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GERBERA CUT FLOWER CULTIVATION IN POLYHOUSE



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Introduction

Gerbera cultivation can be very profitable for farmers of Goa who have small land holdings but good market for this high value flower. Transportation by trains and buses is possible to reach Mumbai, Delhi, Chennai and other nearby markets within 12-36 hrs. Flowers fetch price of Rs. 40-50/ ten spikes during New year season, Festivals, Christmas, Valentine Day celebrations etc. Flowers fetch very good price in marriage seasons also. Growers can avail finance facilities under various schemes of state and central Govts so that venture becomes very remunerative.

Gerbera (*Gerbera jamesonii*) is a herb and its flowers are like Daisy. Flower stalks are long, thin and leaf-less. It flowers year-round in warm, humid conditions. It can also be grown as a field crop in open air on raised beds, as a greenhouse plant under controlled conditions (protected cultivation) and as a potted plant.

The uses of gerbera are many. It is grown as a garden plant for beautification or on flower beds, borders and in rock garden. Flower arrangements can be made in vase. Use in flower bouquet is quite common. Gerberas are propagated by seeds, cuttings of clumps with buds, and from tissue-cultured plants.

Varieties

There are several varieties. Many varieties are released by private companies also. Some of the varieties are: Dalma (white), Dana Ellen (yellow), Rosalin (pink), Savannah (red), Cream Clementine (cream white) and Maron Clemetine (orange). It is recommended that tissue cultured plants of good varieties from reputed companies may be procured.

What is polyhouse and why is it required ?

It is a greenhouse covered with UVstabilized thick transparent white polyethylene. The structure is made of galvanized iron pipes with aerodynamically suited design to withstand winds. The low cost structures are made of locally available timber and bamboos but their durability is less.

The Naturally ventilated polyhouse is suitable for Gerbera cultivation under Goa conditions. It does not require fan and cooling system. Openings on sides and on top provides sufficient ventilation. The nets are provided at openings to avoid entry of insects.

Advantages of polyhouse

- 1) Controlled conditions of RH, Temperature, Light as required for best results

- 2) Protection from rains, storms scorching sunlight
- 3) Protection from pests and diseases

Conditions most suitable for Gerbera cultivation

1. RH 70-75% (High RH increases disease incidence and flower deformity)
2. Temperature 20-30 °C (Less than 12 °C and higher than 35 °C adversely affects flower production)
3. Shade net for 50-70% sunlight (400 Watt /sq. m is required). The shade-nets cut the scorching sunlight to 50- 70%

Polyhouse area and other features

For commercial production, the units of the size of: 500-1000 sq m and above are very viable. Polyhouse of area lower than 500-1000 sq. m would also be feasible for commercial cultivation provided labour and other overhead costs are reduced. The height 5-6.5 m in the middle is sufficient for air circulation.

Ventilation nets on sides and top are covered with polyethylene sheet for protection from rains during monsoon.

Fog or mist-system to lower the temperature and increase RH during peak summer season (April- May) in Goa conditions. It has to be operated for short duration during peak hours in summer when temperatures are high and humidity is low.

Fertigation system

It is an important feature of polyhouse. Drip system for fertigation consists of pump, filter and liquid fertilizer mixing unit. The distribution manifold, laterals with



Fertigation system with drippers

drippers (one dripper per plant) and water tank are the other parts of this system. Water supplied to the system should be clean and tank of 5000 lit is sufficient for 500 sqm unit.

Soil requirement and growing medium

Soil used in growing medium should have pH 5.5 to 6.5. Electrical conductivity should not be more than 1 (mS/cm) for soil and irrigation water. Soil texture should be Well-drained and porous as the roots may go up to 50-60cm deep.

Don't use poultry or other manures. Soil and FYM should be mixed in 2:1 proportion. Well rotten FYM should be mixed thoroughly in the soil before sterilization.

