

Cattleya

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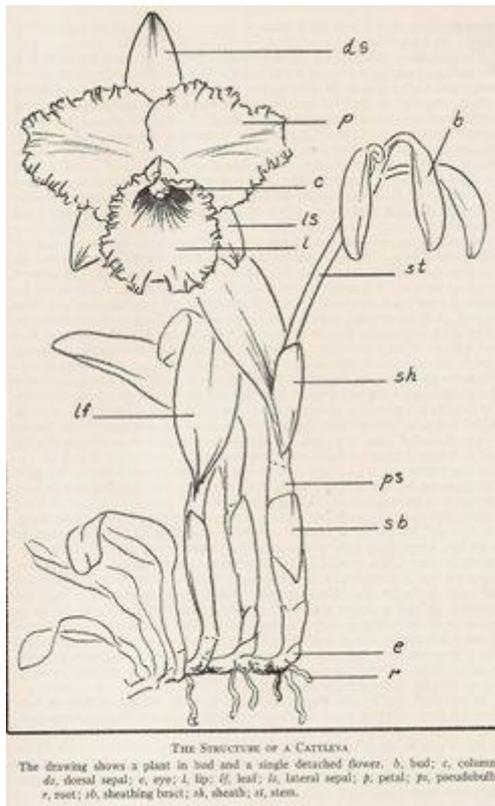
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Cattleyas for the Beginner – 1



b=bud; c=column; ds=dorsal sepal;
e=growth eye; l=lip; lf=leaf;
ls=lateral sepal; p=petal; ps=pseudobulb;
r=root; sb=sheathing bract; sh=sheath

To many people the term *Cattleya* is synonymous with orchids. For a long period, a Cattleya corsage was a prerequisite for any special occasion and as a result the *Cattleya* has often been called the Queen of Orchids. While no longer the reigning queen of the orchid floral industry it is difficult not to be impressed by a well-flowered *Cattleya*. No longer limited to white and various shades of lavender and purple, high quality flowers are available in the entire color spectrum (except true blue) and in a wide range of plant sizes. Most Cattleyas and their relatives are easy to grow. With reasonable care, they can be grown anywhere in the world. Their requirements are few and are summarized below. For the meanings of terms which refer to parts of the plant and flowers, see the accompanying plate.

Cultural Requirements for Blooming-Size Cattleyas

An adult plant is one mature enough to flower. It will be about four to seven years from seed, if it has never flowered before, or older if it has flowered in the past. With proper care, a Cattleya plant can be grown on indefinitely and can be flowered year after year. Proper care depends on a few basic factors, each of them influenced by the others. They are: 1) light and shade; 2) temperature; 3) air movement; 4) humidity; 5) watering; 6) potting and potting medium; 7) feeding. These environmental factors vary from place to place, and each plant will differ in its requirements according to its kind and, to a lesser degree, its individual condition. The essence of good growing is in achieving a happy balance of all factors in relationship to each plant. This is not too difficult, but it demands knowledge, understanding and careful observation on the part of the grower.



Light and shading – To grow well and to flower consistently, cattleyas require a good amount of light, preferably in the range from 2,000 to 3,000 foot-candles (about 65–70% shade), although they will tolerate a great deal more light if it is accompanied by sufficient humidity and air movement to keep the leaf-temperature down. Natural light varies according to the weather, the season, the time of day and geographical location. Therefore, for more northern parts of the country, a “good amount of light” will mean as much light as possible in the late fall and winter, light shade in late winter and early spring, increasing to a maximum in late spring and summer and decreasing in the fall. For the more southern areas of the United States, such as South Florida, Southern California and Hawaii, shading will be necessary all year round. Shading can be an opaque coating painted or sprayed on the outside of a glass greenhouse, a solid material such as lath, commercially available shade cloth, translucent to semi-translucent material such as plastic sheeting or fiberglass panels and, for windowsill culture, a light shear curtain.



Note dark green leaf color of plant grown under too little light to flower.

Light varies according to the time of day. Early morning sun, accompanied by high humidity and low temperature, is especially important. Shading should be heaviest from midday through the late afternoon, especially if plants are grown in windowsills. Afternoon sunlight coming through west-facing windows can be extremely hot and, without adequate air movement and humidity, damaging to your plants.

Cattleyas receiving too little light can be recognized by the dark rich green color of their foliage and failure to flower. Cattleyas receiving a proper balance of light, humidity and temperature will have rather light yellow-green leaves. Too much light will turn the leaves more yellow than green, give them a dull appearance, or will burn black areas on the upper surfaces of the leaves facing toward the sun.

Temperature – Although Cattleyas come from the tropics where the sunlight is hot and intense, most species are found at fairly high altitudes where the air is cool and moist, particularly in the morning and at night. Thus in home or greenhouse culture, the goal is to provide maximum sunlight without excessive temperature. In winter, the daytime temperature

should range from about 60F to 70F, the night temperature being set for a minimum of about 55F. In the summer, a night temperature of 60F to 65F is desirable, while the day temperature ideally should range from 65F to 75F, but an upper limit of 85F is more realistic. Cattleyas will withstand higher temperatures, even over 100F but prolonged exposure will prove harmful. At temperatures above the low 90'sF the plants cannot transport calcium within their tissues. Under these conditions, the plants are susceptible to dieback of the leaf tips on the young developing growths. Mature leaves are not affected making the problem easy to diagnose. High humidity and good air movement will help to compensate for excessive day temperature.

Air Movement – In climates where natural humidity is high, simple ventilation is practical, but in many areas, where natural humidity is low and temperature is high, ventilation can be destructive by draining away humidity in the growing area, drying out the plants and retarding growth. In these climates ultrasonic humidifiers (also called cool-mist humidifiers) and fans set at low speeds are a better solution and in greenhouses evaporative coolers. Fans should run continuously since air movement at night is just as important, providing a light buoyant atmosphere. The small greenhouse, especially, profits from the installation of good fans or blowers, strategically placed to circulate the air throughout the house. Humidity is maintained; the moving air keeps leaf temperature down and helps to avoid the stratification of cool moist air below the benches and warm dry air above, where the plants are. “Dead spots” are minimized and, equally important, damp stagnant areas – breeding place for disease – are eliminated. One to several fans, the number and size depending on the size and structure of the greenhouse, will more than repay their cost. If plants are grown in the home, overhead paddle fans set on the lowest possible speed or a small oscillating fan set facing away from the plants will accomplish the same goal.

When ventilators are opened, care should be taken to avoid drafts, for most cattleyas can be damaged by sudden changes in temperature. This is especially important in the winter or on cold windy days.

Humidity – Cattleyas do best when humidity ranges from 40% to 70%. Humidity as a rule is highest at night and lowest during the afternoon peak of sunlight and warmth. Therefore, except in areas where natural humidity is quite high, or during cold, cloudy or rainy weather, it is important to add moisture to the growing environment, especially during the day. This can be accomplished in a number of ways. For small collections grown under lights, humidity trays may be sufficient. These trays are nothing more than a water-holding tray filled with small gravel (aquarium gravel works well). The gravel-filled trays are filled with water to a level just below the surface. To prevent plants sitting on constantly wet gravel the plants are placed on small saucers or pieces of plastic or metal grid placed on top of the trays. Greenhouses should be damped down in the morning, and again during the day if necessary and possible. A mist spray of the foliage is useful in bright hot weather. In a small greenhouse this may be needed several times a day. A good humidifier, properly connected to both a humidistat and a thermostat, is an almost indispensable automatic device for the greenhouse, particularly if the greenhouse must be left unattended during daylight hours.

In cold dark weather, the greenhouse should be drier. Reduce or dispense with damping down, spraying and humidification, unless artificial heat has already dried out the greenhouse.

Where natural humidity is high or where humidification maintains a high degree of humidity, increased air movement is essential to prevent stagnant air and the development of diseases. Good ventilation or the use of fans is recommended (see “Air Movement” above.)



Too little water has dehydrated this plant.

Watering – Improper watering, both under- and over-, leads to the death of more orchids, including Cattleyas, than any other single cause. There are two aspects of proper watering to consider: when and how. Simply summarized, cattleyas should be watered only after the potting medium has become “dry.” Frequency of watering will vary. Once a week is a good base to begin, remembering that some factors will speed up drying of the potting medium, others will slow it down. A lot of sunshine, heat, good air movement, active growth, a large plant in a small pot, low humidity, the type of potting medium (such as bark, gravel, tree fern chunks, etc.), windy weather and the like all contribute to faster drying and, consequently, increased frequency of water. Conversely, high humidity, dark, cold, cloudy or rainy weather, large pots, inactive plants (that is, not in active growth), tightly packed potting medium, little air movement and similar circumstances will slow the process of drying and hence decrease the frequency of watering. Note that some of these factors affect the entire collection of plants, other affect only certain individual plants. Watch each plant carefully, consider each by itself. Each beginner must learn for themselves, but remember that plants will recover much more rapidly from under-watering and it is best to err on the dry side, following the rule, when in doubt, don't water.

Many beginning growers soak their plants in a bucket of water. While this may at first seem to be a good way of making sure the potting medium gets thoroughly wet, it is actually not a good practice. Should one of the plants have a disease or insect infestation, all those soaked in the same water after it may well become infected. For small collections it is much better to place the plants in the sink and carefully flood with water until the medium is thoroughly wet, being careful not to wash the medium out of the pot. Take time to let the water run copiously from the bottom of the pot, leaching away accumulated fertilizers or minerals from the water.

Potting media – There are a bewildering array of potting media available in which Cattleyas can, and are, grown to perfection: chopped bark, tree fern fiber, coconut husk chips, gravel or lava rock and even sphagnum moss. The most common potting media are still based more or less on chopped fir bark although more open media like tree fern fiber or inorganic media like expanded clay pellets and lava rock may be a better choices in very humid hot areas of the country. The choice is predominantly a personal one and based on whatever gives good results for the grower.



To pot a *Cattleya* plant, it should first be cleaned of old roots, decayed medium and debris. The new potting medium should be moistened before use if possible. This is again more or less a personal choice but soaking the potting medium before use helps to reduce the amount of dust (bark and tree-fern based) and it's easier for beginners to determine when to water when they start with moist media. Select a pot of sufficient size to allow for two years of growth (avoid over potting!). For added drainage broken pots (crocking), gravel or even Styrofoam peanuts can be used to fill up to one-third of the pot (if using slotted clay "orchid pots" this added drainage is unnecessary) . Place plant so the bottom of the rhizome is about $\frac{1}{2}$ inch below the pot rim with the oldest part of the plant against the pot rim. Pack potting medium evenly and firmly around roots up to side of rhizome, being sure there are no loose spots or holes in the medium. Stake and tie plant as needed.

Potting as a rule should be done when the plant begins to throw out roots at the base of the new growth, or just after the new growth begins. For most cattleyas, the time of repotting is not as important if media easily removed from the roots is used, and some growers repot throughout the year as time is available. There are exceptions however. Many of the bifoliate (two-leaves per pseudobulb) cattleyas resent repotting unless new roots are being formed and, if at all possible, these should not be disturbed unless new growth and new roots are beginning.

