The oil content is higher

during the summer months from April to June. The terminal portion with 6 to 12 leaves contains more oil than the middle and basal portions.

KKL-1

In the evaluation trial of the Algerian and Reunion types, PG-7 and PG-20, respectively at the Horticultural Research Station, Kodaikanal, the clone PG-7 recorded 0.3% essential oil has been released under the name 'KKL-1'.

Sel-8

The Indian Institute of Horticultural Research (IIHR), Bangalore, has found 'Sel-8' a Reunion type, as the highest yielder under Bangalore conditions and has recommended it for cultivation.

'Hemanti' 'Bipuli' and 'Kunti' are the other varieties released by the CIMAP, Lucknow, for cultivation in the plains of North India.

Kelkar and Ooty, are the other varieties available in this crop.

Soil

Scented geranium is shallow-rooted crop and, as such, it requires well drained porous soil. The crop is found to perform well in red lateritic soils with a pH of 5.5-8.0, though a calcium rich porous soil is the best.

Climate

Scented geranium can be grown in temperate, subtropical and tropical climates at various altitudes from 1 000 to 2 200 m. It thrives best in subtropical climates with a temperature ranging from 5°C to 23°C. However, temperatures below 3°C will kill the plant. Warm winters coupled with mild summer temperatures and, well-distributed annual rainfall ranging from 100-150 cm is ideal. However, heavy rainfall results in water-logging, causes root-rot and stunted growth. It has been observed that it grows equally well at much lower altitudes and tolerates higher temperatures up to 43° C in the plains when grown under irrigated conditions.

Propagation

Scented geranium is easily propagated by cuttings, since there is no seed setting in Scented geranium, vegetative propagation is must. Terminal cuttings about 20 cm long and consisting of about 8 nodes are the best suited material for propagation, as they give 80% rooting even without any treatment. However, the middle portion and basal cuttings are reported to give poor rooting, which can be improved by treating them for 6 minutes with growth regulators like IBA or IAA at 200 ppm. Thus, a rooting of 80% and

65%, respectively can be obtained.

The cuttings are planted in raised beds of 3 m long and 1 m wide. The soil should be well mixed with powdered FYM. The cuttings are planted closely at a spacing of 8-10 cm. Before planting, the cut ends are dipped in 0.1% Benlate solution. Before root initiation, temporary shade is provided and the beds are watered regularly. The nursery is sprayed with a 0.2% urea solution at biweekly intervals and the cuttings are ready for transplanting. They can also be rooted in polythene bags, which help to avoid damage to the root-system while planting in the main field. This practice ensures a high percentage of success in the field.

Recently, its propagation through leaf petioles has also been reported to give a good rooting percentage (75%), which will help to multiply this plant in larger numbers than the traditional method of propagation using 20 cm-long cuttings. The CIMAP, Lucknow, has developed a protocol for large–scale production of scented geranium calli-clones and plants have been obtained under field conditions with improved oil-yield and quality.

Planting

About 30,000 cuttings are required for planting an hectare area. Before planting, the land should be properly prepared by ploughing (disc) and brought to a fine tilth. Ridges and furrows are made, the application of fertilizer and irrigation should be done a day prior to planting. The cuttings are carefully dug out from the nursery and planted at a spacing of 60 cm x 60 cm.

Irrigation

Plants are irrigated immediately after planting. Irrigation is continued on alternate days for about 10-15 days and then reduced to twice a week. The schedule is modified during the winter and summer months at intervals of 7 to 10 days, depending on the situation. Though scented geranium tolerates short periods of drought, water-logging of the crop must be completely avoided.

Weeding

The crop growth is slow initially; weeds should, therefore, be removed periodically. Trials conducted at CIMAP, Lucknow, revealed that mulching helps in reducing weed infestation, the number of irrigations and produced less weed biomass.

Intercropping

Intercropping of cowpea or black gram is beneficial during the log phase and they do not affect the Scented geranium crop.

Manures and fertilizers

Prior to transplanting the cuttings, 10 t of FYM, 35 kg N, 35 kg P2O5 and 35 kg K2O/ha are incorporated into the soil. A second dose of nitrogen at 35 kg/ha is applied about 2 months after the first application, Further, nitrogen is given in two equal split doses for each harvest-the first dose being just after the crop is harvested and the second two months later. Altogether, 210 kg/ha/yr of N is applied to the crop in six equal doses to cover three harvests. Application of 30 kg N/ha (15 kg/ha as basal and 15 kg as a foliar spray with 1% urea solution, 45 and 90 days after basal application) is reported to increase herbage yield and oil yield by 447% and 140%, respectively, over the control. In addition, the application of 20 kg/ha of zinc sulphate and 10 kg/ha of boron has been reported to increase the herbage yield. Similarly, an application of copper (20 kg/ha) and molybdenum (30 kg/ha/year) in four split doses after each harvest has been found to increase the yield by 37%.

Pests and diseases

Wilt

The crop is affected by wilt disease, caused by the *Fusarium* species, and *Botrydeplodia theobromae*, which are soil borne fungi.

Control measures:

Dip the cuttings in 0.03% Benlate solution at the time of planting in the nursery.Prior to transplanting the rooted cuttings must be again dipped in 0.03% Benlate solution and then planted. The crop is sprayed with 0.03% Benlate solution about 2 weeks before it is harvested. Also after the harvest it is repeated, so that the cut-ends are drenched with the fungicide. It has been observed at the CIMAP, Lucknow, that the cultivation of Scented geranium in association with marigold (Togetes minuta) improves the survival of Scented geranium plants over the monsoon time in the North Indian plains.

Roots-knot nematodes (*Meloidogyne incognita* and *M. hapla)*:

Affect the Scented geranium plant. Application of Aldicarb @ 20 kg/ha to the soil reduces the incidence of root-knot.

Harvesting, processing and yield

Scented geranium is harvested 4 months after transplanting, when the leaves begin to turn light-green and exhibit a change from a lemon-like odour to that of rose. However, this requires careful observation and experience. The crop should be harvested using a sharp sickle and sent for distillation immediately. The use of sharp sickle is important as it minimizes the jerks, pulls and damage to the crop while harvesting. After every harvest, hoeing, fertilizer application and irrigation are done according to the schedule. The plant then puts forth fresh shoots, grows faster, and reaches the next harvesting stage in 4 months. Thus, a total of 3 harvests can be obtained for 3-6 years. Cultivation under polyhouse conditions is reported to reduce the harvest time by 21 days.

The essential oil is distributed over the green parts of the plant, particularly in the leaves. The oil content is higher during the summer months, from April to June. The terminal portion with 6-12 leaves contains more oil than the middle and basal portions.

Yield

The quality and yield of oil will be better if the crop is harvested at the appropriate time of maturity. For a higher yield, a good plant population in the field is necessary. A minimum of 25,000 plants should be maintained in a hectare in a year which, in turn, may yield 15 kg of oil on steam-distillation. The recovery of the oil ranges from 0.08 to 0.15%, depending upon the season of harvest and type of material. Cultivation under polyhouse cover is reported to increase herb and oil yields up to 53% over the conventional planting of the scented geranium crop.