# Gerbera

## Cultivation Guide

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\*The information provided is meant to be used strictly as a guideline and Actual results may vary depending on local climate and growing conditions.

#### **GERBERA CULTIVATION GUIDE**

#### 1. Introduction

Gerbera *(Gerbera jamesonii)* is one of the most important cut-flowers, successfully grown under semi controlled conditions in several parts of India and meeting the requirements of various markets. This success is primarily due to the wide range in colour and shape of the flower. The cut blooms when placed in water remain fresh for a reasonable amount of time. Gerbera belongs to the family "Compositae". Plants are stem less and tender perennial herbs, leave radical, petiole, lanceolate, deeply lobed, and sometimes leathery.

#### 2. Selection & treatment of Soil:

For growing Gerbera successfully, soil selection is very important. The main factors to consider are as under:

- Soil pH should be in between 5.5 to 6.5 or it should be maintained at this level to get maximum efficiency in absorption of nutrients.
- The salinity level of soil should not be more than 1 mS/cm. Therefore, as soon as you select the site, get the soil analyzed to decide its further reclamation.
- The soil should be highly porous and well drained to have better root growth and better penetration of roots. The roots of Gerbera go as deep as 50 70 cm.

Before plantation of Gerbera, disinfections of soil are absolutely necessary. In particular, the fungus Phytophthora is a menace to Gerbera. The various methods of sterilization are:

- Sun: Cover the soil with plastic for 6-8 weeks. Sunrays will heat up the soil, which will kill most fungi.
- **Chemical:** Formalin @ 8 10 lit / 100 sq mt. This pure chemical should be diluted 10 times in water and then sprayed/drenched on beds and then cover with plastic for 7 days. Then flush the soil approximately with 100 lit. of water per sq. mt. to drain the traces.

Or **Basamid (Dazomet)**: (30 - 40 gm / sq mt.)

After sterilizing and subsequent washing out of the soil it is advised to wait for 2 weeks before plantation.

#### 3. Greenhouse for Commercial Cultivation:

Sufficient ventilation space is required on top and sides and to protect the plants from the rain in the monsoons, without affecting the air circulation side curtains should be kept open in slanting position. White shade net (50%) to be used to control scorching high radiation.

Top shade net opening and closing:

- During cloudy climate should be open, otherwise close from 10.00 am to 4.00 pm.
- During cold nights shade nets should be close.
- In summer close from 11 am to 4.00 pm.

The ideal temperature for Gerbera flower initiation is 23°C and for leaf unfolding is 25 -27°C. The flowering of Gerbera is harmed below 12°C (Bud initiation will stop) and above 35°C. (Frequency of flowers will be very low and abortion of buds will take place)

The optimum humidity inside the greenhouse should be 70 -75%, which will maintain the health of the plants.

Washing tops of the plastic on monthly interval will remove the dust and give better sunlight to plants.

Apply white wash at East, west and north sides of green house to protect plants from bright light intensity during summer season.

#### 4. Beds Preparation:

In general, Gerberas are grown on raised beds to assist in easier movement and better drainage. The dimensions of the bed should be as follows:

- Bed height: 45 50 cm
- Width of bed: 65 70 cm
- Pathways between beds: 30 35 cm



If soil is black cotton gravels or rocky soil (6" layer) can be added at the bottom for better drainage. Recommended quantity of soil and sand is added along with organic manures and rice husk.

At the time of bed preparation (After fumigation) neemcake (@1kg/Sq.M.) should be added as prevention against nematode. All material should be mixed thoroughly for

optimum results. The composition of bed material should be such that it should be highly porous, well drained and provide proper aeration to the root system. *"Walking on beds strictly to be avoided"* 

Bed Material Composition: Material	Clay soil	Silty loam soil
Red soil	55%	60%
Sand	15%	10%
FYM	30%	30%
Rice husk	4kg/m2	2.5kg/m2

#### Fertilizer application after bed preparation

Chemical	<u>Quantity</u>
S.S.P. (Single Super Phosphate)	25kg/100sqm
Magnesium Sulphate (MgSo4)	5kg/100sqm
Micro Nutrients (Caliber Fertilizer)	2 kg/100sqm

#### 5. Planting:

Gerbera plants should be planted as follows	
Row to row	35cm
Plant to plant	30cm

Planting should be done without disturbing the root-bal.l Plug of Gerbera plant should be 30% above of soil and 70% below of the soil.

