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Tropical and Subtropical Orchids

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Abstract

Orchids belong to one of the largest plant family in the world with 600-800 genera and 25,000-30,000 species both in the tropics and temperate plant hardiness zones. Light, temperature, humidity, aeration and nutrition are major factor which are required optimally for growth and flowering of orchids. Description and culture of some major tropical and subtropical orchids like Bulbophyllums, Vandaceous types, Brassia, Cattleya, Dendrobium, Miltoniopsis, Paphiopedilums, Phragmipediums, Phalaenopsis and Zygopetalums are given in the study.

Introduction

Orchids belong to one of the largest plant family in the world with 600-800 genera and 25,000-30,000 species both in the tropics and temperate plant hardiness zones (Arditti, 1992). The diversity of orchids and their habitats make growing orchids an exciting, never-ending challenge. Orchids grow from the edge of the Arctic Circle to the islands that rim the Antarctic. Orchids are monocot plants and are categorised by their means of growing. They may be epiphytic, terrestrial and litophytic. About 70% of the worlds orchids are epiphytic and/or litophytic, 25% are terrestrial and 5% of the worlds orchids grow in mixed substrates (both litophytic, epiphytic and terrestrial) (Arditti, 1992). Orchids do also occurre as saprophytes. In the temperate regions, orchids are herbaceous perennials and grown as terrestrials.

In the tropics, orchids are epiphytic plants growing on trees, rocks or in leaf litter. Epiphytic orchid roots are covered with a spongy tissue that helps the orchid cling to a tree or rock and absorb water and nitrogen from the air.

Warmer growing orchid species need a little more care when growing in the British climate as we have quite a temperate environment here. They often come from lower altitude habitats in South America, Africa and the Far East. A general rule is that most warm growing species should not go below 15^{o}C in winter. This is a difference of around 10 degrees from the normal daytime or summer temperature required. This fluctuation is entirely natural and necessary to ensure the correct growing and flowering of the orchids. This extra warmth can mean that the plants dry out a bit more quickly so they may need more regular watering and spraying to increase the humidity.

Depending upon growth habit, orchids are usually grouped into two broad categories. Monopodial orchids have a single, upright stem, with leaves arranged opposite each

other along the stem. The flower stem emerge from the base of the uppermost leaves. Tropical monopodial orchids include the *Phalaenopsis* and *Vanda*.

The another more common growth habit is sympodial. These orchids grow horizontally, form new shoots from the old rhizome. Leaves and flower scapes form at the top of the new shoots. Many sympodial orchids form pseudobulbs, which are swollen shoots that store water and nutrients to help the plant survive periods during prolonged drought (Hew and Ng, 1996; Zengh *et al*, 1992). Sympodial orchids include *Cattleya, Oncidium* and *Dendrobium*

Plants having few leaves, or leatherlike leaves (like most cattleyas and oncidiums), require a high-light environment. If the leaves are soft and limp (like some phalaenopsis and most paphiopedilum), the plants are probably very light-sensitive, and should not be placed in a sunny south-facing window. Orchids with fat pseudobulbs, should be watered sparingly, and should be grown on coarse chunks of bark or lava rock. The orchids without pseudobulbs require more frequent watering, or should be grown in a more moisture-retentive growing medium, such as sphagnum moss.

Description and culture of some major tropical and subtropical orchids like Bulbophyllums, Vandaceous types, Brassia, Cattleya, Dendrobium, Miltoniopsis, Paphiopedilums, Phragmipediums, Phalaenopsis and Zygopetalums are given below:

Bulbophyllum

Bulbophyllum consists of about 2500 species of orchids from tropical and subtropical Asia. The name indicates that the leaves are attached to the top of pseudobulbs (Bhattacharjee and Das, 2008). These orchids are sympodial epiphytes having rhizomatous stems with angled pseudobulbs. The pseudobulbs form a chain like growth on the rhizomes. Inflorescence is erect or pendent and arises from the base of the pseudobulb. The flowers are solitary or in an umbel or united on spurs. Flower size ranges from few millimeters (*Bulbophyllum minutissimum, B. minututum*) to 40 cm in *Bulbophyllum echinolobium*.