Feeding – Cattleyas, like other orchids, are capable of growing (and even flowering) for several years without fertilizer however they will do better with an adequate nutrient regimen. Historically, for cattleyas in a bark medium, a high nitrogen formula like 30-10-10, has been recommended but current research indicates that this high nitrogen is unnecessary and may well hasten the decomposition of the potting medium especially in hot humid areas of the country. A better choice would be a urea-free lower nitrogen formulation such as 10-10-10 or 13-13-13 used in dilute solution ($\frac{1}{4}$ to $\frac{1}{2}$ of the recommended strength) during active growth and in bright weather. To avoid the accumulation of salt buildup in the potting medium, the pots should be flushed with plain water between fertilizer applications.

Overfeeding, in cattleyas, can lead to loss of roots and consequent death of the plant. To a lesser degree, when feeding a well-rooted plant, overfeeding can result in the production of vegetative growth instead of flowers, sometimes resulting in blind sheaths. In feeding, it is better to err on the side of too little than on the side of too much.

Cattleyas for the Beginner – 2

Since cattleyas are adaptable to greenhouse culture in almost all parts of the world, they are to be found in most orchid collections today. For the greater part, hybrids are the general rule, but some species are still quite popular among hobby growers.

The recent transfer of the former Brazilian laelias and *Sophronitis* into *Cattleya* and the transfer of most of the former Central American *Cattleya* species to the new genus *Guarianthe* has somewhat complicated what used to be a fairly simple distinction among *Cattleya* species between those with a single leaf per pseudobulb and those that generally produce two leaves per pseudobulb. These two groups remain, however, significant pieces of the genus: the labiate cattleyas which have large, broad-petaled flowers borne severally on plants possessing one-leaved pseudobulbs; and the bifoliate cattleyas which have smaller, usually narrow-petaled flowers borne (generally) in clusters on plants with spindly pseudobulbs bearing two or three leaves. Species of these two sections as well as those recently transferred hybridize quite readily.

Horticulturally, there are about a score of more-or-less distinct species in the labiate section and about twice that number in the bifoliate group. At various times in the past, many of these have been considered to be only varieties of one or another of the species, but those listed below appear to be pretty well-supported genetically. Many *Cattleya* species are extremely variable in color, form, size, growth habit and blooming characteristics and because of this, the following information on a few of the more commonly grown species is quite generalized and approximate, serving only as an introductory guide.



C. aclandiae 'KG's Spotted Tiger' HCC/AOS;
Grower: Kathy Figiel, Photo© Greg Allikas

Cattleya aclandiae: Brazil. Introduced in 1839 by Lady Akland, of Killerton, near Exeter, it was named for her by Dr. Lindley when he first described the species in the BOTANICAL REGISTER, in 1840. This is one of the smallest in habit among the Cattleyas, the slender, cylindrical, furrowed stems being from three to five inches long, the two leaves each from two to three inches in length. A short peduncle bears one or two flowers from three to four inches across. Petals and sepals are similar, fleshy, yellowish green transversely blotched and spotted with blackish purple. The rather fiddle-shaped lip is three-lobed, the lateral lobes small and curved toward the column, white tinged with rose, the midlobe broadly kidney-shaped, wavy, bright rose-purple veined with deep purple. The exposed column is short, thickened with wing-like

margins, a deep amethyst–purple. Found growing near sea level on small isolated trees in the arid lands near the coast of the province of Bahia, over which a sea breeze blows constantly, it is a warm growing species demanding great light. It requires little compost but should be heavily watered during its growing season. Frequently it produces new growths and flowers twice a year, in May and June, its normal season, and again in the fall. Not common in cultivation, it is a delightful dwarf species with bold flowers, but it does have a reputation as being difficult to grow.



C. amethystoglossa 'Crownfox III', AM/AOS;
Grower: RF Orchids, photo: Greg Allikas

Cattleya amethystoglossa: Brazil. This species first appeared in the collection of Herr Reichenheim at Berlin and was described in 1856 in BONPLANDIA by Reichenbach as *Cattleya guttata* var. *prinzii*, named to honor Herr Prinz who had sent the plant from Brazil. It appeared in England in the collection of Mr. F. Coventry, of Shirley, whose solitary plant went to Mr. Warner in 1860. Figured in Warner's SELECT ORCHIDACEOUS PLANTS as *Cattleya amethystoglossa*. It has since been imported in large quantities from its native home in the province of Bahia. The stems are cylindrical, two to three or more feet high, bearing two leaves from four to eight inches long. Flowers are about three to four inches across, fleshy, in an upright cluster containing five to twenty flowers. Petals are similar to sepals but somewhat broader, petals and sepals bright rose spotted with amethyst–purple, especially toward the margins. Lip is three–lobed, the lateral lobes folding over the column, the middle lobe spreading, notched in the front margin, deep amethyst–purple. An intermediate to warm species, very variable in habit and floral coloring, it flowers anywhere from early spring to midsummer.



C. bicolor 'Tyrone', HCC/AOS; Grower: Charles Fouquette, photo: Loren Batchman

Cattleya bicolor: Brazil. Introduced by Messrs. Loddiges in 1836, it was described in the BOTANICAL REGISTER by Lindley in 1836. The slender stems are from eighteen to thirty inches high, jointed and covered with whitish membranaceous sheaths, bearing two leaves about six inches long. The inflorescence is nearly erect, with two to five or more flowers. Flowers range from three to four inches across. The sepals and petals are fleshy, with a distinct midnerve, greenish brown to olive-brown spotted with purple, the petals somewhat wavy, the lateral sepals bowed inward. The lip is wedge-shaped, without side lobes, curved downward with a central longitudinal depression or line, crimson-purple, occasionally margined with white. This species is unique in lacking the lateral lobes of the lip, a character usually inherited by its hybrid progeny, limiting its value in breeding. Variable in coloring, particularly with respect to the lip, this species is suited to intermediate conditions, blooms during spring and into midsummer, occasionally blooming twice, about March and again in September.



Cattleya dowiana: Costa Rica. Originally discovered by Warscewicz about the year 1850. Sepals and petals nankeen-yellow; middle lobe of lip broad and spreading, with velvety texture, rich crimson-purple streaked with golden veins radiating from the center, three heavier golden veins passing longitudinally from the base to the apex. The original collections were lost and it was not until 1865 that Mr. Arce, a native naturalist, rediscovered it, sending plants to Mr. G. Ure Skinner by way of a Captain Dow for whom it was named by Mr. Bateman in the GARDENERS'

CHRONICLE in 1866. The flowers are from five to seven inches across, usually two but up to seven on a cluster. Becoming scarce in its restricted habit, it is seldom grown, the variety aurea being favored.



Cattleya gaskelliana: Venezuela. Introduced into England in the spring of 1883, by Sanders, it was named for Mr. Holbrook Gaskell of Woolton. It is intermediate in character between *C. mossiae* and *C. lueddemanniana*. Flowers large, six to seven inches, the color varying from medium amethyst purple to pure white. The lip is fairly large, the tube the same color as the petals and sepals, the lobe deep violet with pale border, the throat streaked with yellow and yellowish white. The flowers are usually soft but some fine varieties have been named. Blooms from mid-June to early September, growth beginning in early spring and flowering following without interruption. A nice variety for the hobbyist, still grown commonly, even occasionally as a commercial cut flower.



C. granulosa 'Claire', HCC/AOS; Grower: William Rogerson, photo: Rhonda Peters

Cattleya granulosa: Brazil. Discovered in 1840 by Hartweg who sent a single plant of it to the Horticultural Society of London, its habitat was reported as Guatemala. Subsequently Mr. Skinner sent specimens reputedly from Guatemala. Nevertheless, it is extremely doubtful that such plants actually were found wild in Guatemala and it is possible that either the plants were found in cultivation or the actual source was deliberately concealed to prevent other commercial collectors from locating it (a practice not infrequently indulged in, although condemned by those who respected the search for scientific knowledge). The species was described by Lindley in the BOTANICAL REGISTER FOR 1842. The jointed, somewhat flattened stems are from twelve to twenty inches tall, bearing two leaves six inches long. The flower stem is stout, erect, with from five to eight flowers, each about three to four inches across. The sepals and petals are yellowish olive-green, with scattered spots of red, the sepals oblong and obtuse, the lateral sepals bowed inward. The petals are a little broader than the sepals, with the margin slightly waved. The lip is three-lobed, the lateral lobes erect, whitish outside and yellow inside, the middle lobe clawed with a fimbriate kidney-shaped blade, the claw yellow, the blade white, covered with numerous crimson-purple granulations. Of intermediate culture, it flowers in the late summer and autumn.



C. intermedia 'Aranbeem', AM/AOS; Grower:
RF Orchids, photo: Greg Allikas

Cattleya intermedia: Brazil. Brought by Captain Graham of the Royal Packet Service from Rio de Janeiro in 1824, it bloomed in the Botanic Garden at Glasgow in 1826 and was described by Hooker in the BOTANICAL MAGAZINE for 1828. Coming from a wide area of southern Brazil, it varies to a great degree and the exact circumscription of the species is not possible. It has very slender, jointed stems up to eighteen inches high, with two leaves five to six inches long. Flower stems are stout, three to five or more flowers, each flower four to five inches across. Sepals and petals are narrow, the dorsal sepal strap-shaped, the lateral sepals and petals curved downward, pale rose to milk white, occasionally dotted with amethyst-purple. Lip is trilobed, the side lobes rounded with smooth margins, overlapping around the column, the middle lobe amethyst-purple, spreading, with crisped and eroded margin. A favorite *Cattleya* of the bifoliate group, by virtue of its delicate coloring and bright lip. It flowers in late spring and early summer.



Cattleya labiata: Brazil. The true *C. labiata* is a free-flowering species, bearing from two to five flowers, each from five to six inches across. The petals and lip are well balanced, the latter being more open than in *C. eldorado* but not as flat as in *C. dowiana*. Although quite variable in color, the basic pattern consists of rose-colored wavy petals, sepals the same color, the ruffled lip rich crimson-purple bordered with lilac. The origin of this species is told in the introductory sections of this article. The species is among the most important horticulturally and for commercial flower production. While replaced in the cut-flower trade by its outstanding hybrid progeny, it is notable for the ease with which its blooming season can be controlled by the use of light. Starting its growth in late March or April, it grows rapidly in the bright warm summer months, flowering immediately in the fall from October through November. Since it initiates buds on a shortening day, it is possible to retard flowering by maintaining a long day with the use of artificial light. When the light is discontinued (according to a timetable best established by each grower) the normal process begins and the plants flower at a date much later than normal, being directed toward the Christmas holidays and later. An excellent plant for the hobbyist, as are many of its hybrids. Produces a double sheath, a character occasionally passed on to its hybrids.