While planting Gerbera plants, the crown of plants should be 1-2 cm above soil-level. As the root system establishes; the plants are pulled down. Therefore, the crown must be above the ground level at planting and also throughout the life cycle.



#### 6. Irrigation:

After plantation, maintain the humidity at 80 - 90% for 4 - 5 weeks to avoid desiccation of plants.

Quality of water always should be under check as follows:

- pH- 6.5- 7.0
- Ec- < 0.7 ms/cm.
- T. D. S. < 450 ppm
- Hardness < 200 ppm

To decrease the pH of water, add acids in the water tank which should be rinsed properly and then use the water for irrigation and spraying.

- Immediately after plantation, irrigate the plant with overhead irrigation for three weeks to enable uniform root development. Thereafter gradually change to drip irrigation. Drip irrigation is mainly for correct doses of fertilizers.
- Generally one drip per plant is required. The aim is to provide sufficient irrigation in the 2nd year for the extra foliage. The water requirement of Gerbera plant is approximately 500 to 700 ml per plant per day depending upon the season. In hot summer, foggers can be used to maintain the humidity of the air.
- Before irrigation observe the soil column and visually check the soil moisture content. Then decide on the quantity of irrigation required.
- Always water the plants before 12 noon.
- The relative humidity of air should not exceed 90 92 per cent, as it will lead to deformity of flowers.

• As a thumb rule, the soil should be moderately moist-however never having excessive water.

#### 7. Fertilization:

- After three weeks of plantation apply N:P:K 1:1:1 (e.g. 19:19:19) @ 0.3 gm/plant every alternate day with Ec 1.5ms/cm for first three months during the vegetative phase to have better foliage.
- Once flowering commences, apply N:P:K 2:1:3 (e.g. N:P:K 16:8:24) or N:P:K 20:20:20 + 13:0:45 @ 0.3 gm/plant every alternate day with Ec 1.5ms/cm for more flowers and better flower quality.
- Irrigate and fertilize frequently in small quantities for optimum results. However, always take care to fulfill the crop requirement.
- Micronutrients should be given daily or weekly as per the deficiency symptoms (e.g. Fertilon Combi II, Microsole B, Rexolin, Sequel and Mahabrexil @ 40gm - 50 gm per 1000 lit of water)
- Add organic manures with EC less than 2ms/cm at every 3 months interval to maintain proper C: N Ratio.
- Always do the detail soil analysis every 2-3 months to decide specific nutrient schedule.
- As a layman, whenever you enter the greenhouse the plants should look very healthy and glossy.

#### 8. Cropping Pattern & Harvesting of Flowers:

Gerbera is a 24-30 months crop. The first flowers are produced 7-8 weeks after plantation.

- The flowers are harvested when 2-3 whorls of stamens have entirely been developed; this will decide the vase life of flowers.
- Pluck the flowers in the morning or late in the evening or during the day when temperature is low.
- Pluck the flower from the plant rather than cutting them.
- Cut the heel of the stem by giving an angular cut.
- Immediately put the flowers in 2-3 cm water after harvesting for four hours at 14-15 °C.
- Always add commercial bleach/Sodium Hypochlorite (@ 7-10 ml or Citric acid + Ascorbic acid @ 5ml each/lit of water.
- Sleeves the individual flower with poly thin bag.
- Make bundle of 10 flowers.

• Pack the flowers in a box with following dimensions. Generally 250 to 300 flowers are packed per box.

#### **Diseases & their control:**

#### **Crown Rot:**

Caused by *Phytophthora cryptogea* results in wilting disease of Gerbera, Crown of the plant becomes black.

