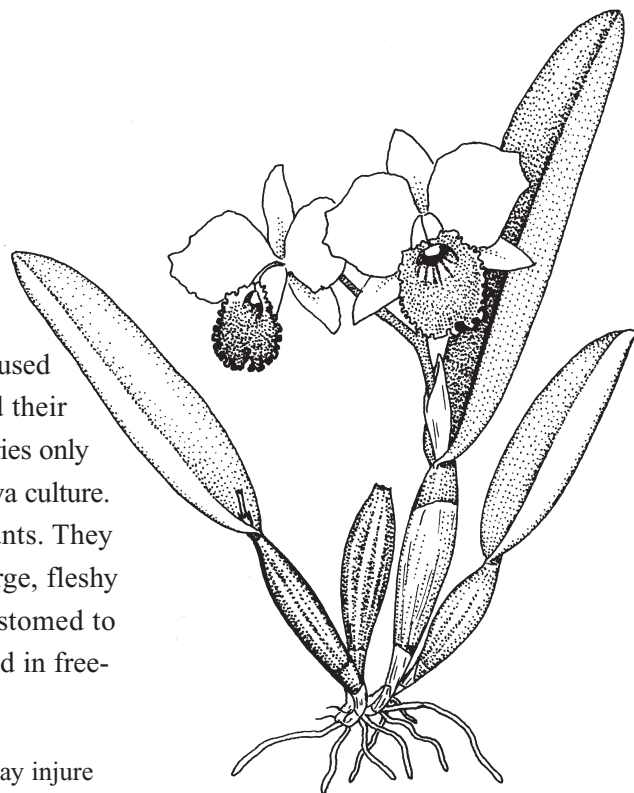


# Cattleya

KAT-lee-uh



Cattleyas are among the most popular orchids. Their culture is often used as the basis for comparison with other types of orchids. Cattleyas and their related hybrids come in many colors, shapes, forms and sizes. Culture varies only slightly among most of these. This sheet is a general guide to basic cattleya culture. Like many other cultivated orchids, cattleyas are epiphytes, or air plants. They have developed water-storage organs, called pseudobulbs, and have large, fleshy roots covered with a spongy, water-retentive velamen. They are accustomed to being dry at the roots between waterings, and therefore should be potted in free-draining media.

**LIGHT** is the most important factor in growing and flowering cattleyas, whether in a greenhouse or in the home. Bright light to some sun should be given to the plants, with no direct sun in the middle of the day. This means an east, shaded-south (as with a sheer curtain) or west window in the home, and 50 to 70 percent full sun in a greenhouse (3,000 to 5,000 foot-candles). Leaves should be a medium-green color, pseudobulbs erect and requiring no staking.

**TEMPERATURES** should be 55 to 60 F at night and 70 to 85 F during the day. Seedlings should have night temperatures five to 10 degrees higher. A 15- to 20-degree differential between day and night is recommended, especially for mature plants. Higher day temperatures can be tolerated (up to 95 F), if humidity, air circulation and shading are increased.

**WATER** should be provided in two ways: in the pot by watering and in the air as humidity. Watering in the container is dictated by many criteria: size and type of the vessel, temperature, light, etc. Mature cattleyas need to dry out thoroughly before being watered again. Seedlings need more constant moisture. Compare the weight of a dry pot of the same size and type of mix; it can indicate if a plant needs water by the relative weight — light means dry, heavy means wet. If in doubt, it's best to wait a day or two until watering. Plants in active growth need more water than plants that

are resting. Water below 50 F may injure plants, as will water softened by the addition of salts.

**HUMIDITY** should be 50 to 80 percent for cattleyas. This can be provided in the home by placing the plants on trays of gravel, only partially filled with water so that the plants do not sit in the water. Air should always be moving around the plants to prevent fungal or bacterial disease, especially if high humidity or cool temperatures exist. In the greenhouse, the humidity is best increased by use of a humidifier. Evaporative cooling increases humidity while cooling the air.

**FERTILIZE** on a regular schedule. In fir bark, a high-nitrogen (such as 30-10-10) formulation, or a similar proportion, is used. Otherwise, use a balanced fertilizer. When in active growth, plants need fertilizer at least every two weeks, and when not actively growing, once a month. Fertilizer can also be applied with every watering at one-quarter the recommended dilution. Thorough flushing with clear water every month is recommended to prevent the buildup of fertilizer salts.

**POTTING** is necessary when the rhizome of the plants protrudes over the edge of the pot or the potting medium starts to break down and drain poorly (usually after two to three years). It is best to repot just before new roots sprout from the rhizome, after flowering or in the spring.

Mature cattleyas are usually potted in coarser potting material than are seedlings. Until a plant has at least six mature pseudobulbs, it generally should be put into a larger pot and not divided. If dividing a plant, three to five pseudobulbs per division are required. Select a pot that will allow for approximately two years of growth before crowding the pot. Pile mix against one side of the pot and cut off any dead roots. Spread the firm, live roots over the pile, with the cut rhizome against the side of the pot. Fill the pot with medium, working it around the roots. Pack firmly and stake if necessary. Keep the plant humid, shaded and dry at the roots until new root growth is seen.

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Prepared by the AOS Education Committee

# Catasetum

kat-ah-SEE-tum

This unusual group of orchids offers fascinating, waxy flowers that often have the peculiar habit of discharging their pollen masses (pollinia) onto pollinators. Almost always deciduous, the pseudobulbous plants have strict growing and resting periods. Most flower before entering a dormant period when they drop their leaves.

**LIGHT** should be strong, especially near the end of the growth period. Early in the annual growth cycle, plants will tolerate less light, from 1,500 to 3,000 foot-candles. Plants grow best with light levels of 3,000 to 6,000 foot-candles, or one-half to three-fourths full sun. As pseudobulbs mature, harden them by giving slightly more light.

**TEMPERATURES** reflect the fact these orchids are native to hot tropical areas and grow during the rainy summer months. During this growing period, day temperatures of 80 to 100 F and night temperatures of 60 to 65 F are beneficial. After growths mature, temperatures can be reduced to 55 F at night, with day temperatures of 70 to 85 F.

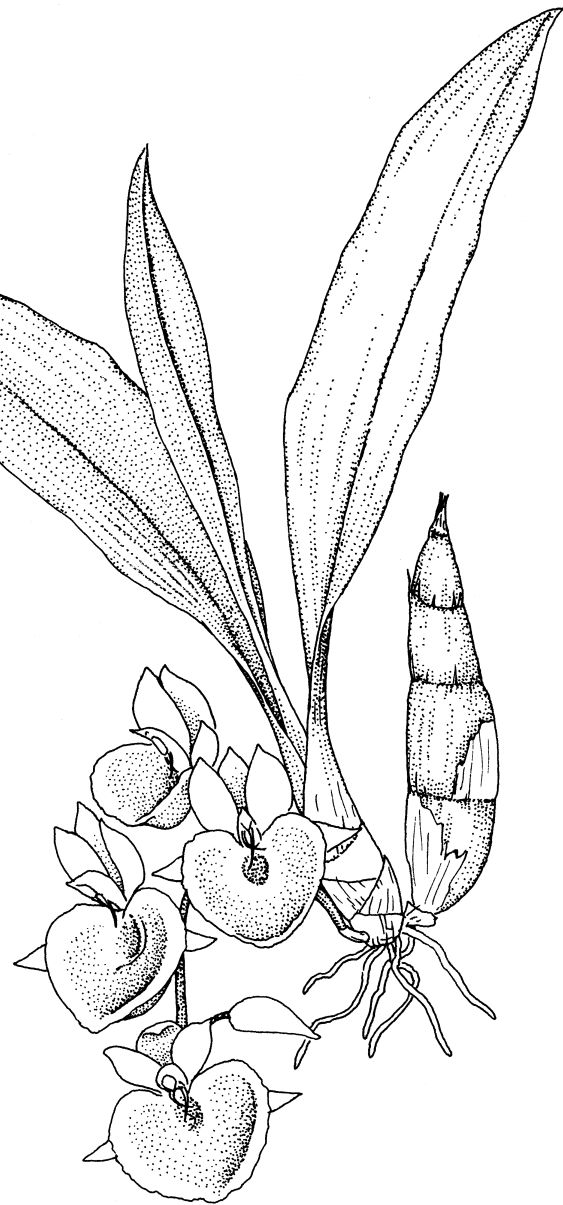
**WATER** is a critical factor for the production of large pseudobulbs that result in best flowering. A great quantity of water must be stored by the plant in a relatively short growing season. Water heavily as new leaves are forming. As the pseudobulb matures, gradually reduce watering frequency. Leaves will yellow and drop. At this time, watering should be stopped completely until new growth begins. Water during this dormant period only if the pseudobulbs shrivel severely.

**HUMIDITY** should be 40 to 60 percent. This can be provided in the home by placing the plants on trays of gravel, only partially filled with water so that the plants do not sit in the water. Air should always be moving around the plants to prevent fungal or bacterial disease, especially if high humidity or cool temperatures exist. In the greenhouse, the humidity is best increased

by use of a humidifier. Evaporative cooling increases humidity while cooling the air.

**FERTILIZE** and water regularly to produce strong pseudobulbs. Use a high-nitrogen formulation (such as 30-10-10) while plants are in active growth, slowly tapering off as pseudobulbs form. A blossom-booster formulation (such as 10-30-20) should be used in the autumn, except for plants that normally bloom in the spring. Frequent applications of a dilute concentrations of fertilizer are more effective than occasional applications of strong concentrations.

**POTTING** should be timed to coincide with the initiation of new growth, usually in the spring. New roots will be produced quickly at that time, and plants will experience minimal setback. These plants have vigorous root systems and require a rich, moist potting medium during the growing season. Many growers bare-root their plants during the resting period to ensure dryness at that time. Fine-grade media are common for smaller pots; medium-grade media are used only in larger pots. Sphagnum moss is used successfully for plants in many areas, as it provides tremendous water- and fertilizer-holding capacities. Some plants can be grown on slabs of tree fern or other material, which makes it easier to keep them dry during dormancy; however, it is harder to keep them moist while growing. When well grown, these orchids can be divided down to one mature pseudobulb and will then flower on the next mature growth. Spider mites are a common pest of these orchids



when in leaf. Control spider mites by keeping humidity high or spraying with recommended miticides.