C. loddigesii 'Mai Short Sweetheart', FCC/
AOS; Grower: B. Andrus, photo: L. Livingston

Cattleya loddigesii: Brazil. Introduced into England from Rio de Janeiro by Messrs. Loddiges, of Hackney, under the name of *Epidendrum violaceum* early in the nineteenth century, it was placed into the new genus, *Cattleya*, under the name *Cattleya loddigesii*, by Lindley when he established the new genus in 1824. The cylindrical stems are about a foot high, with leaves from four to five inches long. Flower stem bears from two to five flowers up to four and a half inches across. Petals and sepals similar and nearly equal, the lateral sepals somewhat bowed, the

petals slightly broader and waved along the margins, delicate rose-lilac. Lip is trilobed, the lateral lobes almost rectangular, erect, the front edge toothed, colored as the petals and sepals on the outside, whitish inside; the middle lobe spreading, much crisped at the margin, pale amethyst-purple; the disk whitish to pale yellow. A widespread species in southern Brazil, it grows in many types of situations, on trees, on bare rocks, in deep shade and in full sun, hence giving rise to a wide range of forms. The species *Cattleya harrisoniana*, treated above, is sometimes considered as a variety. There is a fine pure albino form, known as Stanley's variety, as well as numerous other outstanding varieties. The demarcation lines between this species, *Cattleya intermedia*, and several other so-called species are not sharp and a modern taxonomic investigation of the group would be worthwhile. Blooms in late summer, as a rule, but plants from different habitats flower at different times.



Cattleya lueddemanniana: Venezuela. Another species with a confused background, it has been grown under several names, including *C. speciosissima* and *C. dawsonii*. The type description, however, was by Reichenbach in XENIA ORCHIDACEA in 1854, in compliment to the gardener of M. Pescatore of Paris. From three to four flowers are produced, up to eight inches across, varying from purplish rose to pure white, the petals being nearly three times the width of the sepals. The lip is similar in color to the petals and sepals except the front lobe which is rich amethyst-purple, with two pale yellow or whitish blotches at the throat. The form is variable and this horticultural species is not clearly defined. There is considerable variation in its native habitats, hence, equal variation in the behavior of individual plants which may flower from spring to late summer, according to origin. Some forms are free-flowering, especially those which bloom early. Those which bloom in August and September frequently are more difficult to flower, probably because of the lack of cool night temperature in the summer months.



Cattleya luteola: Brazil and Peru. Described by Lindley in GARDENERS' CHRONICLE in 1853, it had been in cultivation for some years previously. A distinct species, from the upper regions of the Amazon, it is a delightful plant for the hobbyist. The habit is dwarf, five to seven inches in height, with ovoid pseudobulbs and leaves about three inches in length. The flower stems are shorter than the leaves, bearing from two to five flowers. Each flower is about two inches across, pale lemon yellow with the margin of the front lobe whitish and the side lobes streaked with purple on the inner side. The petals are not much wider than the sepals, the lip tubular with a ruffled but not wide-spread front lobe. Free-flowering throughout the year in its native Brazil where it is widely grown on trees, it is more reluctant in cultivation, blooming in early winter.



Cattleya maxima: Ecuador, Peru and Colombia. Originally collected in 1777 by the Spanish botanists, Ruiz and Pavon, who explored the Cinchona forests of Peru for their government, the

specimens remained in their herbarium material until 1831 when it was partially described by Lindley in his *GENERA AND SPECIES OF ORCHIDACEOUS PLANTS*. It reappeared in collections by Hartweg in 1842, flowering in the gardens of the Horticultural Society of London in 1844, but died out. In 1855 it was flowered again by Mr. W. G. Farmer and has been in cultivation since, although never commonly nor as a commercial cut flower. Despite its name, it is not the largest of the *Cattleyas*, the flowers ranging from five to about seven inches across. The original form was deep lavender, the ruffled and spreading lip rose to lavender with a citron-yellow band running down the length of the tube, and a network of deep crimson veins covering the front lobe. The petals and sepals are narrower than in the labiata *Cattleyas*, and the form of the flower is quite open, bringing it into disfavor with the hybridists. However, it blooms freely, is vigorous in growth and the bright color of the flowers make them most attractive in the hobbyist's greenhouse. It frequently makes two growths a year and blooms from each, the season of bloom varying greatly but more commonly in winter. A plant with 13 blooms exhibited by George M. Wagner, Jr., received a Certificate of Botanical Merit from the American Orchid Society in February, 1949.



Cattleya mossiae: Venezuela. First introduced by Mr. George Green who received it from La Guaira, Venezuela, in September, 1836, it flowered in the collection of Mrs. Moss of Otterpool, and was named for her by Sir William J. Hooker who described it in the *BOTANICAL MAGAZINE* in 1839. One of the most popular and useful of the *Cattleyas*, it is extremely variable in form and coloring, particularly on the lip. A free-flowering, vigorous variety, it produces from three to four flowers on the spike, each flower from six to eight inches or more in size, the petals broad, somewhat fluted on the margins, the sepals and petals ranging from deep lilac to white. The broad lip is flattened but has a frilled margin, is very variable in color but basically is the same color as the petals and sepals, with yellow in the throat and disc, the front lobe marked with broken streaks or blotched with violet, the margin being lilac. This is commercially the most important *Cattleya*, blooming in April and May for the Easter and Mother's Day trade. Further, its blooming season can be somewhat modified through temperature controls, to fit the variable date of Easter. There are many new hybrids, however, providing competition in this field. The named varieties of *C. mossiae* are almost as numerous as those of *C. trianae*, its nearest rival in popularity and use. A wonderful plant for the beginner, particularly if a selected form is obtained.



Cattleya percivaliana: Venezuela. Named for Mr. R. P. Percival, an English orchid grower, it was described by Reichenbach in GARDENERS' CHRONICLE for 1882, having been introduced in that year by Sanders of St. Albans, through their collector Arnold, who found it in the Cordillera of Venezuela at altitudes around 4,000 feet. Two to four flowers are produced on each stem, the flowers about four to five inches across. Petals are rosy lilac suffused with purple, the sepals frequently a little paler. The lip is smaller than in most labiata Cattleyas, quite variable in coloring and beautifully frilled. The front lobe of the lip is crimson-purple, shaded with maroon and spotted with yellow toward the throat. Usually an easy bloomer and a vigorous grower, it was at one time highly valuable as a source of cut orchids for the Christmas season, but is now pretty much replaced by hybrids. Called the Christmas orchid because of the season at which it flowers, December to early January, it is a delightful plant for the hobbyist.



C. tigrina 'SanBar Giant', FCC/AOS; Grower: SBOE, photo: Lawrence Vierhelig

Cattleya tigrina (*leopoldii*): Brazil. This is the oldest name for what has long been known as *Cattleya guttata* var. *leopoldii*. A native of southern Brazil, found growing with *Cattleya* (*Laelia*) *purpurata* and *C. intermedia* in Santa Catarina and in other areas with *C. guttata* or *C. loddigesii*, the plants are large, reaching as much as 4 feet tall and can produce 20 to even 30 flowers per inflorescence. While considered bifoliate, the pseudobulbs usually produce three leaves. The characteristic that most readily separates this species from *C. guttata* is its habit of flowering from green sheaths as opposed to dried sheaths in *C. guttata*. The plants grow in coastal

forests below 300 feet in areas with significant day/night temperature differential. The climate is seasonal with high humidity and rainfall followed by an extended dry period. Flowering usually occurs from mid- to late-summer.



C. violacea 'Lois', AM/AOS; Grower: Jack Wible, photo: Teresa Neal

Cattleya violacea: British Guiana, Colombia, Venezuela and Brazil. First discovered by the traveler Humboldt, it was described in 1816 as *Cymbidium violaceum*. Subsequently introduced into cultivation in 1838 by Sir Robert Schomburgk it was named *Cattleya superba* in Lindley's SERTIUM ORCHIDACEUM and became widely known under the latter name. In 1889, however, R. A. Rolfe in the GARDENERS' CHRONICLE demonstrated that the two species were synonymous and the earlier specific name should stand as *Cattleya violacea*. The stems are spindle-shaped, up to a foot high, furrowed, with two leaves up to six inches long. The flower-stem bears three to five or more fleshy flowers, each from four to five inches across. The sepals and petals are spreading, bright rose-purple suffused with white, the sepals smooth, and the petals broader, nearly rhomboidal and waved at the margins. The lip is bly three-lobed, the side lobes acutely triangular and rolled over the column, the middle lobe transversely oblong, convex, eroded at the margin, deep crimson-purple with yellow disk with white blotches on each side, streaked with deep purple. A warm species, needing a liberal supply of moisture, it is a strikingly beautiful flower with brilliant color, well worth the effort needed to grow and flower. It blooms in July and August.



C. walkeriana 'Palmetto Star', AM/AOS; Grower: Fred Missbach, photo: M. Pulignano

Cattleya walkeriana: Brazil. Discovered by the traveler Gardner around 1839, it was described by Hooker in the LONDON JOURNAL OF BOTANY for 1843 *Cattleya bulbosa*, described by Lindley in GARDENERS' CHRONICLE for 1847, is referable to this same species. A vegetative peculiarity

distinguishes this species, for the flowers are not produced from the apex of the pseudobulb as in other *Cattleyas* but arise on separate short, slender shoots which spring directly from the rhizome at the base of the leaf-bearing growth (see footnote). This character is found only in this species and in *Cattleya nobilior*. The spindle-shaped pseudobulbs are up to five inches long, bearing two (occasionally one) leaves from three to five inches long. Inflorescence arises from a separate slender shoot springing from the rhizome at the base of the foliar shoot, one- to two-flowered. Flowers are large for the plant, to four and one-half inches across, ranging in color from bright rose-purple to pale pink-lilac. Sepals are pointed, petals more oval, twice as broad as the sepals. Lip is bly trilobed; the side lobes more or less erect on both sides of the column, their front edges turned outward; the middle lobe spreading, kidney-shaped with wavy margin, a broad band of amethyst-purple surrounding the white or pale yellow disk which is streaked with purple This beautiful and distinctive species is slowly regaining popularity, for it has been found to be more common in Brazil than previously supposed. The flowers are long lasting and hold their shape for two or more weeks without wilting. It is widely cultivated in Minas Gerais, Brazil, where it blooms profusely. The blooming season varies, from fall to spring.



Guarianthe (Cattleya) aurantiaca 'Laura Palmieri', AM/AOS; Grower: Mario & Silvia Palmieri, photo: Maria Teresa Diaz

Guarianthe (Cattleya) aurantiaca: Mexico, Guatemala, El Salvador and Honduras. Originally described as *Epidendrum aurantiacum* by Lindley in the BOTANICAL REGISTER for 1838, this species represents the uncertain boundary line that by convention separated the genus *Cattleya* from the genus *Epidendrum*. It and the other closely related Central American species have recently been transferred to *Guarianthe*. The club-shaped pseudobulbs are a foot to fifteen inches high, with a pair of leathery, dark green leaves. The inch-and-a-half flowers are produced in an arching or slightly drooping raceme from the base of the leaves. The petals and sepals are similar, bright cinnabar-red in color. The lip is obscurely three-lobed, the middle lobe somewhat acute, cinnabar-red with several dark streaks or veins. There are several forms of this species, some being very vigorous with numerous larger flowers. Some forms do not open widely, some being truly cleistogamous, that is, self-pollinating. An easily grown species, of interest for its behavior as well as for the bright color of its small flowers, it makes a nice plant for the hobbyist, blooming in the spring and summer.