Sterilization of growing medium

Sterilization of soil is required for reducing risk of *Phytophthora*, *Pythium*, *Fusarium*. Formalin or formaldehyde (1 lit. in 10 lit water) is sprinkled (1-2 lit/sqm) with rose can on mixed growing medium layer of 1-1.5 feet height and covered with plastic. Remove plastic after 1 week, flush the traces of formalin with water 50-80 lit/ sq. m. Wait for one week for good tillage condition of soil.

Planting beds and initial fertilizer application

Raised beds of 80 cm width are suitable for planting, base should be 90 cm with height 45-60 cm. Gravels can be put at the bottom of the bed for better drainage. Keep 45 cm space between beds as working space. Add and mix 2.5



Planting on raised soil beds

kg Single Super Phosphate and 0.5kg Magnesium Sulphate for 10sq. m. bed area.

Plant three rows of plants per bed with 30 cm distance on one bed. Plant to plant distance should be 30 cm. Planting is done with root ball and crown is kept above soil surface (1 cm). Irrigate lightly after planting. In 1000 sq m area, 5000 plants can be planted with 3 rows while in 500 sq.m. area, 2500 plants can be accommodated.

Cultural operations after planting

The relative humidity is maintained at 70-80% for first 4 weeks. Irrigate plants lightly with rose can after planting daily for 4 weeks (twice in a day). Drenching of soil with fungicide captan and benlate (1g/lit) after 3 and 6 days, respectively is recommended. Spray Nuvan (Dichlorvos) (1.5 ml) after 9 days.

Humic acid (1.5 ml/lit) is applied as a drench after 7 days. Chelated micronutrients are sprayed (0.5g / lit) after 10 days at the interval of 3-4 days up to one month.

Fertilizers are applied as drench to soil with 14:42:14 (1.5g/ lit) after 13 days. Another drench with 19:19:19 (N:P:K) @ 2 g /lit. can be given after 17days. Continue this at the interval of 3-4 days up to 4 weeks. Kelthane and Endosulfan sprays are applied to take care of mites and other insects as and when required. Remove weeds regularly. Drench solution should be applied at the rate of 40ml/plant while for spray use 12 lit. of solution /1000plant as the plants are small initially.

Fertilizers and irrigation (Fertigation)

After one month plants get established and liquid fertilizers can be given through drip.

Apply 20:20:20 N:P:K at alternate day @ 0.4 g / plant) through drip during 2nd and 3rd month along with micronutrients and Calcium chelates. From fourth month onward apply 15:8:35 or 16:8:24 N:P:K + 0:0: 50 at alternate day @ 0.4 g / plant as the flowering picks-up. Calcium nitrate (250g) and chelated micronutrient mixture (Rexolin or Fertilon Combi-II trade names) at 25 g (for roughly 1000 plants) should be given once in 8-10 days through drip. Grown-up plant needs 700 ml water / day hence dripper flow at each plant has to be checked and adjusted accordingly.

Mix the liquid fertilizer in water in a small tank of fertigation system, adjust the flow through mixing unit by adjusting the valves. Flow can be measured at drippers. Check the flow of drippers over entire area, it should be even to all plants.

For example : 1000 plants require 700 lit water and 400 g fertilizer quantity. (700 ml water with 0.4g fertilizer to each plant).

Insect-pests and their control

Thrips, leaf miner and mites are very common pests and need to be controlled immediately as and when appear. The spray solution quantity can be doubled or tripled as the plants grow so as to cover all plants.

White fly : Dimethoate(Rogor), Endosulphan (2ml/lit. water)

Leaf miner : Chloropyriphos, dichlorovos (Nuvan) (1ml/lit)

Thrips : Rogor, Nuvacron (2ml/lit)

Mites : Dicofol (Kelthane), wettable sulphur (1.5g)

Leaf eating caterpillar: Thimet (Phorate) (2g/plant) apply around the base of plant

Diseases and their control

Root rot, crown rot and leaf spot are the common diseases.