#### **Control:**

Aliette (Fosetyl Alluminium) <b>(D)</b> ROKO (Thiophanate- Methyl) <b>(D)</b>	1.5 gm 1 gm
Blitox (Copper oxychloride) (D)	1.5gm
Kocide (Copper hydroxide) (D)	1gm

#### Root rot:

Caused by *Pythium*. Initially dropping of younger leaves, finally wilting of the plant. Root skin is easily removed.

#### **Control**:

Aliette (Fosetyl Alluminium) (D)	1.5 gm
ROKO (Thiophanate- Methyl) (D)	1 gm
Benofit (Benomyl) (D)	1.5 gm
Bavistin (Carbendazim) <b>(D)</b>	2 gm
Captaf (Captan) <b>(D)</b>	1 gm

#### Fusarium:

If leaf-stem is cut, you can see the vessels are black. Blocking of the crown portion with brown discolouration.

#### Control:

ROKO (Thiophanat	te- Methyl) <b>(D)</b>	1gm
Koside (Copper hyd	droxide) (D)	1 gm

#### Alternaria leaf spot:

Develops when moisture persist on leaf surface for longer duration. Black circular spots appears on leaves.

#### Control:

Dithane M-45 (Mancozeb) 1.5 gm

#### Powdery mildew:

White powdery growth on the leaf lamina. In case of severe attack leaves start curling.

#### Control:

Wettable Sulphur <b>(SP)</b> Bayleton (Triadimefon)	1.5 gm 1 gm
Karathane (Dinocap) <b>(SP)</b>	0.4 ml
Quintol (Iprodion + Carbendazim) (SP)	0.5 gm
Index (Myclobutanil) <b>(SP)</b>	0.5gm
Rubigan (Fenremol) <b>(SP)</b>	1ml

#### **Bacterial blight:**

Yellowish oily spots on the leaves later turns brown. Brown discolouration along the mid vein. Wilting of flower bud and brown spots on the stems. **Control:** 

Streptocyclin <b>(SP)</b> Kasu B (Kasugamycin) <b>(SP)</b>	2gm 1.25ml
Emison (Ethoxy methyl mercury chloride) <b>(SP)</b>	0.2gm
Blitox (Copper oxychloride) (D)	1.5gm
Koside (Copper hydroxide) (D)	1gm

#### Insect – Pest & their control:

#### Whitefly:

It occurs when climate is hot and dry. Feeds on the lower side of leaves, excrete large quantity of honey dew which leads to development of black sooty moulds on the leaves.

#### **Control:**

Astra, Lanate (Methomyl)	1 ml
Rogor (Dimethoate)	2 ml
Neemazol	2 ml
Malathion	1 ml
Confidor (Imidacloprid)	0.5 ml
Pride (Acetamiprid)	0.4 gm

Dantop (Clothianidin)	1gm
Actra (Thimethoxan)	0.5gm
Pegasus (Diafenthiuron)	1.25gm
Padan (Cartephydrochloride)	1gm

#### Leaf Miner:

White specks on leaves caused by flies. White serpentine tunnels in leaves caused by larvae, which stays in soil.

#### Control:

Nuvan (Dichlorovos)	1 ml
Vertimec (Abamectin)	0.4 ml
Acephate (Acephate)	1.5 gm
Metacid (Methyl Parathion)	1 ml
Cal MB	2ml
Padan (Cartephydrochloride)	1gm

#### **Red Mites:**

Suck the sap from lower sides of the leaves causing development of brown spots on lower surface of leaves resulting in marginal drying of leaves. Webbing on the flower petals.

#### Control:

Spray plain water	1 -
Sulphur 80% WDG	1.5 gm
Kelthane (Dicofol)	1.5 ml
Vertimec (Abamectin)	0.4 ml
Magister (Fenazaquin)	1 ml
Omite (Propergite)	1ml
Milbeknock (Milbemectin)	0.5ml

#### Cyclamine mites:

Older leaves are curled up. Younger ones being deformed and leathery, deformed flowers or petals are missing. Inward curling and discolouration of petals.

#### Control:

Spray plain water	
Sulphur 80% WDG	1.5 gm

Karathane (Dinocap) Vertimec (Abamectin)	0.4 ml 0.4 ml
Milbeknock (Milbemectin)	0.5ml
Dicofol	1.5ml

#### Thrips:

Causes white specks or stripes on ray florets; flower heads may be deformed. Silvery, grayish spots on the leaves; Brown spots on leaf petioles/ midvein.