Gur. bowringiana 'Augusta', AM/AOS;
Grower: Bill Rogerson, photo: R. Peters

Guarianthe (Cattleya) bowringiana: British Honduras, Guatemala. Introduced by Veitch in 1884, and described in the GARDENERS' CHRONICLE for 1885, this species was dedicated to Mr. J. C. Bowering of Forest Farm, an ardent English amateur orchid collector. The clavate stems are a foot to twenty inches tall, swollen at the base, and bear two narrowly oblong, leathery leaves about six to eight inches long. The flower stem arises from a narrow, flattened sheath and bears from five to fifteen or more flowers which range in size from two to three inches across. Sepals and petals are bright rose-purple with somewhat deeper veining, the petals much broader than the sepals and somewhat wavy along the margins. The lip is narrowly tubular surrounding the column and externally similar in color to the sepals and petals, the anterior portion of the lip flaring outward without distinct lobes, deep purple with a central crescent of maroon surrounding the white to yellowish throat. This robust species is closely allied to *Cattleya skinneri*, at one time being considered a variety of *C. skinneri*, but is readily distinguished by the small pseudobulb-like joint between the two leaves as well as by differences in the flowers. It is easily grown and flowered, producing several leads and racemes of flowers each year, making it an ideal plant for the hobbyist. Its free-flowering character has been utilized in making hybrids which acquire this tendency to a high degree. A very fine form, with extra heavy substance and very broad, overlapping petals, is the variety *splendens*, probably a tetraploid form. The species blooms in the fall.



Gur. skinneri 'Casa Luna', AM/AOS;

photo: G. Allikas

Guarianthe skinneri: Although the flowers of this bifoliate species from Central America are not as large as those of the labiate Cattleyas, this species is highly recommended to the hobbyist, particularly beginners, because of its very vigorous growth and free-flowering characteristics. The club-shaped stems are about a foot tall, bear two largish leaves and a cluster of five to ten fair-sized flowers, about four to five inches across. The petals and sepals range from pale to deep rose-purple, the lip a deeper purple with whitish disk and throat. Very similar to the fall-blooming *Guarianthe bowringiana*, *Guarianthe skinneri* flowers in the spring; typically March.

Cattleya Hybrids

Although the number of *Cattleya* species is relatively small when compared to some of the large genera like *Oncidium* or *Dendrobium*, the number of available hybrids is confusingly large. The beginner is usually bewildered at the vast array awaiting his choice and gropes vainly for guidance in the maze of cross names that dot the pages of orchid catalogues, a problem reinforced by recent nomenclatural changes. Regrettably, it is not possible to list recommended hybrids in the same way that species can be listed, for the progeny of complex crosses are even more variable than are the species, and the same cross name is applied to the progeny of poor parents as to the progeny of selected forms of the same name; i.e., (*walkeriana* x *intermedia*) is *C. Walkerinter* regardless of the quality of the parent clones used. However, if the beginner deals with a reliable commercial source, he can generally be assured of getting the value for which he pays. When choosing seedlings, nice flowers of an average level of quality can be had from moderately priced plants. Top quality award-winning flowers are not common and, hence, are expensive. The development of mericlone has forever changed the equation with regard to price of award quality flowers since it is now possible for everyone to have the same awarded clones for rather remarkably low prices. Just remember, when buying clones, you have the advantage of knowing the quality of the flower; however, there are thousands of other people who have the same clones. If you want unique plants, the way to accomplish this is to choose seed-grown plants. On the other hand, the beginner's real interest should be in learning to grow his orchids well, at first, and on this account should look for hybrids possessing vigor, robustness and ease of culture and flowering, rather than highest quality blooms. He should keep his own cultural conditions in mind, and get crosses which have in their background those species most suitable to his conditions. He must remember, even the finest plants will not be satisfactory if they are not grown well.

Cattleya Culture – Part I

NED NASH

The following article first appeared in the *American Orchid Society BULLETIN* Vol. 52, No. 2, 1983 and is the first installment in a five-part series. It has been edited to conform to modern taxonomic nomenclature and availability of culture media and pesticides/insecticides. While now over 25 years old, the article still remains an excellent resource for the cattleya grower.

CONSIDER these two very common situations: 1) An inexperienced hobbyist, perhaps with no more than two or three orchid plants, visits a commercial nursery and selects a plant for purchase. The plant, in bud and giving promise of a lovely display, is not one our friend has ever read or heard about. Upon inquiring about its cultural needs, he is informed that it needs "Cattleya conditions but with a bit more light" ... or water ... or shade ... or whatever! Or, 2) A hobbyist of long experience decides that this weekend he simply has to repot some (or all) of his Cattleya collection. Perhaps he has procrastinated; perhaps he is over-anxious. In any case, most of his plants do well after potting, rooting and growing with vigor. One plant (usually his favorite), however, does not respond at all well. The plant manifests all the symptoms of dehydration, doesn't make any new growths or roots, and ultimately succumbs.

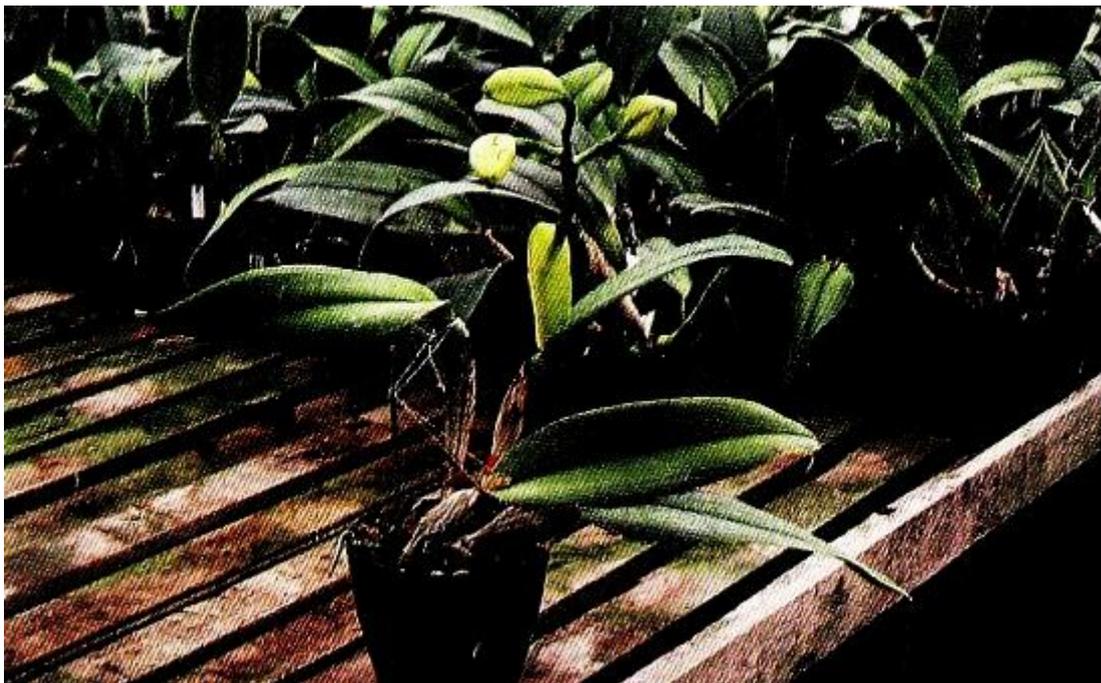


FIGURE 1. With sufficient light, a Cattleya should produce sturdy, upright new growths which require no staking.

The frequency with which these scenes occur across the country illustrates the fallacy of the old saw "everyone knows how to grow cattleyas." This is especially unfortunate as Cattleya culture is a universal foundation for general orchid culture. As most of us started serious orchid growing with a cattleya of some sort, we have a general knowledge of their cultural needs. Indeed, this knowledge becomes almost second nature quite rapidly.

It is simply because "How to Grow Cattleyas" is second-nature to so many that we encounter problems similar to those in our two situations. First, it is easy to forget that there are a lot of people who haven't the faintest idea what a cattleya even looks like, let alone how to grow one.

Even those with a rough idea of how cattleyas should be grown are often hard-pressed to explain why they use a certain cultural practice. Second, even the most experienced grower may become complacent and make mistakes like our friend in the second situation. No orchid grower ever outgrows the need for observation. Properly observing a particular plant's growth habits and patterns can usually prevent problems like those described above.

The following articles are intended both for the beginner and the more experienced grower. While a relative newcomer to orchids, I have been very fortunate to learn from some of the most experienced men in orchids. Many of the illustrative anecdotes and observations in this series have been kindly passed on by Mr. Leo Holguin, General Manager of Armacost & Royston. Mr. Holguin has been growing with Armacost for nearly 50 years and his experience in Cattleya culture is undoubtedly second to none.

I should stress that, while aspects of culture will be discussed in separate sections, this is largely for convenience and ease of understanding. All cultural factors are equally vital to the successful growth of cattleyas. Additionally, no one factor can be separated from the others. All facets are interrelated and should co-exist in harmony.

LIGHT

Cattleyas require good light to grow and flower properly. Insufficient light is the main cause of their failure to bloom. If I am asked by a visitor to our nursery why their plant isn't blooming and if I determine that it has been at least one year since the plant last bloomed, I invariably have to answer with the preceding two truisms. Of course, there are important diagnostic questions to be asked. Is the foliage dark, glossy green? Do the growths grow straight without staking? If the answers are yes and no respectively, the plant has been grown with too little light. The foliage should be medium, olive green, and the growths should develop broad and erect, as should the flower spikes.

Another more severe symptom of too little light occurs when the oldest bulbs die while the new vegetative growths get progressively smaller and weaker. This is analogous to the behavior of house plants grown with too little light. Because light is essential to the chemical reactions which produce a plant's energy, a plant receiving insufficient light will draw nourishment from older portions to subsist and to produce new growth. Since there is a net loss in any energy transfer, new growth will become increasingly weaker until the plant finally succumbs.

How do we know when our cattleyas are receiving enough light? The new growths should grow straight without staking (see FIGURE 1) and form nice, plump pseudobulbs. Seedlings should show progressively larger pseudobulbs until a mature size is reached. Inflorescences should emerge cleanly, growing straight with a minimum of staking. Foliage should be firm and a medium olive green. (Because most cattleyas are fertilized heavily today, owing to fir-bark culture, such plants tend to be greener than those grown in osmunda which require little or no fertilizer.) Light meters are a valuable tool but should not be relied on too heavily.

