

INTRODUCTION:



Dendrobium sp.

Dendrobium is the second largest genus of family. It was established by Olof Swartz in 1799 and today contains about 1,200 species. The genus occurs in diverse habitats throughout much of south, east and southeast Asia, including China, Japan, India, the Philippines, Indonesia, Australia, New Guinea, Vietnam, and many of the islands of the Pacific. The name is from the Greek *dendron* ("tree") and *bios* ("life"); it means "one who lives on trees", or, essentially, "epiphyte". That means it's used to pulling its nutrients and water through its bare roots from moist air. Two care mandates result: airy potting mix that should be kept only barely damp and a moist environment (humidity levels from 50% - 70%).

Dendrobium species are either epiphytic or occasionally lithophytic, they have adapted to a wide variety of habitats, from the high altitudes in the Himalayan mountains to lowland tropical forests and even to the dry climate of the Australian desert. It is a tropical orchid which requires warm, humid and shady conditions. These orchids grow quickly throughout summer, but take rest during winter. Dormant buds erupt into shoots from the base of the pseudobulb mainly in spring, and a few species in autumn. This is then followed by rapid growth of new roots. Reproduction is usually through the seeds, but a few species reproduce asexually through keikis produced along the stem, usually after flowering and sometimes as a result of injury to the growing tip.

Dendrobium orchid production has steadily increased in India with well developed and established farms. It is commercially grown in Kerala, Maharashtra, Tamil Nadu, West Bengal, Meghalaya, Nagaland, etc.

DESCRIPTION:

Orchids are highly valued for their cut flowers in commercial floriculture owing to the wide range of colours, shapes, sizes and fragrance they display, with long vase life being an added advantage.

The *Dendrobium* plant is unusual in appearance, being sympodial, epiphytic and bulbless but possesses heavy cane-like stems. *Dendrobium* flowers have a characteristic shape and are usually purple, white, red, yellow and pink. Because of the large number of species, *Dendrobium* flowers come in all sizes and do well in a variety of conditions. Some

Dendrobiums require warmth and moisture, while others will not flower unless they have been exposed to frost.

VARIETIES:

There are more than thousands of hybrids in the Dendrobium groups; and they are well dispersed all over the world. Now a days, it is not uncommon to find a Dendrobium orchid growing in India, Japan, the Phillipines, Malayasia,etc

Popular varieties are Singapore white,Sonia,Thailand White, Bangkok green, Thailand Pink, Diamond pink, Hawaaiin Gold, etc

Given below are some varieties of Dendrobium:



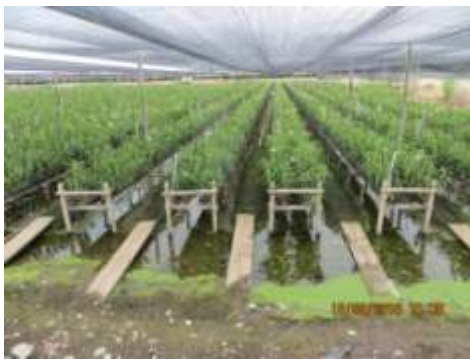
GROWING STRUCTURES:

Shade/Poly Houses:

Dendrobiums are usually grown under shade houses or polyhouses with good cross ventilation. Side walls of both types of structures should be covered with shadenet. The basic function of this structure is to provide a protective environment for crop production. They reduce the intensity of bright sunlight and provide some protection from strong winds, heavy rains and pests.

Bench:

Dendrobium pots /Cocohuskblocks(growing medium) can be kept in the benches for proper aeration. It prevents soil borne diseases and pests. Benches can be made up of iron/plastic meshes, concrete/GI pipes and bamboo. Height of the benches should not be more than 2 feet and 6 inches and breadth not more than 3 feet. Benches can be kept in proper distance for easy intercultural operations.



Concrete benches



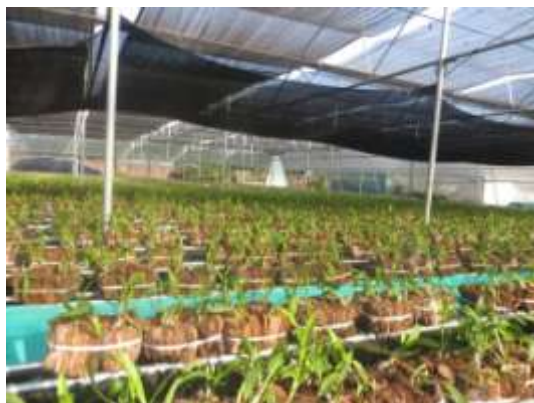
GI Benches

Growing Media:

Dendrobium is growing in coconut husk blocks mostly but sometimes it is grown in concrete blocks too.



In concrete blocks



In coconut husk blocks

SITE LOCATION:

Ideal location should have the following considerations:

- 1.Level topography with good drainage.
- 2.Presence of natural wind breaks.
3. Diffused sunlight.
- 4.Good air movement without regular strong winds.
- 5.A reliable source of good quality water.
- 6.Proximity to utilities and roads.