Important Species:

Name of Species	**Flowering time**	**Name of Species**	**Flowering time**
B. barbigerum	July	*B. lobbii*	Summer
B. careyanum	October-December	*B. macranthum*	Spring season
B. cornu-cervi	July	*B. makoyanum*	
B. cylindraceum	October-January	*B. medusae*	Autumn & Winter
B. eublepharum	August	*B. rigidum*	May-June
B. falcatum	Summer	*B. striatum*	October
B. grandiflorum	July-August	*B. thomsonii*	
B. leopardinum	October-November		

Hybrids: 'Ray Gabaldon', 'A dorbil Ring', 'Madeline Nelson', 'Tsiku Goldfinder', 'Fredensborg Delight', 'Swissthai Alamia', 'Jan Ragan', 'Wilmer Shear Magic', 'Jim Clarkson', 'Tsiku Taurus', 'Agathe', 'Short and Sweet', 'B.C.', 'Chua', 'Aquarius', 'Chanthaboon Glory', 'Meen Bulbul', 'Meen Candy Baby', 'Supat Sun Radiant', 'Supernova', 'Tee Dragon Fly', 'Tee Naga', 'Puch Golden Hydra', 'Tee Gigantic Condor', 'Grace Thoms' (De, 2014).

Cultivation:

All tropical bulbophyllums grow in a flat pot, hanging or suspended on on cork bark in a humid semi-shaded location where the temperature range is 15 to 27^{o}C. These orchids like slightly drier conditions in between waterings and require a rest in winter when they are not growing. These also require good light but shaded from the bright, direct summer sun. In summer, humidity level should be maintained 70%

and 50-60% in winter. Easily propagated through division of clumps while repotting. A potting mixture of Cocochips, Bark pieces and brick pieces is ideal. During active vegetative growth, a half dose of balanced 20:20:20 fertilizer is applied twice a month.

Vandaceous orchids

This group includes monopodial tropical epiphytic or lithophytic orchids like Vandas, Aerides, Ascocentrum, Renanthera, Rhyncostylis, Aranda, Mokara, Vandopsis etc.

Vanda coerulea

Important species:

Genera	Commercial species
Vanda	*V. coerulea, V. cristata, V. stangeana, V. tessellata, V. alpina, V. Rotchildiana, V. Veraruth, V. Lenavat, V. Laurel Yap and V. Onomea.*
Aerides	*Aerides multiflorum, A. odoratum, A. roseum, A, falcatum*
Ascocentrum	*A. ampullaceum, A. curvifolum, A. miniatum*
Renanthera	*Renanthera coccinea, R. imschootiana*
Rhyncostylis	*Rhyncostylis gigantea, Rhyncostylis retusa*
Vandopsis	*Vandopsis undulata*

Renanthera imschootiana

Vanda hyb. *'Robert Delight Blue'*

Hybrids:

Vanda	Roberts Delight, Sansai Blue, Pat Delight, Mimi Plamer, Pine River Blue, Doctor Anek, Pakchong Blue, Bill Sutton, John Club
Aerides	'Edward', 'Brighton's Sparkle', 'Brighton Pink', 'Cagayan', 'Hollyhock', May Woo', 'Jueile', 'Pink Flush', 'Sandorata', 'Lokelani', 'Cressida'.
Ascocentrum	Aeridocentrum, Ascocenda, Nakamotoara, Renancentrum, Vascostylis
Renanthera	Renades, Aranthera, Sappanara, Holtummara, Renancentrum, Renanthopsis, Moirara, Renanstylis, Renantanda, Renanopsis
Rhyncostylis	Arachnostyles, Vascostylis, Neostylis, Yapara, Rhynchovanda
Aranda	Propine Spot, Thailand Sunspot, Christine, Peter Ewart, Mandai Prince
Mokara	Wai Liang, Chark Kuan Orange, Chark Kuan Pink, Kelvin Orange, Kelvin Red, Pink Star, Walter Ouame, Happy Beauty, Jitti Orange

Cultivation:

The cylindrical leaved vandas require plenty of light and can withstand direct sun. The flat leaved vanda can not tolerate direct sun and requires shade (50-60%) during summer.

Cylindrical Vandas require a minimum temperature of 16-17^{o}C at night during winter and a maximum of 30-32^{o}C in the summer. Flat leaved vandas need a winter night temperature of 10-12^{o}C and a summer day time temperature of 22-25^{o}C. During active growth period, they enjoy a high level of humidity and a good aeration. They grow well in wooden baskets or on large slabs of tree ferns. Repotting is done every three to four years. A potting mixture containing charcoal, brick pieces and cocochips is ideal. All vandaceous orchids are heavy feeders and fertilized with a NPK ratio of 30:10:10 in spring and a bloom booster in autumn. Easily propagated by cuttings of the shoots along with roots (De, 2014).

