

Agro techniques in orchids

Introduction

The flowering plants satisfy man's requirement for food, shelter, clothing, drugs besides adding to his aesthetic values. Their latter utility accounts for a high lucrative international trade in floriculture. Plants worth US \$ 100 billion were traded last year and the trade is expected to cross \$ 600 billion mark by the turn of the century. Till very recently, the trade primarily revolved around roses, lilies, carnations, chrysanthemums, tulips etc. but the trend is now fast shifting in favour of orchids, for their long lasting flowers of myriad shapes, sizes and colors (Figures 1-4).

The orchids (family *Orchidaceae*) represent a diverse group of young plants, still in evolutionary flux. The orchids are popular with the professionals & hobbyists for their highly fascinating and beautiful flowers which are bestowed with long lasting properties. The orchid cultivation is fast emerging as an absorbing & rewarding vocation besides being an admirable antidote to the otherwise busy routine of life.



Figure 1 Laeliocattleya.



Figure 2 Cattleya.



Figure 3 Ophrys



Figure 4 Laeliocattleya.

The orchid cultivation generated great impetus when Joseph Arditti et al.¹ made an interesting observation that the average life span of people associated with orchids is generally longer (7213.8 years)

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than the general average, the latter seems more plausible because of curative and aphrodisiac properties of these plants (Table 1).

Table 1 Orchids and their therapeutic uses

<i>Acampe anthropophora</i>	R	Anti malarial
<i>Acampe papillosa</i>	R	In rheumatism
<i>Aerides odoratum</i>	R	Anti-tuberculosis
<i>Ceologyne henri</i>	Ps	To treat tuberculosis
<i>C. ovalis</i>	Ps	As an aphrodisiac
<i>Cirrhopetalum maculosum</i>	R	To enhance longevity
<i>Corallorhiza odontorhiza</i>	R	To treat malignancy
<i>Cypripedium elegans</i>	R	To treat nervous disorders
<i>C. maculosum</i>	R	To promote longevity
<i>C. pubescence</i>	R	To treat nervous disorders
<i>Dactylorhiza hatageria</i>	R	As expectorant and astringent
<i>Ephemerantha fimbriata</i>	L	As an aphrodisiac
<i>Eria muscicola</i>	Ps	To treat cardiac, respiratory and nervous disorders
<i>Eulophia campestris</i>	T	As an aphrodisiac and to treat cardiac problems
<i>E. dabia</i>	T	As an aphrodisiac and blood purifier
<i>E. nuda</i>	T	To treat tumors and bronchitis
<i>Goodyera pubescence</i>	L	To treat malignant ulcers and rattle-snake bites
<i>Habenaria viridis</i>	R	As an aphrodisiac
<i>Liparis odorata</i>	Ps	To treat malignant ulcers
<i>Lissochilus beravensis</i>	Ps	To treat nervous disorders
<i>Microstylis wallichii</i>	Ps	As an aphrodisiac, nerve tonic & enhances sperm formation
<i>Rhynchostylis retusa</i>	S	To treat rheumatism
<i>Satyrium nepalense</i>	R	To treat malaria and dysentery
<i>Vanda cristata</i>	L	As expectorant
<i>Vanda roxburgii</i>	L	In rheumatism, ear infections and fractures
<i>Vanda testacea</i>	S, R	To treat rheumatism, nervous disorder, and scorpion stings

L, leaf; Ps, pseudo bulb; R, root; S, shoot; T, tuber

Besides these, *Habenaria edgeworthii*, *H. intermedia*, *Malaxis muscifera*, *Ephemerantha macraei*, are important ingredients of a rejuvenating drug “Chyawanprash”. Hence, orchid growing has emerged as an admirable hobby and in order to make this hobby as more enjoyable and meaningful, the following information may be useful.