CLIMATE:

Dendrobium orchids are cultivated in all areas due to its widespread distribution. So it is hard to put them in a specific climate category. Many dendrobium orchids are tropical, some prefer intermediate conditions and others actually prefer cooler climates.

LIGHT:

Dendrobium needs abundance of light, and can withstand direct sun on their leaves early in the morning or late in the afternoon/evening. The light intensity for better growth and flowering is 25 to 30 Kilo Lux. They require shading between 11am to 3 pm where the light intensity is too high. However, light requirements varies with the hybrids and mainly depends on the season and place of cultivation. Dendrobium requires 75% sun to grow well. This can be done by erecting a layer of black Shade net over them as it is designed to allow only 75% of sunlight to pass through. During winter season, the shade may not require in some places. In bright sunny days the 50% shade net is retained to allow ideal range of light and the bottom 25% shade net is retained and 50% shade net is rolled back to allow adequate light. Optimum light will ensure strong healthy and attractive blooms and light deficit causes emerald green leaves. Excess light produces brown leaf tips or at first yellowish-white leaves, later brownish, spots on the underside of leaves which is known as sunburn.

TEMPERATURE:

Temperature requirement vary widely depending on the type of Dendrobiums.

Dendrobiums grow best at 23 - 29°C during day time & night temperatures between 15-18°C.

HUMIDITY:

When the temperature is high, humidity is correspondingly low. Most orchids require 60 % to 80 % humidity. As rule, Dendrobium does not thrive well in places where the relative humidity is lesser than 50%. It must be remembered that temperature, light and relative humidity work very much collaterally with one another and harmoniously for optimum growth. In growing seasons, the atmosphere can be kept moist by frequently damping the paths, stages, benches and floor of the shade or green houses. A humidifier will help considerably in maintaining the humidity and health of the plants. Another way of increasing humidity is by setting the plants on trays filled with pebbles or gravel and with water, taking care that the plants are not in contact with the water

AERATION:

One of the main ingredients for growing good Dendrobiums is plenty of air movement. Constant circulation of air maintains the health of the orchid plants. Air movement reduces the fungal infection by drying the excess moisture. Moist atmosphere with good air circulation is ideal for these Dendrobium orchids. This can be achieved by proper ventilation, by providing sufficient windows or openings and air circulating fans.

WATER:

Good quality water is a very important requirement to grow orchids successfully. Acceptable water sources include de-ionized distilled water, tap water free of salts and rainwater. Watering needs depend on the potting media and the growing conditions. Ideally plants should remain highly moist and should never be dry. The quality of water is extremely important for good culture. In nature plants are drenched by rainwater. Rainwater is slightly acidic with a pH factor of 6.4 to 6.8. Hard water will create hard deposits on the leaves of plants. This may clog the pores on the leaves and reduce transpiration. If the water is hard it may be beneficial to periodically clean the leaves with distilled water. Water may get in between leaves or new growth. If this water stays there overnight, when temperatures become cooler, it may promote the growth of bacteria and fungi that may kill the new growth. To reduce risks of this happening, water only on sunny days. Watering early in the day will allow any water that got in between leaves or new growth to evaporate before night.

LIFE CYCLE OF DENDROBIUM:

The life cycle of the Dendrobium orchid includes:

- flowering phase: winter to spring in the northern hemisphere,
- growing phase: summer to fall
- dormancy: late fall to winter

Flowering Phase(February – June)

During this period, bloom sprays appear from the top of the canes. Anywhere from 5-20 flowers will bloom on each cane. Blooms last from one to three months.

Water weekly, but do not fertilize. Consider putting plant on a humidity tray (cookie sheet lined with pebble and filled with water) or spritzing daily in the morning.

Growing Phase (Post-Bloom, June – September)

The blooms die, but the leaves begin growing rapidly. The plant has the potential to double in size in a year. During this time, when the blooms are done, cut the sprays just where they meet the canes. Canes may produce several sprays from the upper leaf axils each year. Fertilize with high nitrogen fertilizer to support this rapid plant growth. Water weekly and use a balanced fertilizer (12-12-12) twice each month. It's at this point that many growers re-pot the Dendrobium to optimize its potential for growth.

Dormant Phase (Sept– January)

During the dormant phase, orchid leaves stop growing so that plant energy can focus on roots instead. Growth starts again at the end of the rest phase with a stem sprouting from the plant, signalling returned need for fertilizer and water.

When fall rolls around, give your orchid a rest by putting it in a cooler room with lower light, less water and refrain from fertilizing. Some growers even recommend you forget your *Dendrobium*. If after six weeks no new stem has started, use a high phosphorous (10-30-20) fertilizer to get blooming going.