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# Cymbidium

sym-BID-ee-um

These orchids are prized for their long-lasting sprays of flowers, used especially as cut flowers or for corsages in the spring. There are two main types of cymbidiums — standards and miniatures. Where summer nights are warm (above 70 F), only miniatures can be recommended, because many are more tolerant of heat and able to flower in warmer weather.

**LIGHT** is important for growing cymbidiums. Coming from cool and bright areas in Asia, they need high light but cool temperatures. In many southern climates, high summer temperatures, especially at night, may prevent the plants from blooming. The maximum amount of light possible, short of burning, should be given to the plants. This means only light shade during the middle of the day, or about 20 percent shade. In cool areas (such as coastal California), full sun is tolerated. Leaves should be a medium to golden green in color, not dark green.

**TEMPERATURES** are another critical factor in flowering standard and miniature cymbidiums. During the summer, standard cymbidiums are usually grown outside in semishade, where day temperatures should be 75 to 85 F (or more), but night temperatures in the late summer to autumn (August to October) must be 50 to 60 F to initiate flower spikes. Optimum temperatures in winter are 45 to 55 F at night and 65 to 75 F during the day. When plants are in bud, temperatures must be as constant as possible, between 55 and 75 F. Miniatures can stand temperatures five to 10 degrees higher than standards and still flower. Most cymbidiums can tolerate light frosts and survive, but this is not recommended. Bring them inside when temperatures dip to 40 F. In mild climates, they can be grown outside year round. A bright and cool location inside is best for winter months.

**WATER** to provide a constant supply of moisture to cymbidiums, which are semi-terrestrial plants. They generally produce all their vegetative growth during the spring and summer and need the most

water during that period. Water heavily during the growth season, keeping the potting material evenly moist. Reduce water when the pseudobulbs complete growing in late summer. Keep barely moist during the winter.

**HUMIDITY** outdoors is usually sufficient during the summer, except in dry climates, where evaporative cooling in a greenhouse is necessary. Keep humidity at 40 to 60 percent during the winter, especially if plants are in bud. Keep the air moving to prevent fungus (*Botrytis*) from spotting the flowers.

**FERTILIZE** at the proper time to help cymbidiums flower. During the growth season (spring through late summer), high-nitrogen fertilizer (such as 30-10-10) is used. In late summer, use a high-phosphorus, blossom-booster fertilizer (such as 10-30-20), to help form bloom spikes. Fertilize at full strength every week to two weeks. In winter, fertilize once a month.

**POTTING** is usually done in the spring after flowering, usually every two years or when the potting medium decomposes. Shake all of the old potting mix off the roots, dividing the plant if desired. Pick a water-retentive potting mix; medium-grade fir bark with peat moss and perlite is a common mix. Select a pot that will allow for at least two to three years of pseudobulb growth before crowding the pot, while planning on placing the active growing pseudobulb(s) of the division farthest from the side of the pot. Spread the roots over a cone of the mix in the bottom of the pot and fill the container with medium, working it among the roots, tamping firmly.



Single backbulbs need not even be placed in mix until new growth and roots are noted. Keep shaded and warm until new growth sprouts, and pot as above.

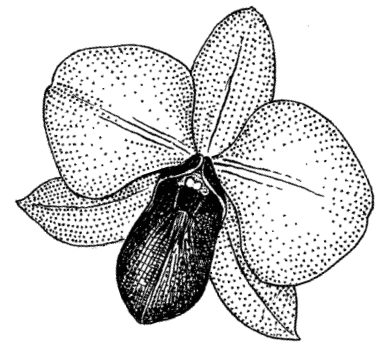
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Prepared by the AOS Education Committee

# Dendrobium

den-DROH-bee-um



*Dendrobium* is a diverse genus of orchids with different cultural needs. Many go through a growth phase and then a rest phase during the course of one year, and must be given water and temperature to match these periods of growth and rest. Flowers can last one day to many weeks, depending on the type. Owing to the extreme diversity of the genus, we have categorized culture according to the following main types:

## PHALAENANTHE

Evergreen for several years, with thin, tall pseudobulbs, terminal inflorescences, usually appearing in the autumn or twice a year (see culture).

Species such as *Den. affine*, *Den. bigibbum* (*phalaenopsis*), *Den. dicuphum* and *Den. williamsianum*.

**Culture** Grow warm year round (see below); 60 F nights; water and fertilize heavily when roots appear from new growth; medium light; reduce water and fertilizer after growth finishes. If a short (three- to four-week), cooler (55 F) dry rest is given, and then plants are warmed again (60 F minimum), another growth may mature during winter and flower in the spring. Treat this growth as a summer growth cycle. These grow well with phalaenopsis, except for the rest period. Plants will go deciduous if grown too cool and dry.

## SPATULATA (Antelope Type)

Evergreen for several years. Most are large, vigorous plants with long-lasting flowers in summer to several times a year. Species such as *Den. antennatum*, *Den. canaliculatum*, *Den. discolor*, *Den. gouldii*, *Den. johannis*, *Den. lineale* (*veratrifolium*), *Den. stratiotes*, *Den. strebloceras* and *Den. taurinum*.

**Culture** Warm all year (60 to 65 F nights, 75 to 90 F days); no rest period; can be kept cooler in winter if dry; medium to high light.

## DENDROBIUM

Most of the plants are pendulous, with leaves all along the canes that most often drop with onset of cooler, drier weather. One to five flowers per node are borne from the nodes of the leafless canes in mid-winter through early spring.

## Group 1

Species such as *Den. chrysanthum*, *Den. friedricksianum*, *Den. nobile* and *Den. wardianum*.

**Culture** Growth period in summer; give warmth, water and fertilize heavily from when roots appear until top leaf appears on canes. Then give high light, little or no water, no fertilizer, cool nights (40 to 50 F). In other words, forget about them.

## Group 2

Species such as *Den. anosmum* (*superbum*), *Den. crassinode*, *Den. falconeri*, *Den. fimbriatum*, *Den. findlayanum*, *Den. heterocarpum* (*aureum*), *Den. loddigesii*, *Den. moniliforme*, *Den. parishii*, *Den. primulinus* and *Den. transparentis*.

**Culture** Same as Group 1, but winter nights 55 F. Deciduous species need virtually no water in winter.

## CALLISTA

Most are pseudobulbous plants with pendent inflorescences.

Species such as *Den. aggregatum* (now properly *lindleyi*), *Den. chrysotoxum*, *Den. densiflorum*, *Den. farmeri* and *Den. thyrsiflorum*.

**Culture** Summer give warmth (60 to 90 F), medium light, medium quantities of water and fertilizer. Winter keep cool (50 F nights), medium light, just enough water to keep pseudobulbs from shriveling, no fertilizer.

## LATOURIA

Leaves at top of pseudobulbs are large and leathery, inflorescence erect, flowers commonly yellow-green.

Species such as *Den. atrovioleaceum*, *Den. macrophyllum* and *Den. spectabile*.

**Culture** Same as antelope types, but cooler and drier when resting in winter.

## FORMOSAE (Nigrohirsutae Type)

Canelike pseudobulbs, with black hairs on leaf sheaths and pseudobulbs often apparent, leading to the popular name nigrohirsutae. Flowers usually white, up to 4 inches across, two to three together from near the end of the pseudobulb. Long lasting. Species such as *Den. bellatulum*, *Den. dearii*, *Den. draconis*, *Den. formosum*, *Den. infundibulum*, *Den. lowii*, *Den. lyonii*, *Den. margaritaceum*, *Den. sanderae* and *Den. schuetzii*.

**Culture** Intermediate to cool year round, 50 to 60 F nights, maximum 85 F days. Water and fertilize when growing; give a slight short rest (dry) when growth is completed. Keep barely moist until growth starts again.

## OTHER SPECIES

Among the popular types are *Den. linguiforme*, *Den. tetragonum*, *Den. gracillimum* and *Den. cuthbertsonii* (*sophronitis*).

**Culture** Depends on the plant's native environment. It is generally safe to grow them intermediate to warm (55 to 60 F at night), drying them out in winter (or as growth stops). Hybrids between sections vary in culture.

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Prepared by the AOS Education Committee

# Lycaste

lye-KASS-tee

**L**ycastes are deciduous in various degrees, from the strongly deciduous, yellow-flowered species like *Lycaste aromatica* that flowers from leafless pseudobulbs to the evergreen types like *Lycaste skinneri* with pseudobulbs that retain their leaves at flowering. This genus produces large, long-lasting, showy, triangular flowers that are waxy. The plants are distinctive for their roundish pseudobulbs and broad, plicate (pleated) leaves. Culture for the hybrid genus *Angulocaste* (*Lycaste* × *Anguloa*) follows the culture for the *Lycaste* parent.

**LIGHT** requirements vary. Deciduous species require light conditions as for cattleyas — 2,000 to 4,000 foot-candles or 50 to 70 percent shade. More light is usually provided as new growths form pseudobulbs. Evergreen species grow best with less light — 1,500 to 2,000 foot-candles or 60 to 80 percent shade.

**TEMPERATURES** for the evergreen species should be fairly constant and never hot. Nights of 60 F and days of 75 to 80 F are desirable. The deciduous species of lycaste can tolerate a wider range, up to 95 F during the day and down to 50 F at night when dormant in the winter.

**WATER** should be applied freely during active growth (usually summer). The potting medium should begin to dry out between waterings. Deciduous species should be kept almost completely dry when leafless; evergreen species should be kept only slightly drier than normal after pseudobulbs form. Water should be kept off the leaves, and especially out of the new growths, to prevent rot or leaf spotting, which disfigure otherwise handsome plants.