Optimum light conditions vary somewhat from region to region. In areas like Florida or Hawaii, cattleyas may be given nearly full sun, while in areas similar to ours in California, plants are best grown with 40-50% sunlight. This is a good example of why close observation of plant growth is a better indicator of proper light conditions than reliance on a light meter. Here at the nursery, we use a light meter to confirm our observations. With a little practice, one can walk into a greenhouse and "feel" if the light is right. Here again, I must emphasize the importance of keen observation of the conditions under which your plants are grown.



FIGURE 2. Heat build-up from too much light caused the yellow patches on these cattleya leaves.

Helpful, too, is an understanding of the preferred habitats of *Cattleya* species. The majority of horticulturally important species grow as epiphytes in the middle elevations of the subtropic. Epiphytism is generally thought to have evolved partially to enable the plants to obtain sufficient light in the often dimly lit forest by getting them up into the more brightly lit canopy. Most epiphytes, cattleyas included, do not grow where they will be exposed to full sun for long. Inner branches, or those under the uppermost canopy of foliage, are the preferred locations. In such areas, while the plant may be temporarily exposed to full sun, it receives bright, dappled light but remains protected from too much sun. If a plant is exposed to the full sun by loss of its foliar protection, its own foliage will burn, as would happen in your greenhouse.



FIGURE 3. Given time and continued over-exposure, "sunburned" tissue turns dark. These burns can greatly reduce a plant's ability to manufacture food.

I should point out that light itself does not cause the foliage to burn. It is the heat build-up caused by light which causes burning. This has several ramifications. For example, leaf heat build-up is probably the major limiting factor in windowsill or under-lights culture due to the difficulty of providing adequate light, under these conditions, without overheating the foliage. Even if the leaves do not actually show the symptoms of leaf burn (see FIGURES 2, 3), physiological processes may become so stressed that the plant(s) will grow poorly. Cattleyas, especially the smaller-growing types, can be grown under these circumstances but more care must be exercised than might be supposed. Heat build-up is also the reason your orchids "melted" on that hot day, even though you parked your car in the shade.

Plants grown in too much shade will burn even more rapidly than those grown with proper light. Remember your first day at the beach after a long winter? The fact that the dark green foliage will draw heat even more rapidly only exacerbates the problem.



FIGURE 4. This greenhouse is properly shaded by lath on the side and a layer of shade cloth suspended on a frame above the roof. With shading, leaf-burn is unlikely.

If you use a paint-on shading compound on your greenhouse, it is imperative that dirt and dust be washed off (by a rain or with a hose) before the compound is applied. If the paint is applied over a dirty surface, it will quickly turn dark. Not only will the light quality be poor, but the dark color will draw heat into the house. Hot, shady conditions are a serious problem for cattleyas. Many growers make the mistake of laying shade-cloth or saran directly on the roof of their greenhouse, or placing it inside directly under the glass. While the light quality will be good, the dark shade cloth will draw heat into the greenhouse. Shade cloth should be suspended 8-18" above the glass on a frame (see FIGURE 4). This traps a layer of cooler air next to the glass, helping to keep temperatures down.



FIGURE 5. By feeling a leaf, the grower can determine whether the threat of light-damage exists under present conditions.

A good general test for heat buildup is to feel the leaves (see FIGURE 5). Ideally, they will feel cool to the touch. If the leaves are warm or hot, the temperature must be lowered however possible. A good temporary solution, the one we use as we have no artificial cooling, is to increase air circulation and spray the plants lightly overhead (see FIGURE 6). The evaporative effect will cool the foliage nicely.

It is clear that light and temperature are closely related. This brings us to a discussion of the proper temperature range for cattleyas.

TEMPERATURE



FIGURE 6. Spraying cattleyas with water is one way of lowering leaf temperature and reducing the risk of injury.

In nature, *Cattleya* species may be subjected to temperatures ranging from the low 40's to nearly 100F. However, conditions are generally more moderate, in the mid-50's to the upper-80's. Modern hybrid cattleyas are much modified by exceptions to the rule. Some knowledge of these exceptions and their part in any given hybrid is necessary.

For example, many standard, yellow *Cattleya* hybrids tend to resent lower temperatures owing to the presence of *Cattleya dowiana* in their background. Those who have experience in growing (or trying to grow) *Cattleya dowiana* are well aware of the finicky nature of this species. On the other hand, most of the smaller-growing, red *Cattleya* and related-hybrid color shades will enjoy slightly lower temperatures than standard hybrids. Indeed, these types attain their best color only when the plants can be grown cool and bright. This habit can be traced to the influence of species formerly classified as *Sophranitis* and Brailian Laelias. Most cattleyas can be grown in the same area for many, if not all growing environments have micro-climates that can be utilized to keep different types happy. For example, it is warmer near the heater and cooler away from it. Hybrids or species requiring more light can be hung higher in the greenhouse, while those preferring more shade can be protected by the foliage of other plants.

In general, cattleyas enjoy a temperature range of 55-60F night and 75-85F day under cultivation. The 15-25 degree differential between day and night is essential for proper growth and flowering. Unless a cattleya receives a cooler, dark "rest" at night it will quickly exhaust its food reserves. This accounts for the weak growths and burned leaf tips on plants that are artificially supplied with overlong day-lengths. Also, most cattleyas are photoperiod- as well as temperature-sensitive. The bloom season is determined not only by day length but by seasonal temperature variation. Experiments have shown that many cattleyas simply will not bloom if the temperature is maintained above 70F.



FIGURE 7. Enhanced air movement, provided here by perforated plastic tube attached to a high-speed fan, maintains even temperatures throughout the growing area while it cools the plants.

There are, of course, situations where it will be impractical, or indeed harmful, to maintain optimum temperatures. Many of the southeastern states may have periods during summer months where the night temperature doesn't drop below 70F. Because these periods are usually accompanied by very high humidity, evaporative coolers are ineffective. Air conditioning is impractical owing to energy costs. Fortunately, these periods are unusually not prolonged and most cattleyas will remain unaffected.

Conversely, the northern states will have periods during the winter when it is difficult to maintain a day temperature of 55–60F, let alone at night. Even if such a night temperature could be maintained, it would only serve to force the plants in a manner analogous to maintaining a constant HOT day and night. In this case, however, the result would be doubly harmful as the forced growth would develop under short-day, low-light conditions. Such growth would be very weak at best and very susceptible to rot and fungal problems. For this reason, experienced northern growers know they can allow their greenhouse to drop into the low 50's or mid-40's under such conditions, thus maintaining a day/night differential of 10–15F. It is advisable to be cautious with watering under these circumstances.

At this point, common sense must be stressed. While cattleyas require a temperature differential to do their best, do not go overboard. We have found, and the experiences of others have backed this up, that cattleyas function best when the temperature differential is not too great and when the temperatures are run at the lower end of the optimum. In other words, they will grow and flower at maximum potential at approximately 60F night (or a little lower) and 80F day. Flowers developed under such nice, even temperatures have the best size and substance because they have developed slowly and evenly. We have found this to be very noticeable at Armacost and Royston since our move to the Carpinteria Valley a little over eight years ago. We are approximately 90 miles north of Los Angeles and within one mile of the ocean. We find that the same Cattleya cultivar will have a flower much improved over how it appeared in the Los Angeles area. We feel this is entirely due to the very moderate, even temperature that we enjoy

here so close to the coast. Common sense enters in deciding on the temperature range for your own area. For example, high day temperatures are unnecessary in the north where nights are normally cool year-round; and one needn't worry so much about high night temperatures when the days are normally quite warm. Intense fluctuations of temperature are what must be avoided.

There are many ways of providing supplemental heat for cattleyas. The tried and true method, probably still the best, is underbench heating by steam or hot water. Pipes, finned or otherwise, are run under the benches with steam or hot water supplied by a boiler. This system has several advantages. The heat naturally rises with great efficiency through the plants. This type of heating does not overly dry either the plants or the atmosphere as gas heat will. Perhaps the major advantage is the excellent root growth promoted by this method. Plants seem to establish easily, quickly and have a better-developed root system. (This principle is widely used in other parts of the nursery industry for the rooting of tip propagations.) The biggest drawback to this system is the high, initial cost of the boiler and piping. However better plant growth and lower, long-term maintenance costs greatly ameliorate this initial expense.

The more common method of heating today utilizes a space heater. Larger units force air through a heat exchanger, thereby heating the air and distributing it throughout the greenhouse. The heat exchanger may be heated by boiler-generated steam, although a gas flame is the most common method. Smaller space heaters generally rely on passive heat distribution. These smaller units are generally placed on the greenhouse floor. The heat rises and is fairly evenly distributed by natural convection and any fans present. The larger, fan-driven heaters are usually suspended from the greenhouse roof. Fanjets may or may not be used. Gas heat tends to be drying, although this is usually not a serious problem. The biggest drawback we have found with this type of heater is heat-exchanger failure. The welded seams rust out and the resultant leakage renders combustion of the gas incomplete. The non-combusted gas escapes into the greenhouse with its attendant problems of flower wilt and plant damage. We find that exchangers fail after 2-3 years and must be replaced. Thus the initially lower price may prove to be false economy.

With the rising cost of energy, many heat-conservation and solar heating schemes are being tried across the country. The A.O.S. BULLETIN has had several fine articles on these subjects in the last few years.

We like to grow our younger cattleyas, especially those right out of flask, a bit warmer and shadier than mature plants. This gives the fragile seedlings a better chance at survival. Young plants from flask are grown with 65-68F nights. As they are moved from flats into pots, they receive 62-65F nights. When potted just before flowering for the first time, they are moved into mature plant conditions. This method pushes the seedlings toward an earlier first-bloom. The advantage is that the plants are gradually hardened as they grow, rather than suffering through a transplant shock when quite young and more vulnerable. It also enables us to provide a b, hardened plant to our customers, easily adaptable to their conditions.

Important aspects of temperature control are proper ventilation and air movement. The admission of fresh, moving air to the growing area is beneficial for several reasons. Carbon dioxide is an essential ingredient to photosynthesis, and fresh air is the primary source. Moving air also helps to give an even temperature throughout the area and keeps leaf temperature down by evaporation.



FIGURE 8. Bottom and top vents on these greenhouses create a constant air exchange with the outdoors, keeping conditions fresh and fairly cool inside.

While fresh air and good circulation are obviously vital, do not go overboard. Provide just enough movement to eliminate stagnant conditions. This helps to keep down fungal problems. When our new greenhouses were constructed, we purposely had them built with a relatively high (twenty-foot) ridge. This increased volume helps to keep temperatures moderated and we need only open our ridge vents slightly to create a very nice air exchange. We have recently added bottom vents along the south face of our range. These are an excellent way of cooling a greenhouse. The cooler air enters at bench level and rises, as it warms, to exit through the ridge vents. By using these passive cooling methods, we very seldom need to use our fanjet blowers for cooling, except under very extreme conditions (FIGURES 7 and 8).