FERTILISING ORCHIDS:

Three basic principles apply to orchid feeding: – Only well rooted plants should be fed – The feed is preferable in small but frequent doses – It should only be applied during the period of maximum active growth. A fertilizer complex containing NPK in equal proportion (19:19:19) ranging between 0.2 to 1.0% is applied depending on the stage of the crop. During vegetative phase, 30:10:10 combination may be used which may be changed to 10:20:20 during blooming stage. One of the liquid sprays which are generally used is the Ohio WP solution and the composition is: – Potassium nitrate: 2.63 g – Ammonium sulphate: 0.44 g – Magnesium sulphate: 2.04 g – Monocalcium phosphate: 1.00 g – Calcium sulphate: 4.86 g – Iron sulphate: 0.5 g – Manganese sulphate: 0.25 ml .This spray mixture is made up for 1 gallon (4.5 litres) of water Generally the frequency of application is twice a week under tropical conditions. Nutrient availability to plants is affected by pH levels. Most nutrients are available at a pH between 5.5 and 6.5 for orchids.

YIELD:

The yield is variety specific and on an average, about 5-7 spikes per plant in the second year and 6-8 spikes per plant from the third year onwards can be obtained.

HARVESTING:

Harvesting should be done in general when most of the flowers on the spike have opened fully with two or three buds. Flowers cut prior to maturity wilt. In *Dendrobium* a spike can be cut at last 1 or 2 buds are yet to open or 20 per cent of flowers are in bud condition. The stalk is cut at the base close to the stem. This operation is generally done in the evenings and the stalks have to be pre-cooled in water before packaging and storage. Immediately after harvest, the lower 0.75cm of the peduncle is cut off, and the flower is inserted into a fresh tube of water containing preservative. Treatment with 8-HQC+5% sucrose improves the flower quality and vase-life of flowers.

HARVESTING STAGE:

Stage of harvesting is important, it has influence on the keeping quality of spikes. *Dendrobium* spikes are harvested while two or three buds are still unopened, it adds to the charm of the spikes.. The number of unopened buds to be retained may be lesser in smaller spikes. Method of harvest: The spikes that are ready for harvest are cut at the base of the stalk, close to the stem. The cut surface should be smooth and should never be crushed. A sharp knife or secateur can be used for this. When several spikes are cut on the same day using a single knife, there are chances that the diseases are transmitted through the sap. The cut surface may act as substrate for disease causing organisms. Dipping the knife in an antibiotic-fungicide mixture and pasting the mixture on the cut surfaces can help in the prevention of this. Alternatively, flaming the cut surface can also be done. This will help in the sealing of the wound too.

POST HARVEST OPERATIONS:

The harvested flowers are immediately dipped in a bucket of water till they are packed. When the spikes are cut from the plant there is chance of entry of air through the cut surface of the spike. If another cut, removing a small portion from the base of the spike, is made under water, entry of air can be prevented. In order to improve the quality of flower spike and increase in the vase life pulsing treatments are given to the cut spikes. In Dendrobium hybrids pulsing with sucrose 6% or BA 75 ppm improved vase life of flower spikes significantly. Spikes of Dendrobium pulsed with HQ 500 ppm + sucrose 5% for 6 hours recorded the longest period of vase life, decreased the respiration rate, improved bud opening and increased water uptake. Cotton dipped in water and placed around the base of the flower stalk A piece of polythene sheet is then kept in place around the base of the stalk using a rubber band. Small narrow bottles filled with water can also be used. The stalk end is inserted into the bottle and sealed with a cellophane tape around the stalk and the mouth of the bottle.



Cut flower grading



Sorted cut flowers



Pellets filled with water



Bundle of tens



Packed cutflower Perforated poly sleeves for packing

PACKING:

The stalks are usually packed in cartons. The size of the carton is determined by the general and the number of spikes to be packed. Generally 50 to 100 spikes are packed in a carton. The cartons are to be provided with sufficient number of holes all around to facilitate good aeration. The prepared spikes are tied in bundles of ten before packing the cartons. It is preferable to provide a lining with newspaper inside the carton. This will not only blot out excess water but also will help to maintain adequate humidity. Among the various types of lining material used Dendrobiumsonia 17, polythene 50 guage showed better results in respect of ultimate vase life, bud opening, retention of colour and water uptake. Sufficient packing may be provided between the bundles and carton using shredded paper. This also keeps the flower parts from rubbing and bruising each other. After filling the cartons the top may be covered with a layer of newspaper. The carton is then closed and the joints sealed with adhesive tapes.



Packed cut flowers ready for despatch

TRANSPORTING & MARKETING:

The flowers are largely transported by air or sometimes by trains. Proper labelling on the boxes (cartons) will help careful handling of the boxes. Refrigerated transport facilities are always more advantageous to conventional means. In India at present most of the orchid flowers are sold out internally, in cities like Delhi, Kolkata, Mumbai, Chennai, Bangalore, Guwahati, Siliguri and Pune.