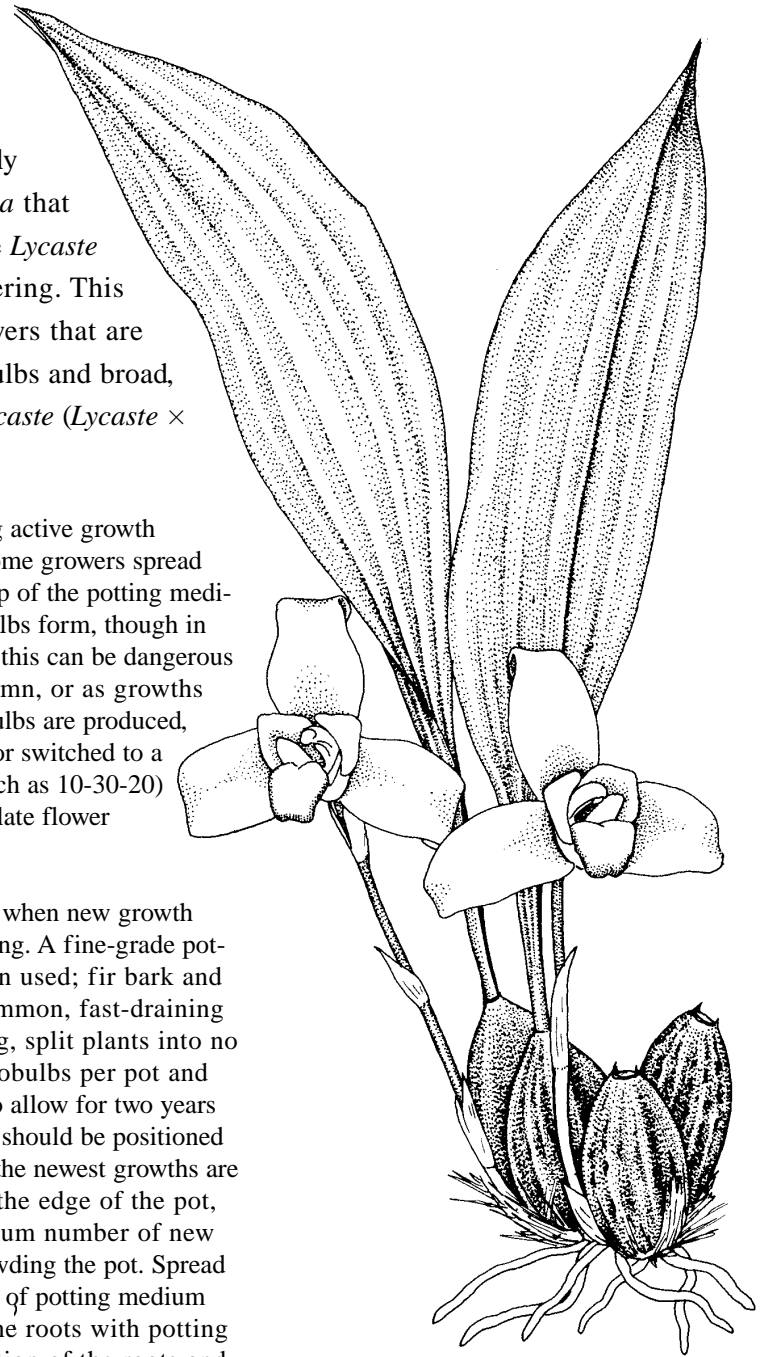
**HUMIDITY** should be maintained at 40 to 70 percent. Deciduous species need less humidity when dormant. Brisk air circulation will help prevent damage to leaves by leafspot fungi.

**FERTILIZE** regularly and heavily when plants are actively growing. A higher-nitrogen formulation (such as 30-10-10) is

recommended during active growth (usually summer); some growers spread blood meal on the top of the potting medium as new pseudobulbs form, though in inexperienced hands this can be dangerous to the plant. In autumn, or as growths mature and pseudobulbs are produced, fertilizer is reduced or switched to a high-phosphorus (such as 10-30-20) formulation to stimulate flower production.

**POTTING** is best when new growth starts, usually in spring. A fine-grade potting medium is often used; fir bark and perlite (3:1) is a common, fast-draining mix. When repotting, split plants into no less than two pseudobulbs per pot and choose a container to allow for two years of growth. The plant should be positioned in the vessel so that the newest growths are farthest away from the edge of the pot, allowing the maximum number of new growths without crowding the pot. Spread the roots over a cone of potting medium and fill in around the roots with potting medium to the junction of the roots and the pseudobulbs. Push the medium firmly around the roots. Keep humidity high and the potting medium on the dry side until new roots form.

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# Masdevallia

mas-de-VAHL-lee-ah

*Masdevallia* is a genus of some 350 species usually from cool, misty mountains of the New World Tropics. Masdevallias are best known for their showy flowers consisting of sepals fused into a tubelike structure. Their origins in cool, damp environments make them an excellent choice for cool or coastal climates. Most species and hybrids are compact enough so that they can be easily accommodated on windowsills or under lights.

**LIGHT** should be like that given for phalaenopsis and paphiopedilums — 1,000 to 1,500 foot-candles. Masdevallias can be kept in light intensities up to 2,500 foot-candles if the growing area can be kept cool. Plants grow well under standard fluorescent fixtures and can be summered outside in shade. In the home, place in an east or shaded south window or under artificial lights.

**TEMPERATURES** should be cool to intermediate. The plants will grow slowly and eventually expire if temperatures remain high for long periods. Cool evenings help reduce heat stress during the day. Nights of 55 to 60 F are ideal; day temperatures should be 65 to 75 F. Evaporative cooling pads or humidifiers are useful in maintaining these conditions. Avoid day temperatures higher than 80 F.

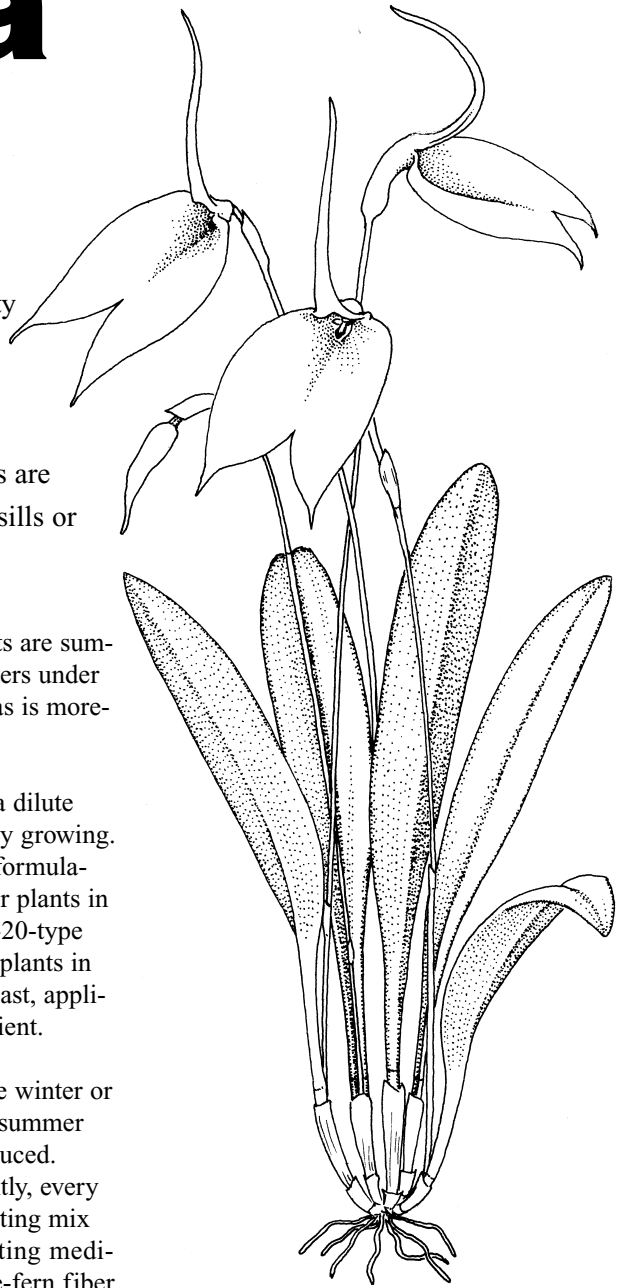
**WATER** is critical for these plants because they have minimal water-storage tissue. Roots should be allowed to become almost dry before watering again; if drainage is adequate, constantly moist roots are fine. Good-quality water low in dissolved solids is imperative for success.

**HUMIDITY** is an important factor in the successful culture of masdevallias. The ideal range is 60 to 80 percent. In the home, set the plants on trays of gravel partially filled with water. In the greenhouse or enclosed growing area, humidity can be increased by use of a humidifier, while evaporative coolers help raise humidity

and lower temperatures. If plants are summered outdoors, automatic misters under the benches are recommended as is more-frequent soaking.

**FERTILIZE** regularly with a dilute solution while plants are actively growing. Applications of 30-10-10-type formulations twice a month are ideal for plants in a bark-based medium. A 20-20-20-type formulation should be used for plants in other media. If weather is overcast, applications once a month are sufficient.

**POTTING** is best done in the winter or early spring, before the heat of summer arrives or as new roots are produced. Plants must be repotted frequently, every one to two years, before the potting mix decomposes. A fine-grade potting medium, such as fine fir bark or tree-fern fiber, is often used with plastic pots. Sphagnum moss is also used, especially for establishing plants. The plant should be positioned in the pot so that the newest growth is farthest from the edge of the container, allowing the maximum number of new growths without crowding the vessel. Plants growing in many directions may be positioned in the center of the pot. Spread the roots over a cone of potting medium and fill in around the roots with potting medium to the junction of the roots and the plant. Firm the medium around the roots. Keep humidity high and the potting medium slightly dry until new roots form.



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Prepared by the AOS Education Committee

# Miltonia

mil-TOH-nee-ah

including **Miltoniopsis** (mil-toh-nee-OP-sis)

These striking orchids, which are also known as pansy orchids, owing to their similarity to garden pansies, are enjoying increasing popularity. *Miltoniopsis* are cool-growing orchids that originate in the higher elevations of the Andes in Colombia, Panama and Ecuador. The warmer-growing species, properly miltonias, originate from the Minas Gerais area of Brazil and more closely resemble large-flowered oncidiums. Their flowers can be brilliantly patterned.