Naturally, high houses such as ours are impractical in cold climates, owing to the large, extra volume to heat. In colder areas, the smaller houses in use require more active air circulation, usually by turbulator-type fans (these draw air up toward the ceiling), and/or circulator fans that move air laterally. Many people have a tendency to get carried away with fans to the extent that they have near gale-force winds blowing through their houses. This is unnecessary and a point of diminishing returns can be reached. Plants can be stressed by excessive fans drying them too quickly.

With experience, you will readily "feel" when the greenhouse is right. The air should be a pleasure to breathe, a combination of good, earthy smells and full of oxygen. The house should feel light and buoyant, as a spring morning might. If you feel good in your greenhouse, so will your plants.

Thus far we have discussed the relationship between light and temperature and the roles they play in the growth of cattleyas. The next article will discuss the water and humidity requirements of cattleyas.

Cattleya Culture – Part 2

NED NASH

This is the second installment of a five-part series that first appeared in the *American Orchid Society BULLETIN* Vol. 52, 1983. This five-part series, while over 25 years old, still remains an extremely valuable resource for orchid growers. This article has been edited to conform to modern taxonomic nomenclature and the availability of pesticides/insecticides and growing media.

THE SECOND most common problem that people experience with *Cattleya* culture, after insufficient light, is improper watering. An understanding of the most common habits of *Cattleya* and related species greatly helps in understanding their watering needs. As discussed earlier, most horticulturally important *Cattleya*-types live as epiphytes in the middle elevations (2000–5000–feet) of the sub-tropics.

WATERING AND HUMIDITY

There are important lessons to be learned here. The roots of a cattleya, because they are by nature largely exposed and dry quite rapidly, simply will not tolerate extended periods of wetness in culture. Unless the roots are allowed at least to practically dry between wettings, they will rot. The absorptive layer of the roots, the velamen, absorbs water like a sponge. When it is fully charged with moisture, no gas exchange with the atmosphere occurs, and this leads to rot. Although cattleyas are generally grown in pots for convenience and ease of handling, their need for cyclic drying and wetting still remains. We will be discussing potting media and potting later in this series but suffice it to say that a relatively coarse and free-draining medium is necessary for cattleyas.

A coarse potting medium and resulting free drainage help to duplicate the cyclic, wet-dry nature of the plants' native habitat. They also provide the liberal air circulation about the roots that the plants enjoy. Yet the coarsest mix and the best draining pot simply will not help if one is too liberal with watering. Many growers tend to "fuss" over the plants too much. Because of their exotic reputation many people are basically scared by cattleyas. Unfortunately, people seem to be more afraid of under-, than over-watering their cattleyas. Many more plants have succumbed to over-watering than vice-versa, although under-watering does have its attendant problems. One has to remember that cattleyas have evolved to be drought-tolerant and will not tolerate too much water at the roots. Don't go overboard on this advice, either! Practice moderation. Allowing plants to dry between waterings does not mean creating a desert for days on end. If a plant is dry, by all means water it!

"Well", you may be asking yourself, "how does one know for sure when a cattleya needs water?" Good question. There are many diagnostic tests one can perform to determine the water content of a pot. First of all, the differential drying rate of plastic and clay pots must be considered. Because clay is porous, it "breathes," hastening the drying of the potting medium it contains. This sweating of moisture from clay pots can give a hint as to whether the plant needs water. Lift the pot. If there is a ring of moisture on the bench under the pot, there is plenty of water in that pot. A trick that works well with both clay and plastic is to insert a freshly sharpened lead pencil about halfway into the medium. If the wood is dark with moisture when the pencil is withdrawn, the plant does not need watering. Today's lightweight potting media in combination with the lightness of plastic pots can give valuable information as to the amount of moisture in the pot. Lift a plant in a plastic pot immediately after you have watered it. It will be relatively heavy. Lift that same pot immediately before you plan to water. If the plant really needs to be watered, it will be quite light. With a little practice, the weight and balance of a plant in a

plastic pot can tell you just how much water is left in the pot and will enable you to estimate when the plant will need water again.

Obviously, very few of us have either the time or the inclination to go to each plant in our collection and test it individually. However, if the plants are set up in "size-place" (pots of the same size together), and one remembers the intervals between waterings for a given pot size, the initial learning period can be greatly reduced. It is a good idea to double-check your presumptions on watering intervals every so often so as not to become complacent.

Seasonal influences are the primary factors affecting watering intervals. Areas like Florida and Hawaii experience seasonal variations in day-length and the amount of cloud cover or rainfall, however slight. As one moves away from the equator, these factors become increasingly important. Plants generally require less water during the winter months, owing to shorter and cooler days which slow the plants' growth rate. (Although less pronounced today because of the complex nature of most hybrids grown, a very dry rest during winter was quite necessary to the health of *Cattleya* species grown years ago.) The extent to which watering frequency is reduced will depend on the severity of the winter in your area. Plants whose growth is slowed by a reduction of total insolation (short days and considerable cloud cover) require less water and will remain wet longer between waterings. Not only do the plants actually use much less water, but the normal evaporation from the pot is also slowed by the lower, average temperatures. This is one of the primary reasons that cold-climate greenhouses require better air circulation than warm-climate greenhouses. The increased air movement aids the evaporative process, thereby helping the pots to dry more quickly.

Conversely, warmer and longer days, with the increased sun they bring, will necessitate more frequent waterings. Not only are the plants in active growth with many new roots forming, but the increased admission of fresh air evaporates moisture from the pots more quickly as well. It is especially important to take advantage of this quickening of growth in northern or cooler areas. The growing season can be quite short in these areas, and it is important to utilize it efficiently. This means monitoring the plants' water needs closely so as to avoid slowing their growth by insufficient water. This is not the contradiction it may seem. As I stated earlier, "If a plant needs water, water it!" Only when the plants' water needs are met will they perform to their true potential.

Adequate humidity goes hand-in-hand with proper watering practices. In nature, cattlcyas are of course subject to fluctuating humidity. This is moderated by the creation of a micro-climate in forested areas by the collective transpiration of the resident plants. At night, the forest's atmosphere may be saturated with moisture as the temperature drops. The species will experience relative humidities in the range of ca. 20% to 100%. More typically, the range would be 40-80%. This is the range they will prefer in your greenhouse.

A brief explanation of relative humidity will be relevant here to help understand its relationship to other environmental factors. A given volume of air will hold a fixed amount of water vapor at any given temperature. For example, a cubic liter of air will hold 10 ml of water vapor at 70F with a 100% relative humidity (RH). (These figures are for the sake of discussion only.) If there are only 5ml of water vapor in that liter of air at 70F, we say the RH is 50%, as the volume of air only contains one-half the moisture it potentially can. Cool air will hold less moisture than warm. If we take that same liter of air and warm it 10F to 80F, it can hold more water vapor than it could have at 70F. We will assume that it can hold twice as much, or 20 ml. Our test liter of air at 70F with 5 ml of water vapor and at 50% RH, if warmed to 80F, will be at 25% RH as it holds only one-fourth of the water vapor that it potentially could.

In a closed greenhouse, we are dealing with nearly fixed volumes of air and water vapor. It is easy to see the effect that temperature change will have on relative humidity. The effect can be

neatly explained as an inverse relationship. That is, RH drops as temperature rises, and vice-versa. Conversely, a plant's humidity needs are in direct relation to temperature. With rising temperatures, more humidity is necessary to prevent the plant's transpiration rate from outstripping its water supply, causing subsequent stress. At night, or on cool, sunless days, the air may reach 100% RH as the cool air has less potential water capacity. This is a rather dangerous situation if left too long, as a saturated atmosphere is highly conducive to fungal and bacterial problems.

In real life, however, a truly "closed" greenhouse is seldom achieved. Whether or not it is even advantageous is open to debate. Vents, doors, uncaulked seams – all do their part in altering the RH in a greenhouse by allowing interchange with the outside atmosphere. We like to at least crack the vents on warm days, as this allows better air circulation. However, this also serves to lower the RH as moist air escapes through the open vents. Damping-down, the wetting of floors and benches, is a good solution. This adds to the potential amount of water vapor in the house. A good test for dryness is to observe whether the greenhouse floor is dark with moisture or light-colored and dry.

Young seedlings require more water and humidity as they do not have the well-developed, water-storage organs of larger plants. More frequent watering is called for. If you are fortunate enough to be home to tend your plants during the day, the seedlings may be lightly misted as necessary. For those of us who must have a job to support our orchid (and other) habits, here is a good trick. After the seedlings are deflasked and planted into community- or corn-pots, bend a wire loop approximately ten inches across and insert it into the pot(s). Place a clear plastic veggie bag over the loop and presto! – you have a "mini-greenhouse." The bag need only be removed for watering. I find about 10 weeks "in the bag" is enough to establish young seedlings and to partially adapt them to outside life.

FERTILIZING

The substrates upon which cattleyas grow in nature, trees and rocks, provide few if any nutrients. Cattleyas do, however, enjoy a steady source of fertilizer from many external environmental sources. Birds and other animals leave their droppings behind, leaf detritus collects around the base of the plants, and nutrient solutions are washed over the plants from above by the frequent rains. We can draw important conclusions from this information that will apply not only to cattleyas but to other epiphytic orchids as well. Since the nutrients are supplied sparingly by outside factors, we can infer that cattleyas are moderate, not heavy feeders. Because the nutrients are being supplied relatively constantly, generally with precipitation, cattleyas will prefer more frequent, but lighter doses of fertilizer. Last, although the nutrients are being provided in a more unorthodox manner than with terrestrial plants, the nutrients are supplied in a more or less "balanced" feed solution.

How do these conclusions relate to successful *Cattleya* culture under artificial conditions? We have already discussed the preference of cattleyas for more frequent feedings of moderate strength because this more closely duplicates the conditions they are used to. We orchid growers eat two to three times a day in moderate amounts rather than gorging once a week (at least I think so). Here at our nursery we fertilize at every watering with one-half the recommended dosage of our custom-blend fertilizers. It is acceptable to feed full strength every two weeks — if one is lazy or pressed for time — but more frequent feedings definitely enhance both growth and flowering.

