KF Bioplants PVT. LTD.®

A KUMAR – FLORIST (HOLLAND) JOINT VENTURE

Phalaenopsis

Manual

INTRODUCTION

Phalaenopsis belongs to the largest family in the plant kingdom, the Orchidaceae. It represents just one genus, with approximately 50 different species, including the well known white *Phalaenopsis amabilis*. The Phalaenopsis generic name means Moth like, and is derived from the Greek Phalaina (moth) and Opsis (similar). The flower structure of Phalaenopsis orchid is characterized by the figure three, three sepals, three petals and a triangular ovary. These plants exhibit a monopodal form of growth (no lateral shoots), whereby the main stem continues to grow throughout the year and only one spray of flowers can develop from each leaf axil. Phalaenopsis has fleshy and distichous leaves

CLIMATE

A. Temperature :

The phalaenopsis is a tropical plant and it requires temperature between 15 to 32^{0}C. It is necessary to maintain average temperature of 26 to 27^{0}C during the growth phase, 19 to 21^{0}C during flowering phase. A temperature drop up to 18^{0}C is required for spike induction.

B. Relative humidity :

An ideal range of relative humidity is 60 to 80 per cent. However high relative humidity with high temperature increases the risk of bacterial diseases.

C. Light intensity :

Provision of sufficient light during cultivation is of importance for development of suitable foliage and roots. Excessive light intensity will result in burning of the foliage. Inadequate light intensity results in straggly and poor quality plants, with an inadequate spray and insufficient root development. Following light intensity at the level of the plants can be employed for various phases of cultivation;

Growing : 5000 to 8000 lux

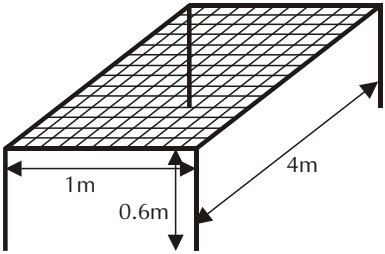
Flowering : 8000 to 10000 lux

D. CO_2 :

Phalaenopsis is a CAM plant (Crassulacean Acid Metabolism), which means that it takes up CO_2 at night, this is in contrast to most other plants, which take up CO_2 during the day. CO_2 requirement is between 600 to 800 ppm.

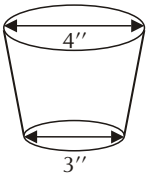
BENCHES

Growing of phalaenopsis usually takes place on open benches that have good air circulation.

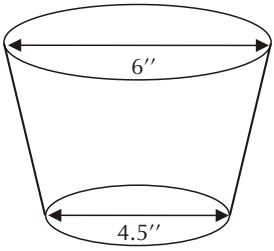


POTS

Phalaenopsis requires transparent pots for growing which will ensure a more active growth and better root quality. Generally, white coloured transparent pots of two different sizes are recommended for growing phalaenopsis.



4″ top diameter pot



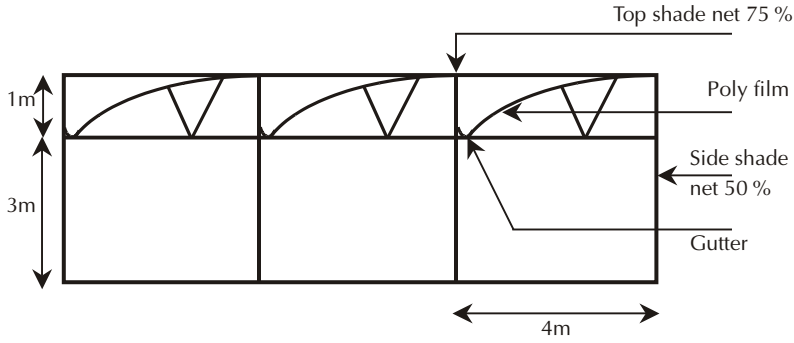
6″ top diameter pot

POTTING MEDIA

Selection of media is very important to ensure proper retention and distribution of water and nutrients as well as drainage of excess water. The media should provide firm support to plants. Hence coconut fibres or coco chips are frequently used as a media for phalaenopsis.

SHADOW HALL FOR PHALAENOPSIS CULTIVATION

As phalaenopsis requires low temperature for flower production. It can be maintained under shadow hall.