**LIGHT** should be relatively shaded. Direct sunlight burns the thin leaves within a short period of time. However, the warmer-growing types prefer more light than their cooler-growing relatives. The cool-growing species need approximately 1,200 foot-candles, while the warmer-growing species require closer to 2,000 foot-candles.

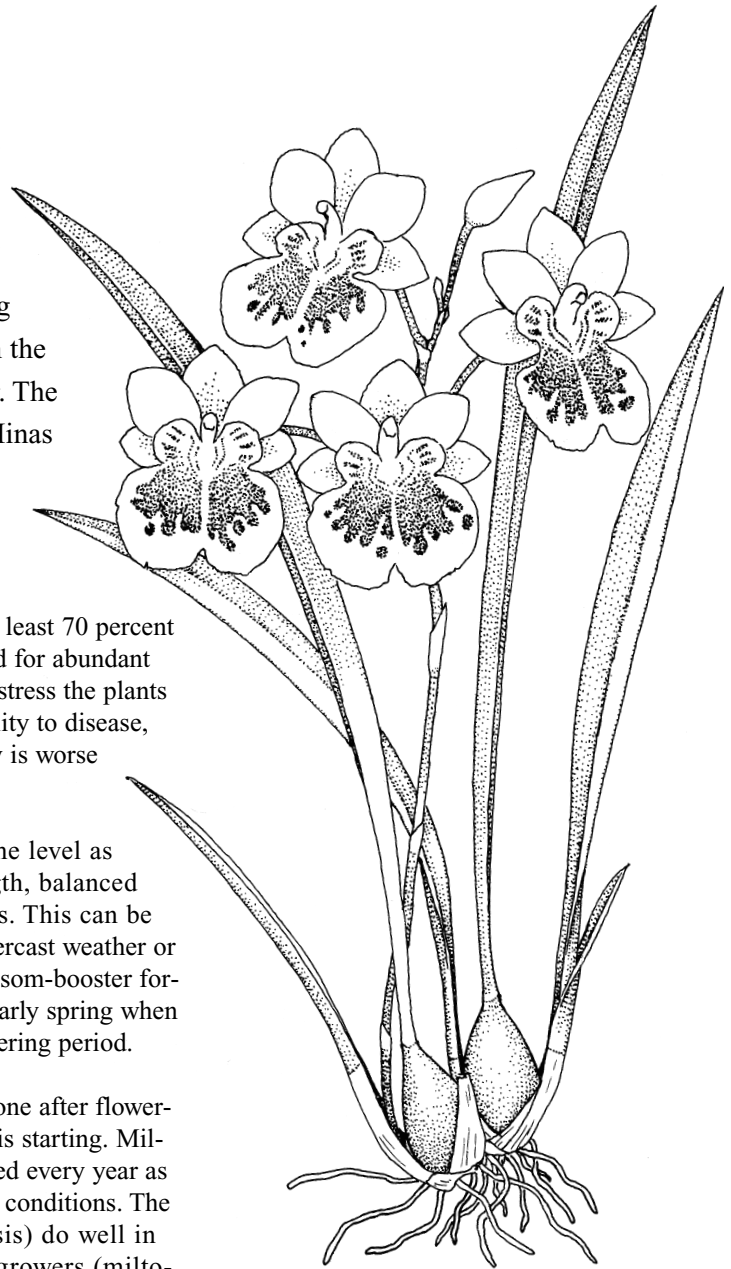
**TEMPERATURE** is critical for the cool-growing plants. Unless temperatures are kept under 80 F, they may not flower. The minimum temperature is 50 to 55 F. Thus, these are really better thought of as intermediate growers because they need intermediate temperatures throughout the year — not too hot, not too cold. The warmer growers will take temperatures over 90 F as long as humidity levels of 70 to 75 percent, or higher, are maintained. The minimum temperature is 60 F.

**WATER** must be plentiful and the medium must drain perfectly. In their native habitat, the plants are drenched almost daily and, because of this, they are intolerant of salt buildup, so leaching every fourth or fifth watering is important when growing in pots. When they are not getting enough water or humidity, the leaves have a tendency to grow with accordionlike pleats. The warmer-growing miltonias should be grown like cattleyas; allow them to approach dryness between waterings. They also tend to be slightly more tolerant of salt buildup than their Colombian cousins so they can dry more between waterings.

**HUMIDITY** must be at least 70 percent because of the plants' need for abundant water. Less humidity will stress the plants and can lead to susceptibility to disease, though too much humidity is worse than too little.

**FERTILIZE** at the same level as other orchids: half-strength, balanced fertilizer every two weeks. This can be reduced by half during overcast weather or in winter. A 10-30-20 blossom-booster formulation is beneficial in early spring when plants approach their flowering period.

**POTTING** should be done after flowering when the new growth is starting. *Miltoniopsis* should be repotted every year as they are intolerant of stale conditions. The cool growers (*miltoniopsis*) do well in small pots. The warmer growers (*miltonias*) tend to have a relatively elongated creeping habit and, therefore, do better mounted. Any potting mix suitable for fine roots such as 70 percent seedling bark with charcoal and perlite or a mix of 70 percent tree fern and 30 percent chopped sphagnum is adequate. Mounts may be cork, tree fern or other hard wood. They should be longer than wide. For some reason, shallow pans work better than deep pots.



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# Odontoglossum

oh-don-toh-GLOSS-um

These high-altitude orchids from the New World Tropics flourish where cool temperatures prevail year round. Odontoglossums are known for their striking sprays of flowers. Culture is similar for hybrids in this group, some being *Odontonia*, *Odontioda* and *Vuylstekeara*.

**LIGHT** should be bright. In a greenhouse, levels from 2,000 to 5,000 foot-candles are acceptable as long as heat levels can be kept down. If summer day temperatures are high, light levels can be reduced to cool the growing area. While these are not generally considered to be good houseplants, they may succeed at an east window or a shaded south window; western exposures are usually too warm in most climates.

**TEMPERATURES** must be exacting for these plants. Day temperatures below 75 to 80 F are almost essential year round. Night temperatures of 55 to 58 F are best. Short periods of warmer day temperatures may be tolerated, especially if humidity and air movement are at optimal levels, nights are cool and the plants have healthy root systems.

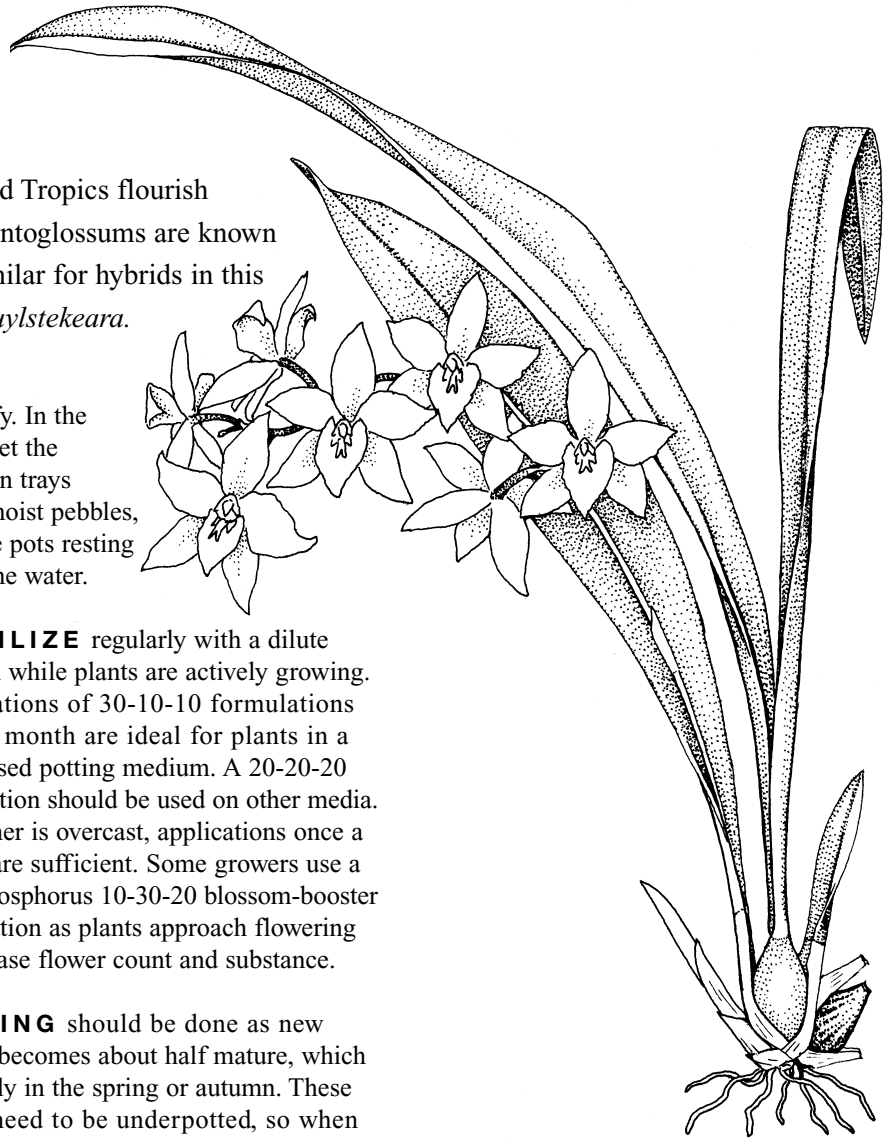
**WATER** should be plentiful, coupled with perfect drainage. The potting medium should just begin to dry before watering. This may mean watering every two to seven days, depending on weather, pot size and material, and type of potting medium. Accordion-pleating on leaves is a symptom of insufficient water or humidity. As with other orchids from high-rainfall areas, odontoglossums are particularly sensitive to poor-quality water, which will give poor roots and leaf-tip burn.