Potting

Orchids are usually potted during spring, occasionally young

plants may occasionally be potted during autumn as well. However, they need to be repotted every alternate year. Earthen pots, plastic containers and hanging baskets (wooden) can be used for the purpose. Moss, pine bark, brick, clay and charcoal pieces can be effectively used as better potting material for almost any kind of epiphytic orchid (Table 2). Coconut fibre, however, retains moisture longer than other of these materials. Crocking (pieces of broken clay pots) or polystyrene packing chips can be put in the bottom of the pots to enhance drainage. Adequate ventilation helps control bacteria and fungi. However, air movement without proper humidity will desiccate the plants and cause damage. To control humidity in summer, use gravel trays. Put gravel into trays and fill it with water. Place pots in these trays.

Table 2 Potting material for some epiphytic orchids

S No.	Species/ hybrids	Commercial biological significance	Potting mixture (moss, pine bark, clay pots, brick & charcoal pieces)
1	<i>Cattleya</i>	Ornamental	2:4:1:1:1
2	<i>Cymbidium</i>	Ornamental	1:2:2:1:1
3	<i>Rhynchostylis retusa</i>	Ornamental medicinal	1:1:1:1:1
4	<i>Vanda</i>	Ornamental	1:2:1:1:2
5	<i>Dendrobium</i>	Ornamental	1:2:2:1:2

During potting, the plants may be correctly positioned using metallic, wooden, bamboo, or plastic stakes. The plants can even be hanged on wooden rats or mango logs but then they would require frequent watering. The dead tissue/organs, if any, may be removed with the help of sterilized tools. The terrestrial orchids require sandy and organic soil as a potting material. The pH of the soil is, however, important as it influences the absorption of the nutrients, a pH ranging between 4.5-5.0 yields best result.

Watering

Watering is important thing to get right in orchid growing. Most orchids are epiphytic, they grow on trunk of other plants, and obtain moisture from the air. There really is no hard rule for watering that can be applied across all orchids, but in general, watch out crinkled leaves and shrunk pseudo bulbs are signs that more water is needed. A rule of thumb, if unsure about whether to give water or not, is simple to abstain from giving water. Too much water is worse than somewhat too little. A good technique of watering is to scoop up water with the pot and let the water flow through the potting material.

Air and moisture

In nature, orchids grow hanging upside- down from tree-stems and branches. The much better air circulation and humidity are important factors controlling growth of orchids. Most plants do best with humidity in the range of 60% to 80%, but the average home register about 30% to 40%. In your home you can increase or raise the humidity level somewhat, in a few different ways eg. spray with spray bottle on plant parts or by putting the plants in an orchidarium. The circulation of air is very important in orchidariums. Smaller fans can be used to get the air in movement and your plants respond with more vigorous growth.

Temperature

Most in-home temperature are acceptable for growing the most common types of Orchids. *Cattleya*, *Cymbidium*, *Paphiopedilum*, *Oncidium* etc can also be grown with great success under normal home temperatures. The difference between night and day temperatures can be substantial in nature. To imitate the difference, a decrease in temperature by 5-10°C during nights, can be applied. Generally, production of flowers is 'started' or induced by a temperature fluctuating period. The microclimate is very important to recognize when trying to imitate mother nature.

Light

Light is probably the single most crucial factor in determining whether or not your plants will bloom. The appropriate amount of light is necessary for proper plant growth. Place your plants close to windows in east side. Southern windows tend to let in too much heat from the sun. Orchids shouldn't be put in unprotected sunlight as they might burn. If the leaves become very yellow & dark spots appear, move the plant to a shadier location.

Flowering

Like in other plants, the flowering in orchids is directly correlated with hereditary and or environmental (temperature, light, chemical stimulus). That the environmental factors play an important role in inducing flower is more than exemplified in orchids since a majority of them fail to flower in homes other than natural ones. However, the recent possibilities that the flowering can be regulated under controlled conditions² have added new dimensions to orchid floriculture. Some such possibilities are being tested for the benefit of orchid enthusiasts.