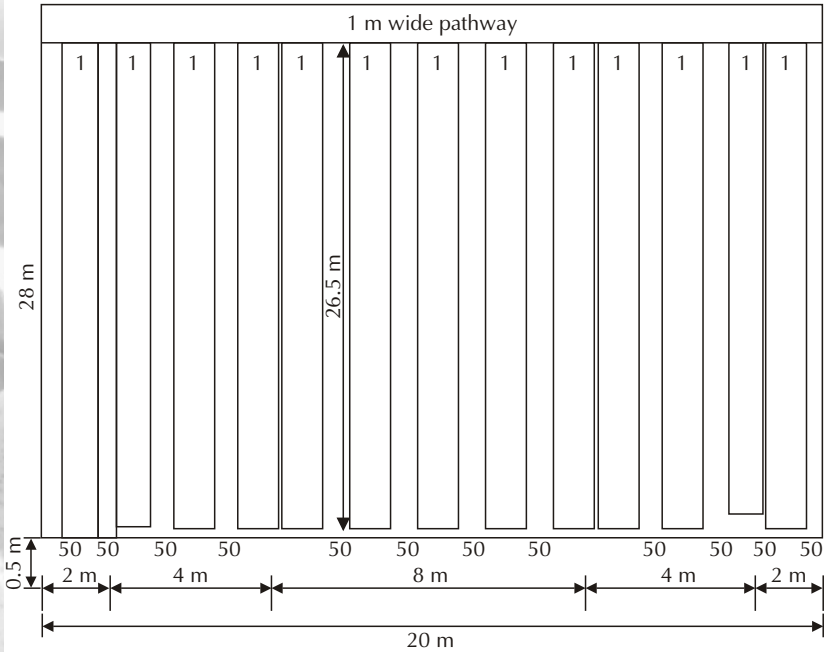
Specification :

1. Total height : 4 m
2. Gutter height : 3 m
3. Top shade net : 75 % green or white
4. Side shade net : 50 % green
5. Plastic : 200 micron
6. Bay size : 4 x 4 m

Advantages :

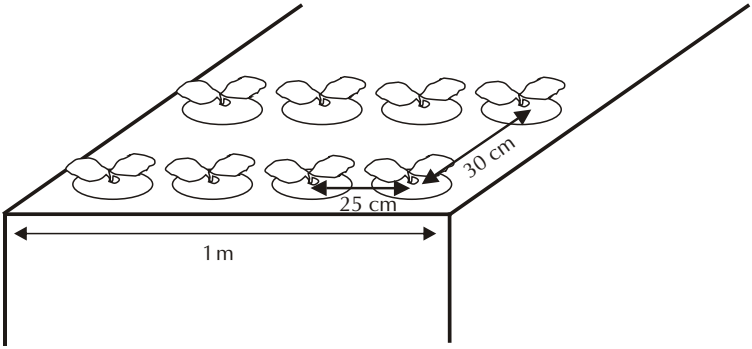
1. Better cooling efficiency because light intensity gets reduced before reaching to plastic.
2. Effective cross ventilation due to nets on side.
3. No need to run foggers quite often as temperature remains low due to better air circulation than normal green house. Hence this reduces disease attack.
4. No direct watering on the plants, which will help to minimize burning, corking and salt deposition on leaves and flowers.
5. Cost effective than naturally ventilated poly houses.

BENCH ARRANGEMENT IN POLYHOUSE



PLANTING

Initially planting is done in 4″ pots filled with only coco fibre. After 6 months plants are transferred to 6″ pot, which contains coco chips.

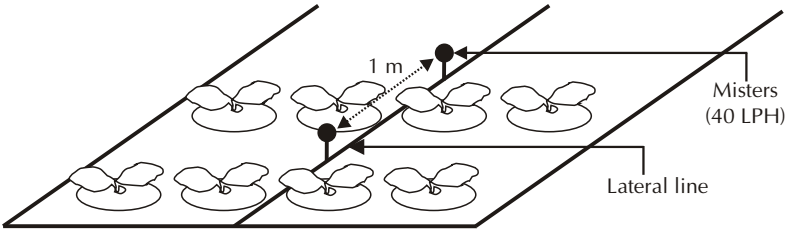


Planting density : Gross: 9 plants/m^2 Net: 13.5 plants/m^2

IRRIGATION

As phalaenopsis is grown on very porous substrate, it is important to supply the water to the crown portion by using sprinkler. The water must be free from any harmful chemicals or contamination. The quantity of water required by the plants depends on climate, substrate and the age of crop. The irrigation system must be capable of supplying between 5 to 12 liters of water per m^2 per hour. It is very important to ensure that plants are provided with appropriate drainage.