**HUMIDITY**, coupled with moving air, should be ideally 40 to 80 percent. Evaporative cooling in a greenhouse increases humidity while cooling the air and is highly recommended for these orchids in most climates. Fogging the air or dampening the floor with water also helps cool and

humidify. In the home, set the plants on trays above moist pebbles, with the pots resting above the water.

**FERTILIZE** regularly with a dilute solution while plants are actively growing. Applications of 30-10-10 formulations twice a month are ideal for plants in a bark-based potting medium. A 20-20-20 formulation should be used on other media. If weather is overcast, applications once a month are sufficient. Some growers use a high-phosphorus 10-30-20 blossom-booster formulation as plants approach flowering to increase flower count and substance.

**POTTING** should be done as new growth becomes about half mature, which is usually in the spring or autumn. These plants need to be underpotted, so when repotting leave only enough room for one to two years of new growth. Underpotting also enables the grower to provide the more frequent watering these plants need as the smaller pots dry more quickly and evenly when filled with roots. A fine-grade potting medium with excellent drainage is required; because the medium is kept moist, annual or biannual repotting is normal. Spread the roots over a cone of potting medium and fill in around the roots with more medium. Firm the potting mix around the roots. Keep humidity high and the pot dry until new roots form.



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Prepared by the AOS Education Committee

# Oncidium

on-SID-ee-um

This is an extraordinarily large and diverse New World genus with an equally diverse number of habitats. *Oncidium*s may originate anywhere from sea level in the tropics to the high elevations of the Andes. This obviously makes cultural generalizations difficult. More specific instructions may be available from the grower. Some genera included are *Aspasia*, *Brassia*, warm-growing miltonias (often called the Brazilian type) and many of their hybrids.

**LIGHT** needs can vary from bright to nearly full direct sun depending on the species. Most will thrive with one to several hours of sun a day. Generally, thicker-leaved plants, such as “mule-ear” and “equitant” *Oncidium*s, can stand more light. In a greenhouse, 20 to 60 percent shade is required, or about 2,000 to 6,000 foot-candles, depending on the plants. In the home, east, south or west windows are ideal. Many types of *Oncidium*s will grow under artificial light: Four fluorescent tubes supplemented with incandescent bulbs and placed 6 to 12 inches over the plants are necessary for proper growth. Metal-halide and sodium-vapor bulbs also provide sufficient light without needing to be so close to the plants.

**TEMPERATURES** for this group are generally considered intermediate to warm: 55 to 60 F at night, and 80 to 85 F during the day. Temperatures up to 95 to 100 F are tolerated if humidity and air movement are increased as the temperatures rise, a good general rule in any case.

**WATER** requirements vary with the type of plant. Generally, plants with large fleshy roots or leaves need less-frequent watering than thin-leaved or thin-rooted plants.

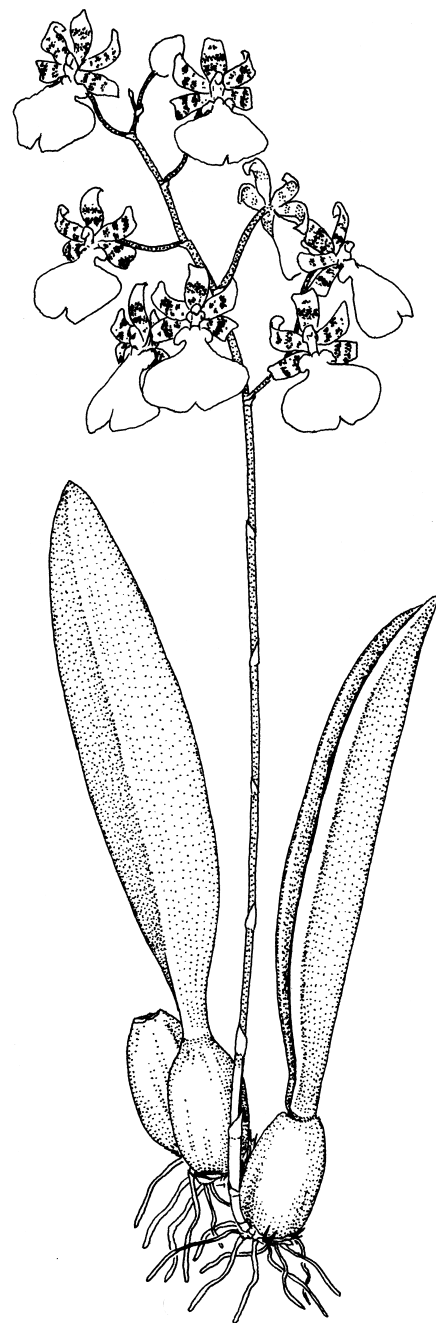
Watering should be thorough, and the medium should dry at least halfway through the pot before watering again. This may be every two to 10 days depending on weather, pot size and material, type of orchid and type of potting medium. Plants not actively growing should be watered less; many species have winter rest periods.

**HUMIDITY** should be between 30 and 60 percent. Many *Oncidium*s require less humidity than other orchids. Most greenhouses have adequate humidity. In the home, placing the plants above moist pebbles in trays is ideal.

**FERTILIZE** regularly while plants are actively growing. Applications of 30-10-10 formulations twice a month are ideal for plants in a bark-based potting medium. A 20-20-20 formulation should be used on plants in other media or on slabs. If skies are cloudy, applications once a month are sufficient.

**POTTING** should be done when new growth is about one-half mature, which is usually in the spring. Fine-grade potting media are usually used with fine-rooted plants and coarser mixes with large-rooted plants; the standard size is medium grade. The plant should be positioned in the pot so that the newest growth is farthest away from the edge of the pot, allowing the maximum number of new growths before crowding the pot. Spread the roots over a cone of potting medium and fill in around the roots. Firm the medium around the roots. Keep humidity high and the potting medium dry until new roots form.

Equitant and mule-ear *Oncidium*s, as well as other fleshy-leaved or large-rooted plants, can be grown on slabs of cork bark or tree fern or in pots filled with a coarse, well-drained medium such as charcoal. This allows the drying between waterings that these types need.



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# Paphiopedilum

paff-ee-oh-PED-ih-lum

**P**aphiopedilums, the lady's-slipper orchids, originate in the jungles of the Far East including Indonesia. They are semiterrestrial, growing in humus and other material on the forest floor, on cliffs in pockets of humus and occasionally in trees. They are easy to grow in the home, under lights or in the greenhouse.

**LIGHT** is easier to provide for paphiopedilums than many other types of orchids. They require shady conditions, as in the home in an east or west window, or near a shaded south window. In the greenhouse, shade must be provided. Give about 1,000 to 1,500 foot-candles. In the home, fluorescent lighting is excellent; suspend two or four tubes 6 to 12 inches above the leaves.

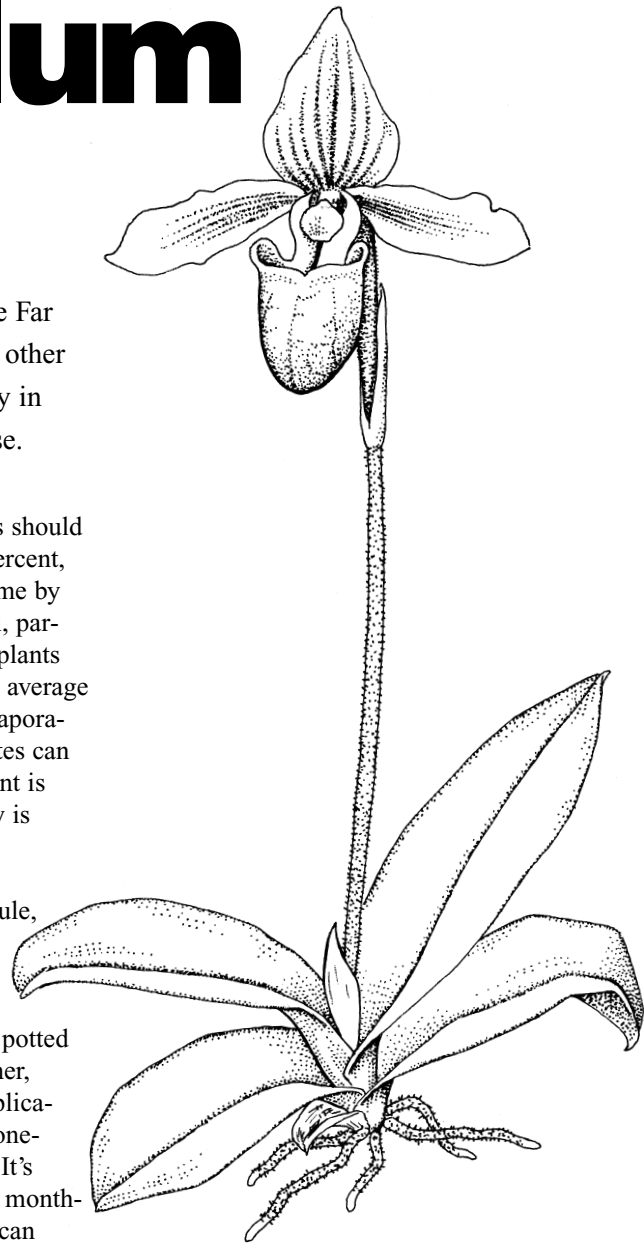
**TEMPERATURES** for paphiopedilums cover a considerable range. Paphiopedilums are traditionally separated into two groups: the warm-growing mottled-leaved types and the cool-growing green-leaved types. A third, increasingly popular group is the warmer-growing strap-leaved multi-floral paphiopedilums. Warm-growing types should be kept at 60 to 65 F during the night, and 75 to 85 F or more during the day. Cool-growing types should be kept at 50 to 60 F during the night and 75 to 80 F during the day. However, many growers raise all plants in the same temperature range with excellent results. The plants can stand night temperatures in the 40s if necessary (as when grown outside in mild climates), as well as temperatures to 95 F. Care must be taken to protect the plants from rot when cold (keep humidity low, and avoid moisture on leaves or in the crowns of the plants), and also to protect from burning when hot (shade more heavily and increase humidity and air movement around the plants).