#### Control:

Confidor (Imidacloprid)	0.5 ml
Nuvan (Dichlorvos) + Nuvacron (Monocrotophos)	1.5 ml + 2ml
Rogor (Dimethoate)	2 ml
Pride (Acetamiprid)	0.4 gm
Vertimec (Abamectin)	0.4 ml
Calnova + Calpaste	0.5ml + 2gm
Actra (Thimethoxan)	0.5gm

#### Caterpillar:

Eat leaves voraciously making circular holes in the leaf lamina. It causes white spots on the petals in case of flower attack.

#### Control:

Lanate (Methomyl)	1.5 gm
Thimet (Phorate) <b>(S)</b>	2 gm/plant
Avaunt (Indoxacarb)	0.5ml
Larvin (Thiodicarb)	0.4gm

#### Root knot Nematode:

Yellowing of leaves, stunted growth of the plant with reduced leaves size, knots on roots. Water logged condition in the green house and muddy water during rainy season are favourable conditions for nematode growth. **Control:** 

Neem Cake		30 – 50 gm /
	plant	
Suzan (Diazinon) <b>(D)</b>		2ml
Metacid (Methyl parathion)		2ml

Benofit (Benomyl)	3gm
Hydrogen peroxide <b>(D)</b>	7ml
Carbofuron granules	10g/sq. m.
Nematogaurd (Pcealomyces)	5gm

#### (D) : Drench @ 30 - 40 ml/plant (S) : Soil application around plant

#### (D) : Drench @ 30 - 40 ml/plant

#### (SP) : Spraying

**Note:** In biological fungicides *Trichoderma viridae* and *Trichoderma herzenium* are effective against all fungal diseases. Chemical fungicides should not be used atleast 21 days after or 10 days before its application.

#### SR. NO. **TRADE NAME CONSISTENT** 1 Hostathion Triazophos 2 Tilt Propiconazole 3 Penconazole Topaz 4 Contaf Hexconazole 5 Spark Cypermethrin + Triazophos 6 Polytrin Profenophos 7 Ridomil Metalaxyl 8% + Mancozeb 64%

#### NEVER APPLY FOLLOWING CHEMICALS ON GERBERA:

#### **Cause of some disorders**

\* Flower bent- Loss of cell turgidity and under nutrition (lack of Calcium)

\* Pre-harvest stem break- High root pressure and high humidity in the air.

\* Premature wilting of Gerbera flower- Cloudy weather followed by bright sun or carbohydrate depletion.

\* Double-faced Gerbera flower- A physiological disorder caused by imbalance of nutrients. Too much growth too little flower buds.

\* Non-uniform flower blooming- Physical injury to flower stem / pest damage / phytotoxicity.

\* Short stem length- High salinity level, moisture stress, low soil temp.

#### **Deficiency Symptoms**

1. *Nitrogen:* General yellowing starts on older leaves and then moves gradually upward because nitrogen is Trans located out of older leaves to the new growth under deficiency.

2. *Phosphorus:* Brownish discoloration along the vein on underside of old leaves.

3. *Potassium:* Marginal necrosis of old leaves.

4. *Calcium:* Extreme yellowing of young leaves.

5. *Magnesium:* Interveinal chlorosis on older leaves get thick and crispy.

**6.** *Iron:* Interveinal chlorosis on young leaves. Serious deficiency results in a yellowish-white coloring.

7. *Zinc:* Chlorosis, one half of leaf blade ceases to expand and develop while other half is normal i.e. C shaped leaf structure.

**8.** *Manganese:* Leaves turn yellowish, starting with younger ones; veins remain green, heavy chlorosis.

9. Copper: Chlorosis in younger leaves; flower develops badly.

10. Molybdenum: Chlorosis on the edges of leaves.

11. *Boron:* Bases of younger leaves are black colored.

#### Control measure:

Chelated sources (like Microsole, Tracel, Micnelf) of these microelements as a foliar spray.