Irrigation Layout



WATER QUALITY STANDARDS

Quality			Sodium		Chlorine		Bicarbonate		Calcium	
	pH	EC (mS/cm)	mmol/ lit	ppm	mmol/ lit	ppm	mmol/ lit	ppm	mmol/ lit	ppm
Good	<6.5	<0.5	<1.0	23	<1.0	97	<0.5	<31	<1.0	<40
Acceptable	6.5-7.2	0.5-1.0	1-3	23-69	1-3	97-291	0.5-1	31-61	1-2	40-80
Poor	>7.2	>1.0	>3	>69	>3	>291	>1	>61	>2	>80

FERTILIZERS

Nutritional composition for the phalaenopsis

Water supply for 100 per cent rain water.

Main Element			Trace Element		
Nutritional Element	mmol/lit.	ppm (mg/lit.)	Nutritional Element	µmol/lit.	ppm (mg/lit.)
NH_4^+	0.5	9	Fe++	16	0.89
K+	4.6	180	Mn++	3.0	0.16
Ca++	1.3	52	B^-	10	1.55
Mg++	0.4	10	Zn++	3.0	0.20
NO_3^-	6.2	384	Cu++	2.0	0.13
SO_4^-	0.4	38	Mo^-	1.0	0.16
P-	1.5	146			

Standard Fertilizer solutions for the Phalaenopsis
(Concentration 100 times in 1000 lit. water)

A-Tank solution

Sr. No.	Nutrient	
1	Calcium Nitrate	31 Kg
2	Potassium Nitrate	19 Kg
3	Fe - EDDHA 6%	190 gm

B-Tank solution

Sr. No.	Nutrient	
1	Ammonium Sulphate	3 Kg
2	Potassium Nitrate	15 Kg
3	Mono Potassium Phosphate	21 Kg
4	Magnesium Sulphate	7 Kg
5	Magnesium Nitrate	3 Kg
6	Borax	100 gm
7	Manganese Sulphate	55 gm
8	Zinc Sulphate	55 gm
9	Copper Sulphate	50 gm
10	Na-Molybdate	25 gm

FLOWER PRODUCTION

The complete growing period is approximately 5 years. Generally flower production starts 8 months after plantation. In order to obtain high quality production, it is important that the plants are large enough (it should have 5 adult leaves) and plants have good root system before harvesting of flowers.

PREMATURE FLOWERING

The premature flowers will need to be removed during growing phase. If this is done immediately flower stick will till be soft and can be pinched off. If however the flower stick is little older it will need to be cut away. The minimum temperature to limit premature flowering during growing phase should be 27^0C.

HARVESTING & YIELD

The phalaenopsis flower stem are supported with stick when flower buds begin to swell. The branches are harvested when the last flower is still in bud.

Average flower production is 4 stems per plant per year.

POST HARVEST & PACKAGING

After harvesting stems are kept in bucket containing water and stored under a temperature between 7 to 10^0C. The vase life varies between 5 days to 6 weeks depending on climate and variety.

The flowers are packed in single use boxes that have dimensions of 100 x 15 x 11.5 cm. Depending on the number of flowers per stem, 25 to 30 stems are packed per box.

DISEASES

Bacterial disease

I. ***Pseudomonas cattleyae*** it is most important bacterial disease infecting phalaenopsis.

Symptoms : Disease can be recognized by characteristic brown patches on the leaves, having oily spots, surrounded by yellow rim. Initial infection shows dark pit in the leaf.

Control measure :

- Use of good and healthy planting material.
- Regular rouging of plants.
- Adjust the amount of nitrogen.
- Maintain proper relative humidity.
- Spray with Streptocyclin @ 0.1 gm/lit or Kasu B @ 1.25 ml/lit

II. ***Erwinia carotovora (Bacterial soft rot)*** **:** Plants infected by this bacterium produces foul smell from wet spots on leaves, which expands rapidly. Finally leaf becomes completely soft and slimmy within one or two days.

Control measure :

- Use of good and healthy planting material.
- Regular rouging of plants.
- Spray with Hydrogen peroxide with Silver (2 ml/lit).
- Spray Streptomycin sulphate (0.2 gm/lit).

Fungal diseases

I. ***Botrytis :*** Petal blight is manifested in the form of a large number of small brown spots on the flowers. It is caused by the flowers being wet when evening falls or by an excessively high relative humidity.

Control measure

- Avoid excess humidity and continuous wetness on the leaves and flowers.
- Spray with Quintol or Rovral (0.5 gm/lit).

II. ***Fusarium*** **:** It causes a black triangular spot with at its edges a yellow reddish discolouration at the base of the old leaf. The leaf falls away completely. *Fusarium* is often caused when the root collar of the plant has been wet for too long.