Brassia

The Brassias are commonly known as the 'Spider Orchids' due to their spindly flowers. They are very attractive when in bloom with graceful arching spikes of many showy flowers. They come in various shades of green with variable darker markings on the petals and lip. Also the flowers are sweetly scented and they are mostly spring or summer flowering. The plants have dark green leaves and oval pseudobulbs with a compact habit.

Important species	**Important hybrids**
Brassia augusta, Brassia verucosa,	Miltassia, Aliceara, Brassidium

Cultivation:

They need fairly good light to help regular blooming which is generally annual in the spring or early summer months. Intermediate with a minimum 12°C in winter, daytime maximum of 30°C will grow best in a humid greenhouse but some will grow well in the home. To help with re-flowering keep all brassia types in good light all year round, shaded from the bright summer sun but good light in winter. They like to be moist all the year round as many tend to grow in the in the winter months. They also make copious aerial roots so these will enjoy regular spraying. They are grown in open bark compost and like to be grown hanging up in a basket or a hanging pot. Repot when the plant has outgrown its pot or basket, they don't mind being a little over the side of the pot, when the new growth is young in the late summer.

Cattleya

Cattleyas are most people's fascinating home garden orchid**.** Flowers are long lasting and possess a beautiful fragrance. Cattleya hybrids also produce the biggest orchid flowers. Named in the honour of William Cattley, a noted 19th century English Horticulturist, this genus falls into subtribe Laeliinae, which comprises many Cattleya like species. Of the many intergeneric hybrids, Laelia, Sophrinitis and Brassovola are the main genera used in hybridization program. *Cattleya* orchids are also known as the 'Queen of Orchids' (Bhattacharjee and Das ; De, 2014).

Cattleya consists of 113 species from tropical America. The plants possess elongated pseudobulbs and may be of unifoliate or bi-foliate. The leave are thick and leathery. The present day hybrid cattleyas belong to the unifoliate group. The flowers are 5 to 15cm in size and they occur in all colours except true blue and black. Unifoliate cattleyas bear upto 5 flowers per inflorescence whereas bifoliate possesses 2 to 25 flowers per inflorescence.They are from the tropical Americas, but can also be found in the West Indies and Mexico. *Cattleya* orchids are epiphytes and have

well-developed water-storage organs (called pseudobulbs) and large, fleshy roots. *Cattleya* orchid plants are long-lived perennials and will usually flower annually. These orchid plants are naturally erect, without need of much staking, and of a medium olive-green color.

Important Species	**Important Hybrids**
Cattleya labiata, C. aurantiaca, C. bicolor, C. maritima , C. loddigessi, C. maxima, C. violacea, C. velutina, C. intermedia	B. Little Stars, Bc. High Sierra 'Lynn', Bc. Maikai Louise AM/AOS, Blc. Color Magic 'Mendenhall' AM/AOS, Blc. Despertar de Oro 'The Light', Blc. Fatari Carmela, Blc. Goldenzelle 'Lemon Chiffon' AM/AOS, Blc. Hawaiin Butterfly Carmela, Blc. Lucille Lundberg 'Yellow Sky', Blc. Lucky Strike AV Orchids, C. 'Queen Sirikhit'

Cattleya maxima

Blc 'Chinese Beauty Orchid Queen'

Cultivation:

Cattleyas are sympodial epiphytes, slow growers and requires good and plenty of light all year round. They will thrive under a 40% shade cloth. To help with re-flowering keep all cattleya types are to be kept in good light all year round, shaded from the bright summer sun but good light in winter. The ideal temperature range is 15-30^{o}C. They prefer 60-80% relative humidity. Cattleya orchids should be watered once or twice a week. They must be allowed to dry between waterings. They like a free draining compost consisting of tree barks, tree fern fibre, coconut chips, charcoal and perlite. During active growth period, plants are fertilized with N: P: K: (20: 20:20) at 15 days intervals and once in a month in winter. Repotting is done every two to three years using plastic pots (Bhattachrjee and De, 2003).