- A. A combination of red & blue light favours optimal growth and flowering in orchids.
- B. A correct ratio between the light and dark periods initiates the production of phytochrome, long night is more important in bringing about flowering than the short day in short day plants and vice versa.
- C. Since the flower production increases sharply with the decrease in the endogenous level of auxins in plants, a spray of anti auxins proves useful for inducing flowering. Moreover as direct sunlight is inversely correlated with auxin level in the shoot apex the flowering intensity can be controlled by manipulating the exposure of the plants to direct sunlight.
- D. Night temperature plays an important role in flowering i.e. night temperature of 55-60°F will favour flowering while that of 65°F might suppress flowering.
- E. A fortnightly treatment of NPK (12:32:16) induces enlarged flowers and extra long inflorescence.
- F. Exogenous supply of gibberellins induce and enhance flowering in many orchid species. Spray of Gibberellins (1mg/l) weekly preponed the flowering.

Propagation

Orchids can be propagated by both seeds and vegetative means. It is difficult for a common grower to raise plants from seeds which requires good amount of experience & knowledge, hence they rely on multiplication by traditional method of vegetative propagation such as by division, cutting, air layering etc. Though easier to follow, these

are slow processes and only few plants can be multiplied from one plant in a year.

Division

The method involved in dividing large clumps into smaller units can be adopted satisfactorily for orchids belonging to sympodial group. This method of propagation is suitable for genera like *Cattleya*, *Laelia*, *Cymbidium*, *Dendrobium*, *Ceologyne*, *Epidendrum* etc. It was, however, suggested not to divide the plants unless these were 8-12 pseudo bulbs of large size. Rather than carrying out the division process immediately, preliminary cut should be made one or two months before actual division of the specimen. The bigger the size of the plant, the better will be re-establishment after separation.

Off shoots or keikis

Orchids with long cane-like stems as *Dendrobium* and *Epidendrum*, produce little plants with roots at the nodal region of their pseudo bulbs or stem. Off shoots are also produced in *Phaius* and *Phalaenopsis*. Present study indicate that application of cytokinins induced off shoots or Keikis in *Dendrobium* (Figure 5) These Keikis can be separated from the parent plant and set in small pots containing mixture recommended for mother plant (Figure 6) (Figure 7).



Figure 5 Application of cytokinins induced off shoots or Keikis in *Dendrobium*.



Figure 6 These Keikis can be separated from the parent plant and set in small pots containing mixture recommended for mother plant



Figure 7 These Keikis can be separated from the parent plant and set in small pots containing mixture recommended for mother plant.



Figure 8 When the root formation is completed the layer is removed from the mother plant and planted on bark piece.

Cuttings

Monopodial species are difficult to propagate vegetatively. Cuttings, preferably with a few roots, are sometimes successful with *Vanda*, *Renanthera*, *Arachnis*, *Phalaenopsis* etc. Stems should nearly be cut in sections of 3-4 nodes and placed in moist sand or damp *Sphagnum* moss, kept in a cool and dry place, for root formation.

Air layering

Vanda and some other monopodial orchids may also be propagated by air layering. The method was to give a slant cut partially through the stem, 20-30 cm below the apex and wrap with *Sphagnum* moss

or *Osmunda* fibre around the cut portion. When the root formation is completed the layer is removed from the mother plant and planted on bark piece (Figure 8) and later in pot having potting mixture used for growing the mother plant.

Repotting

Repotting is only necessary when the body of the plant has grown over the pot edge or the media itself breakdown. Shred bark, *Sphagnum* moss and coconut fibres are commonly used in orchid media. It's important that there can be a circulation of air through the pot. The plant must not be let standing wet for longer periods of time. The best time to repot is at the begin of the growing season. This gives the plant the best chance to grow into the new pot and secure itself.

Follow these basic steps to re-pot your orchid:

- A. Gently remove media from roots giving warm water washings in the *in vitro* plantlets.
- B. Gently ease the plant out of its old pot from *in vivo* grown plants. Don't be afraid to destroy the old pot if it helps in keeping the roots intact. Remove dried or brown roots. Put drainage material in the bottom of the pot.
- C. Place the plant in the pot. Cover the pot with polythene and make holes in polythene at intervals to decrease humidity. Water lightly until the plants adjusts to its new pot.
- D. Spray fungicides (Bavistin;0.1%) at fortnight interval and observe the plants regularly for leaf spots if any.

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None.

Conflict of interest

The author declares no conflict of interest.

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