Control measure :

- Avoid excess watering
- Drenching with Topsin or Roko (2 gm/lit)

III. ***Rhizoctonia spp.*** **:** *Rhizoctonia* mainly occurs on the substrate when planting is done very deep and growth is not good. Under such conditions fungus becomes parasite. Young leaves when comes in contact with substrate, get affected by this fungus. It can also damage the roots.

Control measure :

- Relative resistance to *Rhizoctonia solani* can increase by good air circulation, good drainage.
- Drenching with fungicide Bavistin (2gm/lit) or Benomyl (1.5gm/lit) before planting.

IV. ***Althelia rolfsii (Sclerotium rolfsii)*** **:** This fungus attacks young plant parts which come in contact with substrate at larger extent. Hot and humid conditions are suitable for its growth. White fungus hairs develop in the substrate, in which orange brown coloured mustard shaped fungus tissues, develops rapidly.

Control measure :

- Drenching with Quintol or Rovral (1 gm/lit).

V. **Moulds :** Large fluctuation in the moisture content or the EC can cause damage to roots, thereby enabling moulds to attack the tissue. In the event of problems with roots, the EC should be maintained at a sufficiently low level, pot temperature should be maintained at sufficiently high level and substrate should temporarily be kept somewhat drier.

Viral disease

Infected plants show poorer growth, small flowers and retarded development into full-grown plants. It also shows discolouration of flowers and chlorotic or necrotic spots on leaves.

Control measures :

- Use of healthy planting material.
- Regular rouging of plants.

Root problems

It generally occurs when there is large fluctuation in quantities of nutrient and water as well as in substrate temperature. Excessive

irrigation and poor drainage can also cause root necrosis. If roots are unable to provide water and nutrients to plants edges of the leaves become weaker and dull coloured.

Control measure :

- Avoid fluctuations in nutrient and water quality.

INSECT & PEST

I. **Slugs and snails:** Slugs and snails chew round holes in the young plant parts. It can damage large number of plants within short period of time. Small snails and slugs can also attack root tips.

Control measures :

- Slug pellets in the pots and on ground can control them effectively.
- Metaldehyde 6% @ 0.7 gm/m^2.

II. **Mites :** The red spider mites are found underside of the leaves. They suck the sap from the leaves causes slight deformation and silvery discolouration of the leaves.

Control measures :

- Mites can be controlled by spraying fresh water.
- Spray Karathane (0.5 ml/lit) or Kelthane (1 ml/lit) or Magister (1 ml/lit) or Vertimec (0.4 ml/lit).

III. **Caterpillar :** It attacks occasionally on young leaves and flowers.

Control measures :

- Spray with Lannate (1 gm/lit) or Metasystox (1 ml/lit) or Decis (0.5 ml/lit)

IV. **Aphids or scale insect :** Brown scales and balsam wooly aphids are found in groups in flower and the leaf as well as in the roots. Hence they are difficult to control by chemical sprays. Aphids can be identified by whitish deposits on the plants and brown scales can be identified by oval lumps on and beneath the leaves. A sticky layer is deposited on plants due to their secretion, which becomes black because of black moulds.

Control measures :

- Racking around plants.
- Soil application of thimet (2 gm/pot)
- Spray with Dimethoate (2 ml/lit)

V. **Sciaridae (Fungal gnats) :** Large numbers of sciaridae larvae attack the root.

Control measures :

- Hanging of yellow sticky pads.
- Spray with Decis (0.5 ml/lit) or Lannate (1.5 gm/lit).

ABNORMALITIES DUE TO CLIMATIC FACTORS

I. **Bud loss :** Buds get detached from flower sticks during flowering phase when the temperature is excessively high in relation to the light intensity. It can also occur when the roots of the plant are of poor quality or if the cutting has taken when the plants are still immature.

II. **Dripping spikes and leaves :** If there is continuous moisture drops on the stem, the top half of the spike will die off at earlier stage.

III. **Glossiness in flower :** It mainly because of viral damage, lack of potassium and high humidity levels in combination with dark conditions.

IV. **Cooling or transport spots :** While transferring the plants from growing department to flowering department may develop sunken spots on the foliage. The spots are caused by some or all cells. These cooling or transport spots also develop as a result of stress and an excess of light on moving plants.

PHYTOTOXICITY

The following agents are known to be cause phytotoxic reactions or growth stagnation in phalaenopsis.

Vertimec : Mainly during flowering.

Copper oxy chloride

Malathion

Parathion

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