**WATER** must be available at the roots constantly, because all plants in this genus have no pseudobulbs. All of these plants need a moist medium — never soggy, but never dry. Water once or twice a week.

**HUMIDITY** for paphiopedilums should be moderate, between 40 and 50 percent, which can be maintained in the home by setting the plants on trays of gravel, partially filled with water, so that the plants never sit in water. In a greenhouse, average humidity is sufficient. Using an evaporative cooling system in warm climates can increase the humidity. Air movement is essential, especially when humidity is high.

**FERTILIZE** on a regular schedule, but care must be taken to avoid burning of the fleshy, hairy roots. High-nitrogen fertilizers (such as 30-10-10) are recommended when potted in any fir-bark mix. In warm weather, some growers use half-strength applications every two weeks; others use one-quarter strength at every watering. It's important to flush with clear water monthly to leach excess fertilizer, which can burn roots. In cool weather, fertilizer applications once a month are sufficient.

**POTTING** should be done about every two years, or as the medium decomposes. Seedlings and smaller plants are often repotted annually. Mixes vary tremendously; most are fine- or medium-grade fir bark, with varying additives, such as perlite (sponge rock), coarse sand and sphagnum moss. Moisture retention with excellent drainage is needed. Large plants can be divided by pulling or cutting the fans of the leaves apart, into clumps of three to five growths. Smaller divisions will grow, but may not flower. Spread the roots over a small amount of medium in the bottom of the pot and fill with medium, so that the junction of roots and stem is buried  $\frac{1}{2}$  inch deep in the center of the pot. Do not



overpot; an average plant should have a 4- to 6-inch pot.

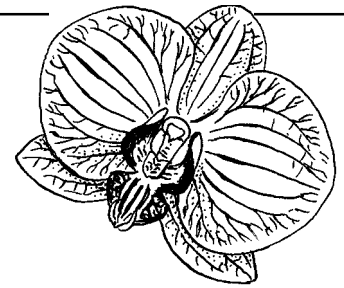
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Prepared by the AOS Education Committee

# Phalaenopsis

fal-en-OPP-siss



## The Moth Orchid

**A**n American Orchid Society demographic survey showed that Phalaenopsis have become America's favorite orchid. And no wonder. Perhaps no other orchid is better suited to home orchid growing. Plants with long-lasting sprays of lovely mothlike blooms in a broad array of colors are inexpensive and widely available, ready to give weeks of pleasure in your home or office. Simply provide modest light and consistent moisture, and they will delight you with their relative ease of culture. The main flowering season is late winter into spring, though commercial growers today can make flowering Phalaenopsis available year round.

### LIGHT

Sufficient light is important for healthy growth and flower production.

**PROVIDE** Bright light, no direct sun. In the home, an east, west or shaded south window. In a greenhouse, about 30 percent full sun. Under lights, four 40 watt fluorescent tubes and two 40 watt incandescent bulbs directly over plants. Foliage should be naturally semierect, and of a medium olive-green color. Dark green, limp foliage indicates too little light.

### TEMPERATURE

Mature plants need a 15 to 20 F difference between night and day.

**PROVIDE** Nights of 60 to 65 F; days of 75 to 85 F. Seedlings need temperatures five to 10 degrees higher than mature plants.

### WATER

Mature plants should seldom dry out between waterings. Seedlings need more constant attention to moisture.

### HUMIDITY

Phalaenopsis need 60 to 70 percent humidity. In the home, place on trays of moistened pebbles. In greenhouse, use a humidifier if conditions are too dry.

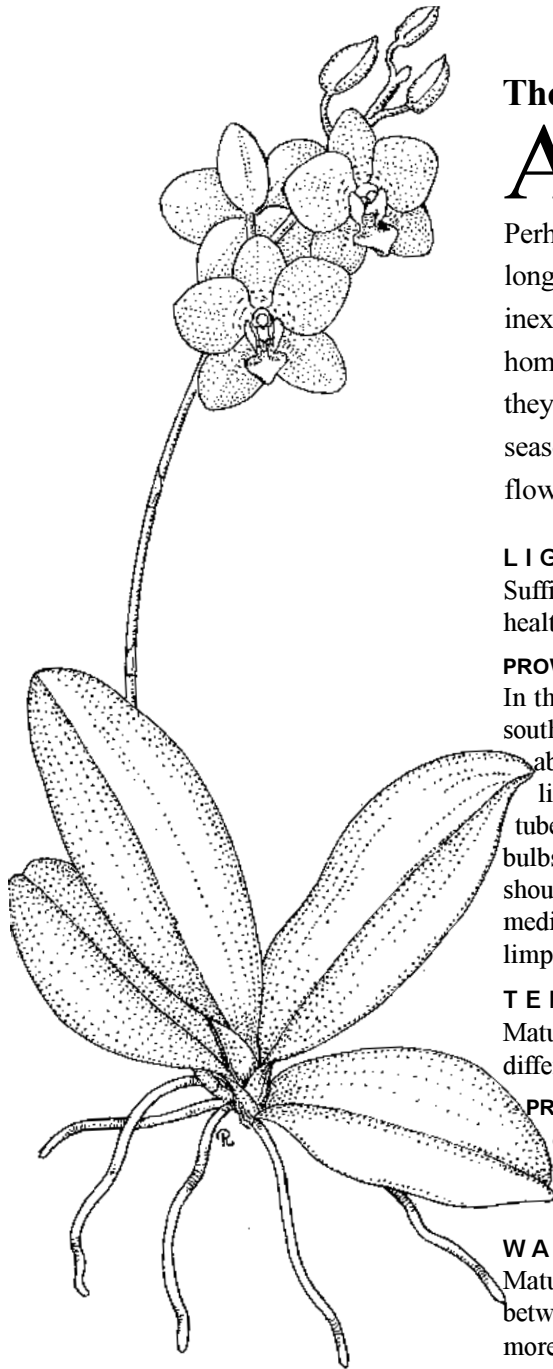
### FERTILIZER

Must be provided on a regular basis because most potting media have little.

**PROVIDE** The exact fertilizer you use will depend on the mix in which your plant is growing. A good general rule is to use a balanced (10-10-10, 12-12-12 or similar ratio) fertilizer "weakly, weekly." That is, fertilize every week at one quarter to one half of the recommended dilution.

### POTTING

Should be done every one to two years before the mix breaks down too far. Best done in late spring after main flowering season, using a well-drained but water-retentive mix. Select pot size for root mass, not top size.



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# Stanhopea

stan-HOHP-ee-ah

**S**tanhopeas and related genera have large, pleated leaves and bear incredible flowers with intricate, complex structures and mechanisms for pollination, ranging from channeled walkways for insects to buckets of a watery solution. Most have inflorescences that grow downward, so the plants must be potted in hanging baskets or similar containers. Flowers are often spicily fragrant, and although the flowers are short-lived, each plant may produce many inflorescences throughout the year. Related genera *Paphinia* and *Peristeria* grow warmer than others in this group, and may produce upright inflorescences.

**LIGHT** should be bright, with direct sunlight diffused so as not to burn the leaves. Most growers suspend these orchids due to their pendulous inflorescences. This also brings the plants closer to the light. Light levels approximating those for cattleyas, around 3,000 foot-candles, are best.

**TEMPERATURES** should be moderate: 52 to 60 F at night, with day temperatures 68 to 75 F in the winter. Plants can stand short spells of higher temperatures, but air movement, humidity and shading must all be increased. Many species flower in the summer, and putting them outside in the summer may be beneficial. Move into higher light slowly to avoid burn.

**WATER** in ample quantities is important to produce strong pseudobulbs and prevent foliar spotting. Stanhopeas and their relatives can be sensitive to salt accumulation in the medium, so should never be allowed to dry out entirely, even during the winter months when growth may slow or stop. Poor watering habits are also conducive to root loss in these types, and some may be very slow to re-establish once they have lost their roots.

**FERTILIZE** at regular intervals. Most growers fertilize with a diluted concentration every week to two weeks. For plants in bark, use a 30-10-10 high-nitrogen formulation, alternating with a 20-20-20 balanced formulation; in the blooming

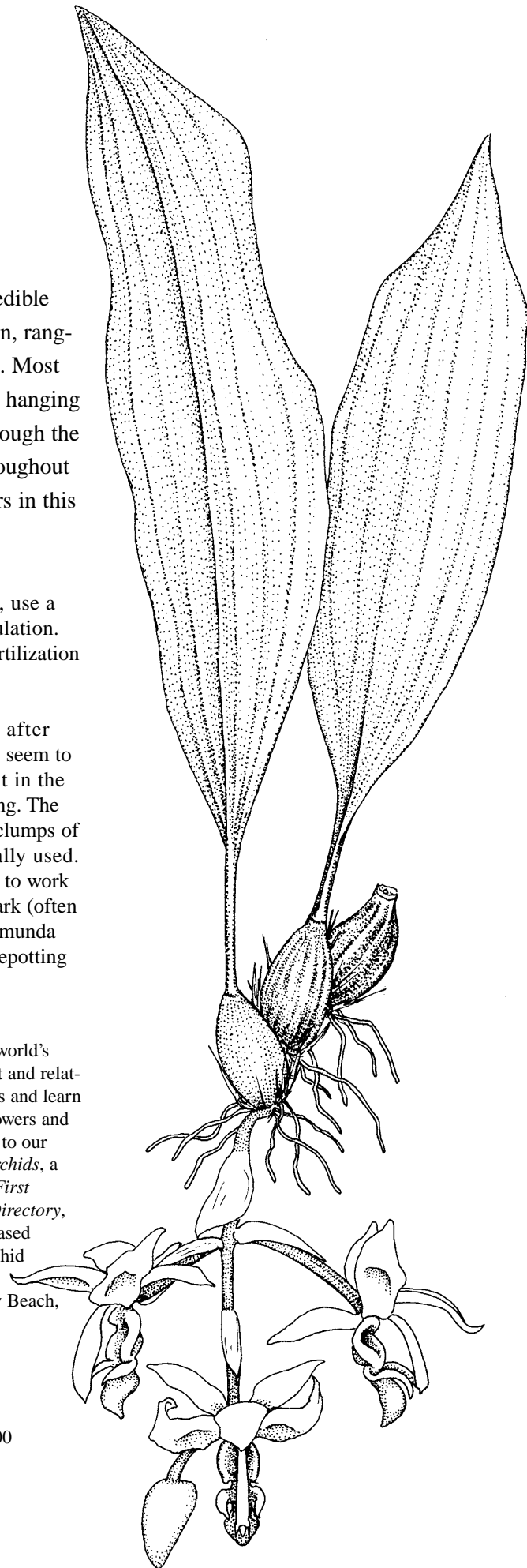
season, which is mainly summer, use a 10-30-20 blossom-booster formulation. Plants grown in osmunda need fertilization only infrequently.