Organic media utilizing fir bark were experimented with in England many years ago, but they were considered unsatisfactory. Because growers were so used to osmunda and never fertilized, it was felt that orchids did not require additional feeding. Plants grown in fir bark and not fertilized do poorly indeed, as the bark requires nitrogen as well as the plant. Interest in fir

bark media was renewed in the early 1950's in California because of a ready and cheap supply. A fertilizer suitable for use with these types of media was developed by O. A. Matkin. It was found that these types of media require a relatively high ratio of nitrogen, as the organisms present in the medium that break it down require nitrogen and will take it from the plant if sufficient is not provided. For this reason, organic mixes containing fir bark or tree fern are watered with a fertilizer balanced to a 3-1-1 or 3-1-2 ratio; the two "extra" parts of nitrogen are for the mix, leaving a truly "balanced" 1-1-1 feed solution. We use one-half strength 30-10-10 every watering, altering with a low nitrogen 10-30-30 fertilizer every fourth watering. The low nitrogen fertilizer helps to encourage root and flower production (phosphorus and potassium do this) and to harden the plant somewhat. A point should be made here in regard to commercially prepared, balanced fertilizers. A bit of study will show that most, if not all of these growth formulations prepared for fir bark growing have the basic 3-1-1 or 3-1-2 ratio (i.e., 30-10-10, 27-9-18, etc.). Since the nutrients are derived from the same salts no matter which company blends them, there is really very little difference between commercial preparations. Distinctive dyes are usually added to differentiate products, but the dye is really most important as an indicator that the fertilizer solution is coming through the hose [Editor's note: Since this article first appeared a number of studies related to fertilizer needs have been conducted. We now know that optimum fertilizer is directly related to water quality and that excess nitrogen is not as important as first thought since the excess nitrogen contributes to the decomposition of the potting medium. We also know now that urea nitrogen is not efficiently used by orchids and that urea-free fertilizers are a better choice.]

A situation similar to that of the 1940's and 1950's now exists. The supply of good quality fir bark (remember those halcyon days of kiln-dried Weyerhaeuser bark?) and tree fern is declining rapidly, much as osmunda fiber did thirty years ago. For this reason, many growers are now experimenting with inorganic media. Because inorganic media generally provide no nutrients, culture in them is essentially hydroponic. That is, the medium provides only support and water retention. A truly balanced fertilizer is required [urea-free fertilizers are especially important here]. There are many good commercially prepared products available. It is important that the fertilizer be designed specifically for this type of use, as one can run the risk of under- or over-fertilizing with resulting harm to your cattleyas.

Part 3 of this series on Cattleya culture will deal more specifically with potting and potting media. —Armacost & Royston, 3376 Foothill Road, Box 385, Carpinteria, California 93013.

Cattleya Culture – Part 3

NED NASH

The following article first appeared in the *American Orchid Society BULLETIN* Vol. 52, 1983 as part of a five-part series. While over 25 years old, it still remains an excellent resource for orchid growers. It has been edited to conform with modern taxonomic nomenclature and the availability of pesticides/insecticides and potting media.

POTTING CATTLEYAS can be the simplest aspect of growing or the most exasperating. It is certainly the most difficult about which to write! While we have already discussed much of the "why" we pot cattleyas as we do, here we will talk about the "how" and "when".

POTTING AND POTTING MEDIA

We learned earlier that most of the Cattleya alliance species grow as epiphytes in nature. Their roots are largely exposed and subject to periodic drying. Much of their moisture requirement is met by the frequent, brief rains of the tropics. Some is met by the nightly dews which are absorbed by the spongy, velamen layer of the roots. It is the plants' love of good root aeration that leads us to use the relatively coarse, free-draining media that we do.

Osmunda, hapuu, fir bark, charcoal, and many other materials share the desirable characteristics we look for in cattleya potting medium. One or another may work better in a particular area or for a particular grower, but all have relative merits and drawbacks. What works best for you and is cost-effective is the "best medium". It may not be so for others. An important point here is to give a fair trial to any new medium with which you are experimenting. This means growing a year, preferably two, in that medium before a final decision is reached. (Of course, if immediate, severe adverse reactions are noted, it is wisest to terminate the trial!) Because of the relatively slow responses of cattleyas, it often requires some months for the plant(s) to adjust to a new medium and begin to display any adverse or desirable reactions.

Leo Holguin tells a very good tale that illustrates this point. Many years ago, a hobbyist came to him for advice about mixes and potting. Apparently, his plants were doing poorly, indeed, declining. Leo asked him what potting medium he was using. The hobbyist replied that he had recently repotted all his plants into new medium "Z", (Not a good idea in the first place: never experiment with a new medium on all your plants before trying it on a few, first!) after being dissatisfied with their performance in medium "Y". Leo asked him how long he had used medium "Y". "Oh, about six months or so", he responded. "I tried it because they didn't do well in medium 'X'." This sequence had apparently been repeated every 6-8 months with medium "W", medium "V", medium "U", etc. Leo suggested that the hobbyist give his plants a fair shake in medium "Z" for at least two years and see how they did. When the gentlemen returned two years later, he had learned his lesson, as his plants were finally recovering and growing well.

Especially in these days of shortages, it is well and good to experiment with new media and materials. But be scientific and use common sense! It is wise to evaluate a medium thoroughly before deciding to try it on your plants. Factors to consider before trying a new medium include convenience. Is it easy to use? Is it readily available locally, and is liable to remain so? Finally, is it reasonably priced? If you can answer these questions to your satisfaction, give the medium a try. Remember, though, to use it only on a few of your expendable plants at first. This will enable you to evaluate its performance fairly without sacrificing a good plant.

The basic media types were discussed earlier under the fertilizer section. The vast majority of cattleyas in this country are grown in fir bark and/or tree fern mixtures. These will provide

freedom of drainage and aeration if appropriate, commercially prepared fertilizers are also readily available. Here on the west coast, we use fir bark almost exclusively, often with the addition of redwood bark. Habit and availability have led to this practice. In the southern and eastern areas of the United States, also in Hawaii, tree fern is used more extensively as it is more readily available [Editor's note: tree fern is now becoming more difficult to obtain and at reasonable prices. As a result more plants are being grown in alternatives like Alifor, lava rock, Stalite and other inorganic media].

I want to stress here that the medium alone doesn't grow the plant! The grower does. This incorrect supposition can often lead to misunderstandings. "Boy, that mix sure works super for Joe down the street! I'm gonna try it!" If the medium doesn't grow plants like Joe's it isn't Joe's fault. Joe simply grows his plants well in his potting medium. Observation of your plants' growth habits is what will make you a good grower, not just the medium or fertilizer or whatever. Beyond helping to determine light levels, watering levels, or possible necessity of pest or disease control, good habits of observation are an absolute must in deciding how and when to pot.

Remember our friend from the first article and how his favorite plant died after he repotted it? He lacked good observational habits. Otherwise, he might have noted that the plant in question was not at a point where it could safely be repotted. Knowing when to repot is probably the most difficult part of growing cattleyas successfully. It is encouraging to note, however, that time and experience have provided us with more insight than the early growers had.

Before the advent of the large-scale growing of hybrids, *Cattleya* species by the tens of thousands were imported for cut-flower use. While many of these species grew easily and prolifically under cultivation, a few were intractable, at best sulking and refusing to grow if not potted at just the right time. *Cattleya warscewiczii* (*C. gigas*) and *C. dowiana* are two good examples, as are the bifoliate species *Cattleya amethystoglossa* (especially the "blue" or *coerulea* forms) and *C. guttata*. The mere mention of these and other *Cattleya* species can still strike fear into the most experienced grower's heart. Observation was the saving grace with these difficult species. Over time, growers noticed that there was a very particular time of year (and stage of growth) at which a given species would initiate most or all of its roots for the year. If the plants were potted at just this time, they took off and grew happily. If not – no more plant!

While most cattleyas grown today are very complex hybrids, and exhibit little or none of this fussiness, problems can still occur if common sense is not used. Basic knowledge of the species behind a hybrid is important as this background determines to a large extent the plant's preferences.

Common sense dictates that a plant in bud should not normally be repotted. Not only will the flowers be poor, but the plant's strength will be sapped by the flowers. If the plant must be potted while it is in bud, it is best to break off the buds to protect the plant's future productivity. A plant with mature leads that have finished their rooting is another poor bet for repotting. Waiting for fresh root tips to appear or the beginning of a new growth will help to ensure that plant's speedy recovery from the shock of repotting.

As one grows and learns from his or her cattleyas, a sense of when to repot will develop. Observation of the plants throughout the year helps the grower to learn at what growth stages a particular plant, or type of hybrid, will "throw" roots. Once this is learned, it is best to repot just before the roots are to be initiated. This added precaution will prevent the newly emerging, tender root tips from being damaged or broken. Many times, if the root tips newly emerging from the base of the growth are destroyed, the plant will not grow any new roots until another new growth is formed.

Knowing the species background of hybrids is important, especially in those hybrids relatively close to species (primary or secondary hybrids) or which have a great deal of certain species in their background. For instance, yellows can be more demanding than whites or lavenders as there is usually quite a bit of *Cattleya dowiana* represented in their breeding. For this reason, extra care must be utilized with most yellow hybrids to pot only when there is evidence of root activity, preferably in the spring or early summer. This also holds true for bifoliate-type greens as they are heavily influenced by *Cattleya guttata* and/or *C. bicolor*. It should be stressed that these are examples but are not the only two things one need look for. If you have noticed that a certain plant or plants exhibit(s) a failure to establish well after potting, close observation can often lead to a better understanding of why the plant(s) may be acting that way.



FIGURE 1. Newly emerging roots indicated that now is the time to repot this overgrown cattleya.

Because it may be difficult to visualize the stages of rooting behaviour (and, not coincidentally, being difficult to write about), this series of illustrations and explanations should help to clarify the subject.

This obviously overgrown plant in FIGURE 1 shows the rooting behaviour of many standard *Cattleya* hybrids. Note that the first pseudobulb over the pot edge is mature and fully rooted; it has probably already flowered. The roots are healthy but have not branched. The second pseudobulb over the edge is maturing (note that the sheathing basal leaves/bracts are still green) and is just beginning to show renewed root activity at its base. This plant should be potted now!

There are several other interesting features illustrated here. The roots on the mature bulb are healthily growing in air like aerial roots. Although they will branch freely all along their length, it is best to trim them when potting to approximately four inches. As these roots have matured in air, they will probably die when confined to a pot. Four-inch length allows for anchorage and possible branching without excessive potential for rot in dead tissue.

This picture also shows what we call the "stairstep" habit of many unifoliate species and hybrid cattleyas. The plant appears to be climbing out of its pot. While we will be discussing this habit at greater length later in the article, this habit greatly affects how a cattleya must be potted. The division must be leaned forward so that the rhizome is level with the surface of the mix. A plant potted in this way will tend to grow along the surface of the mix, rooting as it goes. If the rear portion of a division is sunk into the mix so as to keep the bulbs straight up and the new growth at surface level, the plant will tend to climb right out of its pot. Not only is this unattractive, the fresh root tips will not penetrate the potting medium quickly, if at all, leaving them exposed to insect or physical damage. So, no matter how unnatural it may seem at first to have the bulbs leaning forward, potting in this way really will help your plants to grow better in the long term.

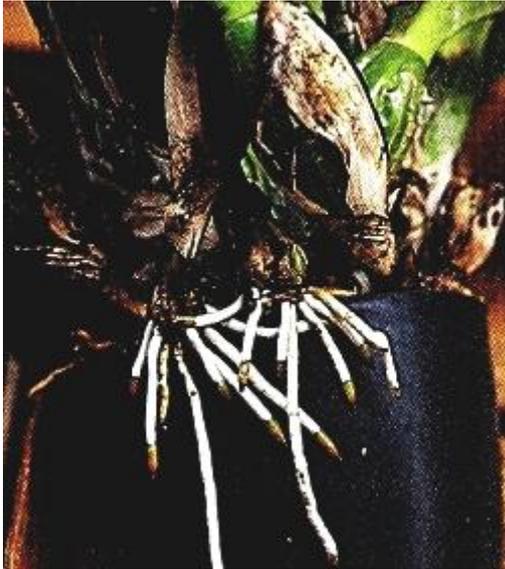


FIGURE 2. Though the new roots of this cattleya are well on their way, it is not too late to repot.