Dendrobium

Dendrobium consists of 1600 species of sympodial epiphytic orchids. The genera are characterized by long pseudobulbs or canes with soft leaves on entire length or in some species, pseudobulbs are short or swollen terminating in two coriaceous leaves. The pseudobulbs are of four types, cane woody, cane cylindric, cane clavate fleshy and bulbous round. The leaf size ranges from 2.5cm to 40cm, thick, are deciduous or evergreen. In some groups, the flowers joined in pairs or three on small peduncle on the entire length of the pseudobulbs, with caduceus leaves. In some species, with persistent leaves, the flowers are grouped in pairs or threes or alternately closely set forming erect or pendent thyrses. In another group, flowers are generally solitary and small, arising from the axils of leaves. The inflorescences are terminal or subterminal and arranged with one to several dozens of flowers with extremely diverse dimensions, size and ranges of flower colour (De, 2014).

Important Species	Important Hybrids
Dendrobium nobile, D. aggregatum, D. phalaenopsis, D. chrysotoxum, D. densiflorum, D. fimbriatum, D. formosum, D. loddigessi, D. thyrsiflorum, D. aphyllum, D.moschatum, D. chrysanthum	Den. Sonia 16, 28, Burana Green, Red Bull, Thongchai Gold, White, Channel, Genting Blue, Candy Stripe Pink, Bengal Beauty, Angel Flower Oxbow, Lucky Lady, Sakura, Candy Stripe, Emma White

D. chrysanthum

Dendrobium Hyb. 'Emma White'

Cultivation:

They grow well both in tropical and subtropical climate and require bright light and good ventilation. The cool and temperate varieties require a day temperature of 15-20^{o}C and a night temperature of about 13^{o}C. The warm types require 30^{o}C during day time and 20^{o}C at night. Simply trim off old flower stems when they have finished and the plant will reflower again the following year provided the conditions are right. To help with re-flowering keep all dendrobiums in good light all year round, shaded from the bright summer sun but good light in winter. Easily propagated by cane cuttings or kiekies. Cool types need regular watering in summer and feeding with NPK (30: 10:10) at weekly intervals. Rest in winter when hardly any water is required and again necessary for the re-flowering. Warm types like to be watered well when in growth in summer but again kept on the drier side when resting in winter. Repotting is done in alternate years in the month of February to June in a potting media consisting of Cocochips, leaf mould, cocopeat and brick pieces (Bhattacharjee and De, 2003; De, 2014).

Miltoniopsis

These are sympodial plants with pear shaped one leaved pseudobulbs clustered closely together and persistent lanceolate leaf sprout from the base of the pseudobulbs. They are called as Pansy Orchids, showy and so called because of their large, flat, rounded, pansy-like flowers. They are often fragrant and come in a range of shades of pink, purple, red, white and occasionally yellow. They donot like strong light (1000-2000 fc.) and require plenty of shade in summer. A temperature range of 10-20^{o}C is ideal for its growth and flowering. They prefer high humidity upto the extent of 80% along with proper ventilation. A half strength of 30:10:10 (NPK) is applied fortnight intervals in summer and every month in winter. Propagated by division of clumps while repotting.

Paphiopedilums, & Phragmipediums

These are stemless sympodial orchids and are called as 'Slipper Orchids' These

unusual flowers have a slipper-shaped lip at the front of the flower which, in nature, help the flower become pollinated. In their native countries they are terrestrial, living in the ground or maybe on rocks. They do not have bulbs like other orchids but instead produce shoots that form into a clump. The flowers come from the centre of the newest mature shoot. Paphiopedilums come from the Far East whilst phragmipediums are South American. Some paphiopedilums have attractive mottled foliage (De, 2011; Bhattacharjee and De, 2003).

Important Species	Important hybrids
Paphiopedilum callosum, *P. fairreanum*, *P. hirtussimum*, *P. insigne*, *P. spicerianum*, *P. venustum*, *P. villosum*	Prince Edward of York, Michel Kooppwitz, Saint Swithin, Mount Toro, Joyce Hasegawaa, Lynleigh Koopowitz, Magic Lantern, Harold Koopowitz, Sorcerers Apprentice, Grande, Don Wimber, Elizabeth March, Hanne Popow, Jason Fischer, Living Fire

Paphiopedilum spicerianum

Paphiopedilum insigne

Most Slipper orchids are warm growing and require a minimum temperature of 15°C, with a daytime maximum of 30°C. Some plain leafed Paphiopedilums need a cooler minimum temperature of 10°C. Keep well shaded from bright, direct summer sun. Give as much light as possible during the dull winter months and good air circulation. They require 40-60% relative humidity. Keep the free-draining bark compost, tree fern fibre and gravels moist all the year round. Avoid watering collecting in the crown of the plant as this can cause a rot. Add a little orchid fertilizer to the water once every 2 or 3 waterings (approx. every 10-14 days) all year round. Propagated through division of clumps while repotting in spring season.