**POTTING** is done best right after summer flowering, as most plants seem to grow year round. Plants that rest in the winter can be repotted in the spring. The best flowerings come from large clumps of plants, so large baskets are usually used. An airy, yet moist medium seems to work best, such as medium-grade fir bark (often mixed with sphagnum peat) or osmunda fiber. Vigorous plants may need repotting every three years or so.

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# Vanda

VAN-da

The *Vanda* Alliance is made up mostly of warm- and full-sun-growing orchids with colorful flowers. Originating in tropical Asia, they are easily grown in warm climates, where plants are cultivated outside in light shade, such as in a lath house. In climates where winters are cold, they are often summered outside, and grown inside during the winter in a sunny window, or year round in a greenhouse. Smaller growing ascocendas are best outside tropical conditions.

**LIGHT** is a crucial factor in blooming most vandaceous plants. There are three types of vandas: strap-leaved, semi-terete and terete. The first type has broader, flat leaves, while terete types have round, pencil-shaped leaves. The semi-teretes are hybrids between the two, with an intermediate leaf shape. Terete types need full sun, and are best grown in high-light climates. In a greenhouse, give the plants about 25 to 35 percent shade, less in winter if overcast. Leaves should be a medium green, not dark green. In warm, bright climates, you can grow any type of vanda outside (if warm) with partial shade for strap-leaved types and semi-teretes (especially in midday in summer) or inside (when cold) in a bright, south window. In climates where winters are overcast, try ascocendas. Grow them outside in summer and in full sun inside during the winter. Be careful to acclimatize plants to avoid burn.

**TEMPERATURES** for most vandas should be warm; a minimum winter night temperature of 55 F is recommended. Colder spells can be tolerated for a short time if it is not windy. Optimum temperatures are 60 to 70 F at night, and a maximum of 95 F during the day. Warmer temperatures mean faster growth, which must be balanced with higher humidity, air movement, and increased water and fertilizer. Days should be warm and humid for optimum plant growth.

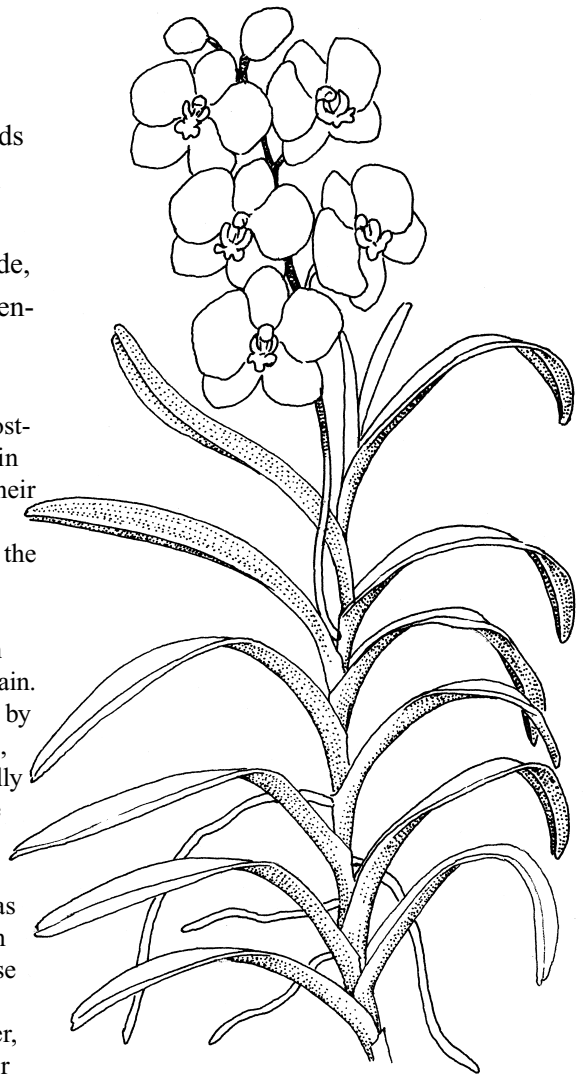
**WATER** should be applied copiously when the plants are growing, but the roots must dry quickly. Because of this, and

their extensive root system, they are mostly grown in slatted-wood baskets, or in pots with a coarse potting medium. If their situation is warm and sunny, they may need daily watering. Water sparingly in the winter or during cloudy weather.

**HUMIDITY** of 80 percent is ideal. In tropical climates this may be easy to obtain. In a greenhouse, this is easier to provide by using an evaporative cooler. In the home, place the plants on trays of gravel partially filled with water. Air movement must be strong.

**FERTILIZE** with a balanced (such as 20-20-20) fertilizer applied full strength once a week during warm weather or use a one-quarter-strength solution at every watering. During cool or cloudy weather, apply fertilizer once every two to four weeks. Use a high-phosphorus fertilizer (such as 10-30-20) every third application to promote flowering.

**POTTING** should be done in the spring. Plants in baskets do not need to be repotted often. Leave them unless the potting medium breaks down. Set the plant, with the old basket intact, into a container of water to make the aerial roots more pliable, and then set plant and basket into a larger basket. For plants in pots, repot in a slightly larger pot, positioning the plant in the center. Use a coarse medium, whether fir bark, tree fern or charcoal, and work it around the roots. Keep shaded, humid, but drier at the roots until new root tips grow. Do not overpot.



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*Prepared by the AOS Education Committee*

# FAQs

## Frequently Asked Questions About Orchids

The American Orchid Society receives hundreds of orchid-related questions each month in a variety of media: phone, fax, e-mail and, yes, even through the mail. Director of Education and Conservation Ned Nash, who answers the majority of these queries, has gathered the most frequently encountered questions here.

### WHERE DO I CUT THE FLOWER SPIKE WHEN IT IS FINISHED?

**The simple answer:** *When most orchids have finished blooming, the spike should be cut off with a sharp, sterile blade as close to the base of the spike as is practical.* Of all of the more commonly available orchids, only phalaenopsis (the moth orchid) will rebloom from its old spike. Phalaenopsis will generally rebloom given a little extra care. The spike should be cut between the scar left by the first flower and the last node (swollen, jointed area on the stem). One of the lower nodes will then initiate a new spike that will generally produce flowers within eight to 12 weeks. Younger or weaker plants may not rebloom. It is also a good idea to cut the spike off entirely by midsummer to allow the plant to grow strongly to produce next year's bloom.

### HOW OFTEN SHOULD I WATER?

**The simple answer:** *Once every four to seven days depending on season and dryness of the home.* Allow the plants to approach dryness, gauged by pot weight or by the pencil trick (the point of a sharpened lead pencil, when inserted into the medium, will darken with moisture if the plant has enough water), and apply

sufficient water so that it drains freely through the container. Never allow any potted plant to sit in its own water.



Flowering plants may require more-frequent waterings to make up for the greater burden of the flowers. Plants will require less water when not in active growth (generally winter months), and more while growing (generally spring and summer months). Increased frequency of watering will not make up for a poor root system. If roots are not plump and alive, repotting may be called for, or the plant may have been recently repotted by the vendor, in which case it will require raised

humidity to compensate for the lack of supporting root uptake. Last, plants with thinner, softer foliage will generally require more water than those with harder, more succulent leaves. Plants with pseudobulbs (such as dendrobiums and cattleyas) generally need to dry out more between waterings than do those without (such as phalaenopsis).

### DO ORCHIDS NEED TO BE FERTILIZED WHILE THEY ARE IN FLOWER? WHAT FERTILIZER SHOULD I USE?

**The simple answer:** *Yes, if anything, flowering plants need extra fertilizer.*

Your plants will need to be fertilized with a product appropriate to the medium in which they are grown. In general, plants in a bark-based mix will need a fertilizer high in nitrogen (usually in a 3-1-1 ratio), while a balanced fertilizer will do for all others (usually a 1-1-1 ratio). If in doubt, fertilize with the same balanced fertilizer you use for your other container plants. Orchids will do far better with too little fertilizer than with too much. The old adage, "feed weakly, weekly" is appropriate. Fertilize every week with a dilute solution.

### WHEN SHOULD I REPOT?

**The simple answer:** *When fresh rooting activity is expected (generally in the spring) or is very evident, generally every one or two years.* Fresh rooting activity is best shown by the succulent green root tips on plump white roots. Often, the main flush of rooting will come from the base

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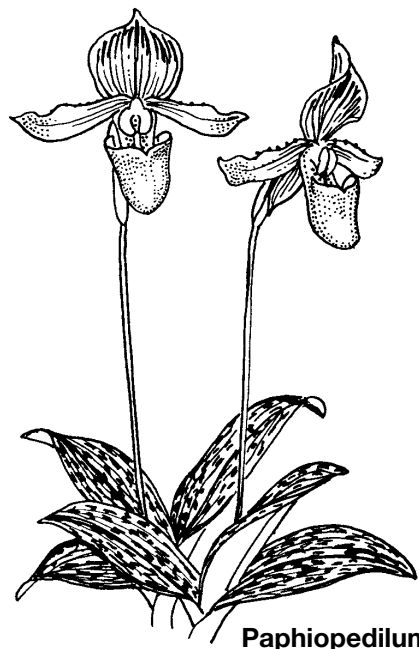
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of the plant (in the case of phalaenopsis), or from the developing newest growth (in the case of dendrobiums and other orchids with pseudobulbs, such as cattleyas). Orchid plants need repotting for one or a combination of two main factors: Potting mix breakdown, often evidenced by dead roots, or the plant outgrowing the container. In the first case, a larger pot may not be required, simply replacement of the growing medium. In the second case, the plant may need dividing or may be shifted into a larger pot. Fresh media should always be used. A good general rule of thumb is to pot for the bottom of the plant, the root system, and not for the top, the foliage. Freshly repotted plants should be placed in a shady, humid area until continued new root growth is observed. In general, if in doubt, pot in the spring.