Root rot : This can be controlled with Captan, Benlate, Aliette drench to soil (2g/lit)

Crown rot : Aliette, Topsin-M (2 g/lit)

Powdery mildew : Wettable Sulphur spray (1.5 g)

Alternaria leaf spot : Dithane M -45 (Mancozeb) spray (1.5g)

Harvesting

Gerbera plants produce flowers 7-8 weeks after planting. Plants have productive life up to 24-30 months. One plant yields 30-40 flowers per year and 75 to 100 flowers in 30 months. Flowers are ready to harvest when 2-3 whorls of stamens are developed.

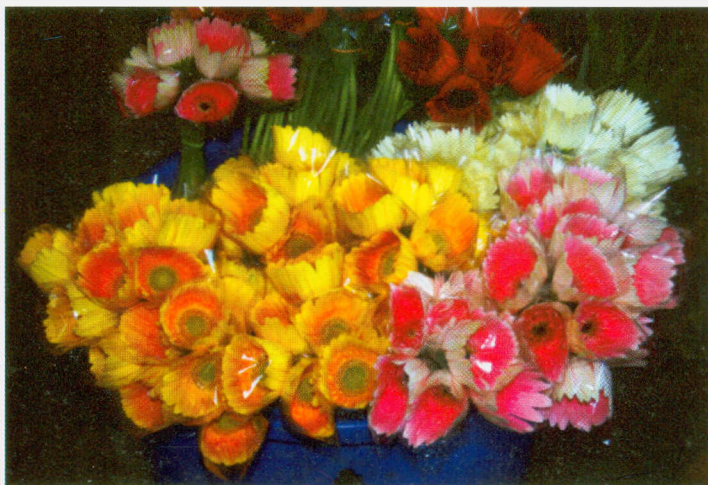
Pluck the flower at the heel with angular cut. Plucking should be done in morning or evening.



Gerbera flowers ready for harvesting

Postharvest quality and management

Flowers with stalk length 45-55cm and diameter 10-12 cm fetch very good price as they are 'A' grade flowers. Vase life is 8-10 days. For best vase life put the cut end of the flower in clean water at 15 °C for 4 hrs. Add 10 ml Sodium Hypochlorite in 1 lit water before placing the flower. For long distance transport corrugated box/cartons are used. Gerbera does'nt need cooling like rose or carnation and have reasonably long shelf life.



Gerbera flowers packed in polythene bags

Economics

It is very economical to grow Gerbera in polyhouse. The break-even is achieved within 1 year (it means all the costs are recovered in 1 year). Economics for 500 and 200 sq. m. unit is as follows.

Economics of Gerbera cultivation in polyhouse

Item of expenditure	Area 500 sq.m.	Area 200sq.m.
Fixed cost Rs.		
Poly house @ Rs. 400/sq.m	2 lakh	0.80 lakh
Fertigation unit (1 quantity)	0.4 lakh	0.15 lakh
FYM, Soil, Bed sterilization	0.25 lakh	0.10 lakh
Planting material@Rs.30/plant	0.75 lakh for 2500plant	0.27 lakh for 900 plant
A. Total fixed cost	3.4 lakh	1.32 lakh
B. After subsidy 50% on fixed cost under NHM	1.70 lakh	0.66 lakh
Bank interest 8% on full amount of fixed cost for 3 months and on half amount for 9 months	17,000/-	6,600/-
Recurring cost		
Fertilizers, chemicals/ @ Rs. 60/sqm	0.30 lakh	0.12 lakh
Labour skilled (one)Rs.150/day	0.54 lakh	--
Labour unskilled (one) Rs.80/day:	0.29 lakh	0.29 lakh
Electricity and others	0.11 lakh	0.051 lakh
C. Total recurring cost	1.24 lakh	0.46 lakh
Flower production 40/plant/year	1,00,000 flowers	36,000 flowers
D. Income from sale @ Rs3.5 / flower	3.50 lakh	1.26 lakh
E. Gross income = D-(C+ interest)	2.09 lakh	0.734 lakh
Net income E - B	0.39 lakh	0.074 lakh

At the end of the year net income 0.39 lakh in 500 sqm unit and 0.074 lakh in 200 sqm unit if subsidy is availed.

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