Orchid

(Dendrobium spp.)

Cultivation Guide

Florance Flora

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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.

Introduction:

Orchids are most beautiful flowers in God's creation, comprise a unique group of plants. Taxonomically, they represent the most highly evolved family, the Orchidaceae among the monocotyledons with nearly 800 genera, 35000 species and more than 90,000 registered hybrids. Orchids are perennial herbs and exhibits incredible range of diversity in size, shape, colour, and ornamentation of their flowers. Many of these have fragrant flowers and are grown internationally as cut flowers and potted plants. The flowers in some elite orchid hybrids have a vase life of 3 - 5 weeks and surpass all other flowering plants in this respect, which also fetch a very high price in the market. Most of the commercially cultivated orchids are native of humid tropical forest i.e. Australia, Burma, China, India, Sri Lanka, South and Central America, Malaysia, Philippines, Thailand etc.

Intensive tropical orchid cultivation for cut flower export emerged in south – East Asian Countries such as Singapore, Malaysia and Thailand, during 1960 - 1965, and it gained popularity rapidly. Now Thailand is the largest exporter of tropical orchid plants and cut flowers in the world. The market share for Thailand, Singapore, and Malaysia is about 56%, 14% and 30% respectively. While Thailand concentrates mainly in growing *Dendrobium* (90 – 95%), Malaysia and Singapore a wider assortment such as *Aranda* and *Mokara* with *Oncidium* and *Dendrobium*.

Orchids growing in India:

The majority of tropical orchids under cultivation are native of tropical countries and area covered by the zone between 17° N and 17° S latitudes and this area has a rainfall of 150 - 250 cm per year. India has a tremendous scope for orchid cultivation due to diversity of environmental conditions and availability of all necessary resources.

Principles of *Dendrobium* orchid cultivations

The key to successful orchid cultivation is to provide suitable conditions to meet the growth requirements of particular species / variety. This is a matter of knowing how much light, air, water and nutrients are required by the plants and what sort of potting or bedding material is suitable.

Weather:

Most of the tropical orchids grow well in hot and humid conditions with good ventilation and can be grown in temperature range between $12 - 45^{\circ}$ C. In winters, if the temperature goes down below 12° C, some of the tropical orchids such as *Dendrobiums* transits into a dormant stage by dropping their leaves and not producing new shoots. When temperature becomes congenial they start producing new shoots again. If dormant stage is long then the flowering period will be short. Some orchids such as *Oncidium* and *Vanda* withstand lower temperatures better than *Dendrobium*.

Location and Site:

Commercial Orchids cut flowers farm should be close to the international airport, i.e. not more than two hours by road, as they are highly perishable; any delay during this stage will affect the flowers quality. In India, Mumbai, Chennai, Kolkata, Bangalore, have good international airport networks to enable worldwide orchid export. The ideal cultivation area of tropical orchids should be in the tropical zone between 17° N and 17° S of the meridian line. The area that has low rainfall is preferable to a high rainfall area. Orchids grown on nearest to meridian line will have longer period of flowering.

Light and Shading:

To achieve proper vegetative growth and as well as flowering, sunlight is essential, but 100% sunlight is not suitable, so for good growth and flowering shade net should be provided. This shade house structure should be open from all sides for good ventilation. For *Dendrobium, Aranda* and *Mokara* 60 – 65% and for *Oncidium* 70 – 75% shade net should be used. But it will be depend on the age of the plants, season, and varieties etc. Just after transplanting, they should be provided some extra shade for 2 -3 months or until the plants are fully established. *Dendrobium* naturally drops their leaves in winter and also the new leaves of the young plants will turn yellow due to the dry condition and strong sunlight. In summer when the temperature increases then new shoots will again appear and also the young plants need extra shade as sunlight is strong and the weather is hot all of the extra shade must be removed in rainy season so as to provide better ventilation to control diseases.

Planting:

For commercial cultivation of tropical orchids various types of planting media i.e. wood pieces, coal, dry fern roots, stone / bricks and coconut husks etc. can be used either in pots or directly on raised beds / netted tables. Coconut husk is the best and most suitable planting media. For commercial cultivation of *Dendrobium* hybrids on beds - 4 rows planting on 20 cm spacing. In this method 40000 plants are planted per acre.

Water Quality and Watering:

Rainwater is the most suitable for growing orchids but it is very difficult to get it all year round for commercial farm. The good quality from a lake, river, or canal is the best for orchid's cultivation. Water pH should be between 6.5 - 7.5 and EC less than 400 micromhos / cm. The water requirement for tropical orchids per acre is 10,000 - 12,000 liters per day in summer while 5,000 - 6,000 liters per day in winter. Round the year availability of good quality of water is the important factor for successful orchids growing. The preferable time for watering is before 10 am because in the morning environment has a high humidity and low temperature, thus is most suitable for the absorption of more water by plants. Evening watering promotes fungal diseases due to wet condition at night so evening watering should be avoided if weather & plants both

are too dry in that case before sunset irrigation can be given. Correct watering can produces strong and healthy plants and quality flower.