Phalaenopsis

Phalaenopsis consists of 70 species of monopodial orchids distributed in Asia, Philippines, Indonesia, Malayasia, Australia and New Guinea. They are commonly known as 'Moth Orchids'. The plants are pseudobulbless with short stems covered by the clasping leaves. The leaves are leathery, thick. The inflorescence arises from the axil of leaves, drooping or erect bearing spikes of 100cm length. The flowers are spectacular, long lasting and white, pink, yellow or mottled. *Phalaenopsis* has two types. In the first type, leaves are thick and fleshy, elongate-elliptic and obtuse in apex. The flowers petals are broader than the sepals and the lip possesses two attractive centre lobes and appendages. The flowering stem is upto 60 cm long and bears 15 or more blooms. Species belonging this group are *Phalaenopsis parishi*, *P. aphrodite*, *P. stuartiana*, *P. schilleriana* and *P. sanderiana*. In the second type, plants are short stemmed bearing fewer blooms. The flowers are smaller with equal sizes of sepals and petals and without any appendages. Species belonging this group are *Phalaenopsis cormi-cervi*, *P.*

leuddemanniana, *P. equestris* and *P. mannii* (De, 2014)

Important Species	Important Hybrids
Phalaenopsis amabilis, *P. lobbii*, *P. manii*, *P. sanderiana*, *P. parishii*	Taisuco Crane, Taisuco Kochdian, Nobby's Pink Lady, Minho Valentine, Minho King Beauty, Sogo Zebra, Chih Shang Stripes, Okay Seven, Carmela spots, Rousserole, Soroa Delight, Leopard Prince, Golden Amboin, Yellow Queen, Ching Her Buddha, Golden Sun, Micro Nova, Mini Mark, Anna-Larati Soekardi, Strawberry, Kaleidoscope

Cultivation:

Phalaenopsis is a tropical orchid and requires an average temperature of 26-27^{o}C during active growth period and 19-21^{o}C during flowering phase. Low light intensity (1000-1500 f.c.), free air circulation, warm room and 60-80 % relative humidity are ideal for its growth and flowering. Being a CAM plant, it takes CO_2 at night at the rate of 600-800 ppm. A potting mix consisting of 60 percent medium cocopeat, 20 percent perlite and 20 percent chopped sphagnum moss is recommended. A one-quarter, diluted 10-10-10 or 12-12-12 fertilizer should be applied weekly. Phals prefer an evenly moist media and they are sensitive to drying out. Repotting of Phalaenopsis is done every one to two years in late spring or after the main flowering season. Easily propagated through top cuttings or kiekies.

Zygopetalum

Zygopetalum consists of 25 species of terrestrial, lithophytic or epiphytic orchids from Brazil, Bolivia, Peru, Paraguay, Venezuela and New Guinea. The pseudobulbs are ovoid with distinct sheath, 5cm to 7.5cm tall , strong with lanceolate, disticous leaves. The inflorescence develops from the base of pseudobulbs, arching or erect in nature. The flowers are fragrant, long lasting in shades of brilliant green, blue or purple. The flowers are 5cm to 7.5cm across with wavy margins. They are excellent for cut flowers and corsages (Bhattachrjee and Das, 2008; De, 2014).

Important Species	Important hybrids
Zygopetalum cerinum, *Zygopetalum crinitum*, *Z. intermedium*, *Z. Mackayi*, *Z. wendlandii*	'Blue Blood', 'Blue Bear', 'Imagination', 'Tanzanite', 'Millie', 'Black Plague', 'Kiwi Black', 'Kiwi Choice', 'Pioneer', 'Tasman', 'New Era', 'Dark Star', 'Impulse', 'Intuition', 'Great Eisen', 'Blue River', 'Indigo Skies', 'Blue Banks', 'Bon Voyage', 'Centenary', 'Hot Springs', 'Blackjack', 'Night Hawk', 'Violet Moon', 'Leopard Prince', 'Blue Blood', 'Big Country', 'Hawker'

Cultivation:

Zygopetalums thrive well in a temperature range of 20-26^{o}C during day time and 10-15^{o}C during night. They require bright light in the 3000-4000 f.c. range. During summer season, it needs 40% shade cloth. They love water during active growth period and are watered at 5-7 days intervals. A potting mixture consisting of cocopeat, cocochips and tree barks is ideal. Easily propagated through division of pseudobulbs.

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