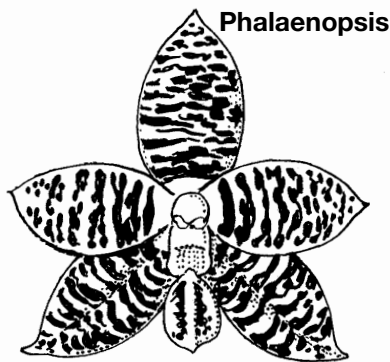
**WHAT IS THE BEST POTTING MATERIAL?**

*The simple answer:* Best is whatever your vendor or source recommends and stocks. Orchids, in general, will grow satisfactorily in many different potting mixes if watering and fertilizing are adjusted appropriately. That is, if the basic requirements for moisture, root aeration and support are accommodated, the most readily available media in your particular area are probably those that have proven to work



**Paphiopedilum**

the best. Orchids are grown today commercially in a variety of media, from fir bark to sphagnum moss to the increasingly popular peat-based mixes best exemplified by Pro-Mix. Watering frequency is generally inversely proportional to the porosity of the medium used. In other words, the faster the mix drains, the more often you'll have to water.



**Phalaenopsis**

**WHAT IS THE BEST ORCHID FOR GROWING IN THE HOME?**

*The simple answer:* One of the most widely available orchids of the mass market types is also the best for the home — the phalaenopsis or moth orchid. Many homes have insufficient light levels for the reflowering of most orchids. However, there are a few orchids that will grow in lower light and will reflower under home-light conditions. Home-light means light provided by a slightly shaded south window, or an east or west window. Phalaenopsis will grow easily under the same conditions enjoyed by African violets. Another good choice, but usually only for those already initiated into orchid appreciation, is *Paphiopedilum* or lady's-slipper orchids. These, like phalaenopsis, have relatively attractive foliage, and will reflower in home conditions giving weeks of floral display. Both need to be kept evenly moist. Do not allow to fully dry out, and fertilize regularly with a weak dilution of any available fertilizer.

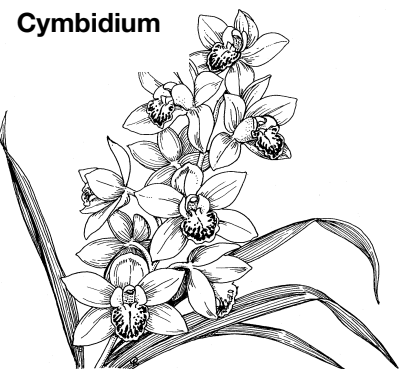
**MY ORCHID'S LEAVES ARE WRINKLED AND LEATHERY. WHY?**

*The simple answer:* Lack of water or dehydration. The next step is to determine why the plant is not getting sufficient water. First, look at the roots. If they appear a healthy white or green and are plump,

and the medium is in good shape, suspect underwatering, especially if the roots are white and the pot is very light. If, on the other hand, the roots are in poor condition, suspect root loss. If the plant has no roots, it cannot take up any water, no matter how much you give it. In this case, the cause may be root loss owing to overwatering or medium deterioration, or a recently repotted and poorly established plant. The immediate solution is to raise humidity in the plants' vicinity to reduce stress on whatever roots there may be, and then deal with whether to repot or to simply wait until the plant establishes in the fresh medium.

**CAN I GROW ORCHIDS OUTDOORS?**

*The simple answer:* Yes. Especially if you live in a frost-free or nearly frost-free area, there is a wide variety of orchids that will grow and flower with light shade outdoors year round. Where winters are cold, orchids can be grown on the patio or



**Cymbidium**

under trees in the warmer months when frost does not threaten. This is often a wonderful solution for orchid growers in colder climates, and enables the plants to grow so much better than they would if left indoors all year. Growers in frost-free areas with cooler summer nights (below 60 F in August and after) can grow cymbidiums, one of the finest of all garden orchids. Where summer nights are warmer, many varieties of vandas and cattleya types are appropriate.

If your questions have not been answered here, read the Beginner's Care Sheets for the five most popular-grown genera included with your New Member Packet.

# Orchids in the Home

Anyone can grow orchids in the home without living in the tropics or having the luxury of a greenhouse. Today, houseplants are a regular part of home decoration. If you have ever successfully grown a houseplant, or enjoyed a flowering potted plant, you can grow orchids. The good news is there are plenty of options to give yourself a beautiful display of flowering orchids year round. Hint: Orchids grown in the home during the colder months will respond wonderfully well to being summered outdoors in a protected area. This will also extend the range of plant selections available to you. Be sure to read the AOS's companion sheet *Orchids in the Garden and on the Patio*.

## LIGHT

No flowering plant will do well without sufficient light. In the home, where most available light is incidental (that is, at an angle, and therefore less intense), plants will need to be fairly close to an east or west, or lightly shaded south, window. A north window will rarely provide adequate light. If light is too intense in a southern exposure, a sheer curtain could be hung to diffuse the light. Extra hours of light will not entirely compensate for poor light quality. Indeed, extending daylength artificially to more than 16 hours can be detrimental to the plants' health and often will prevent flowering.

## TEMPERATURE

The plants will be comfortable where you are comfortable. Typical home temperatures of 55 to 60 F at night and 75 F during the day are fine. Guard against excessively low or high temperatures immediately adjacent to glass windows. Some leeway for seasonal fluctuations is allowed.

## HUMIDITY

Rugs, drapes and some furniture act as giant wicks that absorb the home's humidity, as do heating and air-conditioning systems. Also, it is not advisable to have the home's interior be too wet to accommodate the plants. Solutions: Group plants to take advantage of their collective transpiration (exhaled moisture) or place them on gravel-filled humidity trays to raise the humidity to 50 percent.

## WATERING

Care must be taken to balance the rapid surface drying that can take place in the home with the plants' lower metabolic processes resulting from lower light. Each particular type of orchid will retain its basic water needs, whether for moisture or periodic dryness. The home grower also needs to give thought to the logistics of watering. You can carry plants to the sink or even outdoors (when weather allows), or water them in place and remove excessive water so the containers do not sit in water.

## FERTILIZER

Fertilize regularly at a low dosage of approximately one-quarter strength with a fertilizer appropriate to the potting mix in which your plants are grown. Fertilize less often during the winter.

## A Selection of Plants

**Angraecums** Dwarf Madagascan species, fragrant at night; bright light.

**Cattleya Alliance Hybrids and Species** Choose miniature types less than 10 inches tall; bright light of southern exposure is best.

**Dendrobiums** Dwarf phalaenopsis types, or higher-altitude miniatures; bright light at south window required.

**Oncidiums** Many types available in flower, best if smaller growing; bright light.

**Paphiopedilums** Lady's-slipper orchids grow well under home conditions, giving long-lasting blooms; provide African-violet conditions.

**Phalaenopsis** Moth orchids are absolutely the number-one best orchid houseplant; provide African-violet conditions.

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# Orchids in the Garden

and on the Patio

Properly selected and cared for, orchids can be among the showiest and most exotic of all garden or patio plants. There are many areas throughout the southern and central United States where temperatures for a good portion of the year are compatible with the needs of many orchids. Some coastal areas are nearly frost-free year round. In these areas, with some protection from excessive sun, wind and rain, lovely orchid plants can be successfully cultivated on the patio or as a part of the landscape. In frost-free areas, the plants can be left in place all year. Where frost or temperatures below 40 F threaten, plants can be brought into the home to be grown on windowsills, under lights or on an unheated patio where the coldest temperatures are avoided. The trick is in selecting plants that are already adapted to your particular area. First, though, consider some basic cultural needs of the plants.

## LIGHT

No flowering plant will do well in deepest shade, and orchids are no exception. Orchids generally come from environments where dappled light is the norm. The hotter the sun, the more midday shade is required. In humid or coastal areas, more sun can be given. The required amount of light will also dictate your selection of plants. If you can offer only one light situation, select only plants that can do well under those conditions.

## TEMPERATURE

In most cases, you will be limited to whatever Mother Nature provides, eased only by the amount of shade you supply. Generally, there are many lovely orchids that will do well in the temperature range from 40 to 90 F. Your particular temperature conditions will influence your choice of plants.

## HUMIDITY

Most areas with satisfactory temperatures will have adequate humidity. Anywhere from 40 percent and up will do. Only in the deserts will it be unsatisfactory. In such areas, grouping orchids with other plants can create a microclimate that will suit them.

## WATERING

This will depend greatly on your plant selection, and whether the plants are grown under cover. In general: Most orchids require at least some air circulation around their roots yet are intolerant of excessive moisture at the roots.

## FERTILIZER

Fertilize regularly, at a low dosage of approximately one-half strength, with a fertilizer appropriate to the potting mix in which the plants are grown.

## A Selection of Plants

### Cattleya Alliance Hybrids

Especially good are hybrids with *Laelia anceps* in their ancestry; half sun, temperature-tolerant.

**Cymbidiums** Only in areas with cool summer nights, not for the Gulf states; nearly full sun.

**Dendrobiums** Among the many choices, Indian and Australian types best; half sun, temperature-tolerant.

### Encyclia Species and Hybrids

Half sun, very temperature-tolerant.

**Epidendrums** Especially the brilliant reed-stem types; need almost full sun, temperature-tolerant.

**Oncidiums** Mexican species, or higher-elevation types; bright shade to half sun.

**Paphiopedilums** Lady's-slipper orchids are for the shaded garden.

**Phaius** The nun orchid, with broad leaves and tall spikes; shade to half sun, keep moist.

**Spathoglottis** Broad, palmlike leaves and spikes of purple and yellow flowers; shade to half sun.

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