Nutrition:

For growing orchids successfully for cut – flowers as well as for pot plants, all major (N, P, K, Ca, Mg, S) and minor (Fe, Mn, Zn, Cu, Mo, Cl, Bo) nutrients are essential for optimum vegetative growth and flowering if applied in correct concentration and according to the plant growth stages. The ratio of NPK in different formula with minor elements for each stage of the growth must be provided to the plants correctly and regularly. Nitrogen (N) promotes vegetative growth, Phosphorous (P) promotes flower spikes and flowers buds while Potassium (K) provide strength to the plants and flowers. In *Dendrobiums*, at the stage of shoot formation and its growth during summer, NPK feetilizer ratio 1:1:1 is recommended whereas for flowering stage and rainy also in winter season, the ratio 1:2:2 @ 0.50 - 0.75 % concentration are recommended by Thailand experts.

For *Oncidiums*, NPK ratio 1:2:2 is suitable for spraying @ 0.5% concentration all year round, while for *Aranda, Mokara, Vanda* and *Aracnis*, the NPK ratio as used for *Dendrobiums* can be used @ 0.75 - 1.0 % concentration on weekly interval or twice in a week in split doses. Important to note that only 100% water soluble and pure fertilizers should be used. The correct time of spraying fertilizers is early in the morning, before strong sunlight.

Plant Protection:

Diseases are not a serious problem in orchid cultivation because they have their own in built safety factors against diseases. When any disease infection takes place, the food from the leaves is transferred to the pseudo bulbs and then leaves drop, the best way to control diseases is keep plants under good ventilation, controlled irrigation, using diseases free planting material and also to have regular and correct fertilizer program. The diseases and pests affecting the orchids, and their control measures are as follows:

Disease	Causal organism	Treatment
Bacterial rot	Erwina, Pseudomonas	Streptocyclin
Black rot / Crown rot	Phytophthora, Pythium	Thiram, Etridiazole
Black leaf spot	Alternaria	Dithane M-45
Cercospora spot	Cercospora	Ferban,
Flower Blight	Curvularia	Thiram, Ferban
Fusarium Wilt Fusaria	um	Topsin, Aliette
Root rot	Pellicularia	Ridomil, Topsin

Treatments
Indoxacarb, Deltamethrin
Imidaclorprid, Thimethoxan
Dimethoate
Omite, Kelthane
Nuvan, Nuvacron
Metaldehyde, Lannate

Flower Productivity:

Tissue cultured propagated plants start flowering after two to two and half years, however it generally depends on the varieties, cultivation practices and plants growth. Up to the age of 3 years flowering may be round the year but 3rd year onwards have a peak flowering season i.e. September to March in *Dendrobium*, November to March in *Oncidium*, January to June in *Aranda*, *Mokara*, *Vanda* etc.

In *Dendrobium* – 1^{st} year (2 years old plants) – produce short and medium size of spikes and at least one spike per plant; 2^{nd} year (3 years old plants) – short, medium, long, super

long spikes and at least 2 -3 spikes per plant, and 3rd year onwards - short, medium, long, super long spikes and at least 4 - 6 spikes per plant, may be goes up to 8 spikes per plant if cultivation methods are perfect and plant growth is healthy.

In *Oncidium* – 1st year – 1 spike, 2^{nd} year – 2 -3 spikes, and 3^{rd} year onwards – 3 – 5 spikes per plant. In *Aranda, Mokara, & Vanda* - 1st year – 1 spike, 2^{nd} year – 2 -3 spikes, and 3^{rd} year onwards – 3 – 6 spikes per plant.

Harvesting and shelf-life:

The preferable time for harvesting of flowers should be early in the morning but can also be done in the evening if the sunlight is not so strong. After harvesting flowers should be washed carefully (dipping in water tub for 1 - 2 minutes) with clean water before grading, bunch making, and packing. These all post - harvest activities should be done in a cool and shady place. Before packing, the flowers must be dry and kept in a cool and shady place till their dispatches and transportation.

Orchid flowers have much longer shelf life than other commercial cut flowers and this vary from variety to variety and also depends on growing techniques. Suitable climates, good quality of water, proper ventilation, optimum use of fertilizers and less use of chemicals increase the shelf life of flowers. If at the time of harvesting more buds are open, shelf life will be longer than if more buds are closed, because unopened buds and small size of buds take the food from the open flowers. In the rainy season, flowers may drop due to destruction of the pollen by rain or insects, so shelf – life will be shorter than the winter. In summer season also shelf life is shorter due to high temperature and low environmental humidity.

The following tips are helpful for increasing the shelf life of the flowers:

- Harvesting at the stage of 70% open flowers.
- Harvesting early in the morning.
- After harvesting, flowers should be washed and kept in a shady and cool place.
- After grading & bunching, base of the spikes should be kept in water (pH. 5-6)
- For export to a far off destination, fumigation and pre-cooling is essential.