FIGURE 2 shows a spring-flowering Cattleya hybrid approximately two weeks after flowering. The roots on the lead bulb have begun to grow and this plant may now safely be repotted. Ideally, it should have been potted immediately after the flowers were cut two weeks earlier. Extreme caution will have to be exercised to avoid damage to the elongating roots.

Potting time is also an excellent time to clean up the plant, removing dead sheaths and old flower stems. Good sanitation is an important part of growing orchids well. Besides, the plants look better when they are cleaned and cattleyas out of flower need all the help they can get to look attractive!

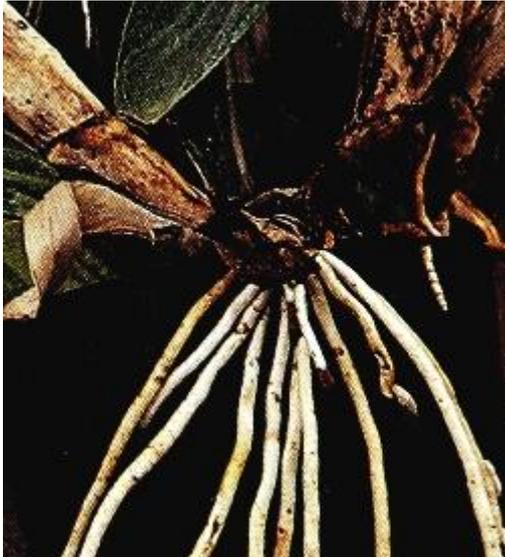


FIGURE 3. Now is not the time to repot this plant, as the roots of its newest growth are fully developed

It is too late to pot the plant in FIGURE 3! This is another spring-flowering hybrid and was photographed about a month after the flower had been cut. Note that the roots are almost fully made up and new growth is beginning to break. We like to wait for the new growth to make up at least half-way before potting as it is all too easy to break off a young growth while tamping in the mix. While breaking a new growth is certainly not fatal, it is still a set-back to be avoided where possible.



FIGURE 4. Failing to repot when necessary resulted in this tangled mess of new growths and roots.

"The bulbs are at the edge of the pot, but the mix is still good and it's growing so well! Maybe I'll just wait till next year to pot this one." Here, in FIGURE 4, is what happened. Saving a little work this year can lead to a major task next potting season. Pictures like this make even experienced potters shudder. When this type of tangling goes too far, entire leads must sometimes be sacrificed so that the division may be properly potted. We have even had new leads grow straight down over the pot's edge and through the slatted wood bench to flower underneath! The important lesson here is never to put off until tomorrow what is best done today!



FIGURE 5. Properly positioned and staked, this Cattleya division should re-establish quickly.

Here in FIGURE 5 we have a properly potted division of a mature Cattleya hybrid. The back of the division is against the rim of the pot and the front has plenty of room for two years' growth. Notice that the bulbs lean forward slightly, allowing the rhizome to be level with the surface of the potting medium. The bulbs are secured with string, steadying the plant. An unsecured plant can damage its tender, new root tips against the medium if it rocks while being moved or watered. The new growth can be seen emerging at the medium surface and is beginning to orient itself properly upright. It is in perfect position to root directly into the fresh medium. The vital label is in place and this plant is ready to go back into place in the greenhouse.



FIGURE 6. Because this division was incorrectly oriented, one month after repotting its new growth is entirely above the medium.

An improperly potted division as in FIGURE 6 will show symptoms early on. Although the mature lead bulb rooted into the mix, the developing growth is well above the surface of the mix. This photo was taken approximately one month after potting. The combination of incorrect orientation and the stairstep effect will result in the leads growing farther above the mix so that in two or three years, when the plant again requires potting, the newest lead may be four inches or more above the surface of the potting medium. Note also that the back bulbs are partially buried. This is a potential problem area for rots as the base of the bulbs may never entirely dry.



FIGURE 7. New leads whose bases are level with the mix will root firmly soon after repotting.

This division in FIGURE 7 had been potted (correctly) approximately one month before this photo was taken. The new leads emerged at the mix surface and are now beginning to orient themselves upright as they grow. Beginning root activity can be seen at the base of the new growths. Some temporary shrivelling of the older bulbs is normal but they will plump up quickly as new roots form.



FIGURE 8. Little more than a month after repotting, the roots of this new growth have penetrated the potting mix.



FIGURE 9. Recently repotted, this *Cattleya* seedling is beginning to take root.

Above, the potting medium has been cleared away from around the base of this four-to-six-week-old division in FIGURE 8 to illustrate how the new roots quickly penetrate the medium. Although most cattleyas root when their pseudobulbs are at least half-mature (and often also immediately after flowering), root loss through potting can encourage rooting, as is the case here.

FIGURES 9 and 10 show the rooting behaviour of young seedlings. FIGURE 9 shows a recently potted seedling just beginning to root. The slight dehydration in evidence is remedied as the plant establishes.

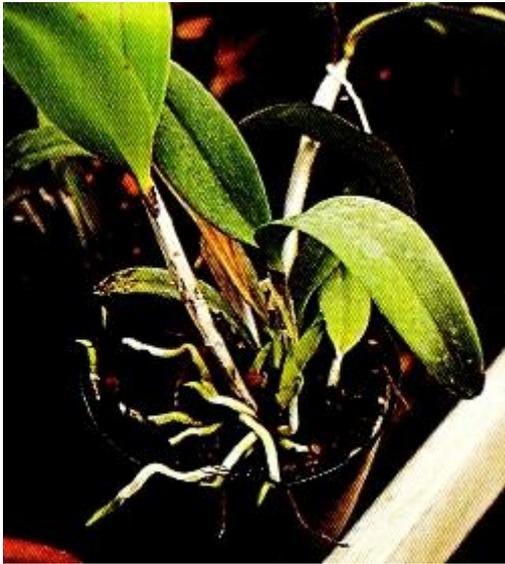


FIGURE 10. Vigorous rooting three months after repotting indicates this *Cattleya* seedling is becoming well-established.

The seedling shown in FIGURE 10 has been potted for about three months. Well on its way to being fully established, green-tipped, clean, white roots are growing profusely into the fresh mix. Vigorous rooting, as illustrated here, is just as satisfying to many experienced growers as flowering!

All of the experience and good intentions in the world won't help you with certain varieties. Many older cultivars, with notoriously poor growth habits, have passed out of cultivation simply because they grew too large, or poorly, to be considered worthwhile. Distance between pseudobulbs, pseudobulb size, and liberal production of multiple, new leads are all important considerations in this energy- and space-conscious age.



FIGURE 11. The elevated position of these new growths is a sign of an incipient "stairstep" growth habit.

There are still many clones in cultivation that have some or all of the above-mentioned drawbacks but are grown either because of their intrinsic antique value, or because they are good parents. The *Rhyncholaeliocattleya* (*Brassolaeliocattleya*) Norman's Bay line is a good example of this type. FIGURE 11 shows the beginnings of the worst trait of this line; the extreme, stairstep growth habit. The lead bulb (on the right) has initiated two new growths, an excellent habit, but the lower new growth is approximately 1 1/2 inches above the surface of the mix and the upper is approximately 2 1/2 inches above. Difficult to pot at best! Note here, as well as FIGURE 12, that there is one to two inches between pseudobulbs. Plants with this habit leap out of their pots very quickly!



FIGURE 12. Two years after repotting, the extreme stairstep growth habit of this *Cattleya* hybrid has produced this unwieldy plant.

FIGURE 12 shows the stairstep effect in a more advanced stage. This plant was potted two years ago. There are already four bulbs on one rhizome which are over the pot edge. This obviously renders the plant difficult to keep upright, to bring into the home to enjoy or to keep out of its neighbors' pots! When purchasing plants, look for this behaviour and avoid it where possible. Unless, of course, you just can't resist the flower!



FIGURE 13. A stairstep growth habit manifests itself early in this seedling's development.

The stairstep effect, generally less severe in FIGURES 13 and 14 than in FIGURES 11 and 12, can be observed very early in an orchid's life. In FIGURE 13 we have a seedling approximately

30 months old and ready for its first pot after being in a flat. We can see that it is climbing already.

FIGURE 14 shows the proper, if somewhat unnatural-looking orientation of the plant to a pot. Although the bulbs lean radically, the rhizome is level. The bulbs can easily be tied up (see FIGURE 5) or left. The new growth will develop nice and straight, assuming that it has had sufficient light.

After all these "do's" and "don't's", the beginning grower might understandably approach potting his cattleyas with some trepidation. This is not the intention of this article. While cattleyas are certainly not the easiest orchids to pot properly, they are in general not all that difficult.

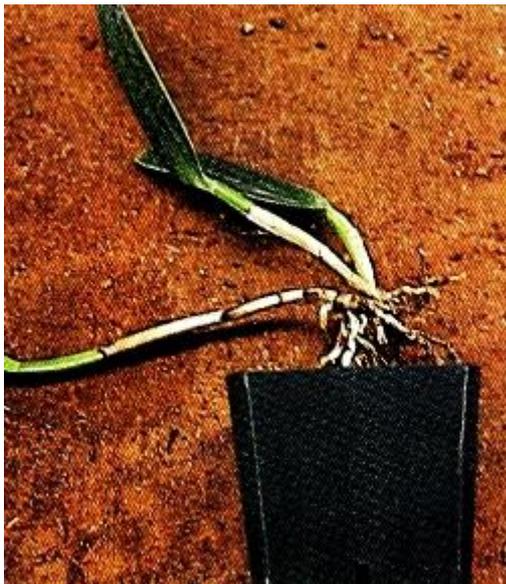


FIGURE 14. To combat this tendency to climb, an almost horizontal orientation of the seedling is necessary in repotting.

Two points should be remembered: first, it takes just a little extra time and effort to do a good job; and the extra time will be repaid many times over by the better growth of your plants. Second, in endeavoring to cover all the bases, I may have implied that the potting of these plants is quite complex. For 95% of the cattleyas you will ever grow, potting is not difficult at all. To help readers look out for potential problems, the problem areas need to be enumerated. Few people need or want help with their easily-grown plants; they want help with their problem plants.

At this point, advice given earlier should be repeated. That is, don't be afraid of your plants! They want to grow and flower. All the grower need do is to be aware of and to be responsive to their needs. This implies clear-headed, positive observation and good judgment.

The next article in this series on the culture of cattleyas will deal with problems of pest control. Armacost & Royston, 3376 Foothill Road, Box 385, Carpinteria, California 93013.

Cattleya Culture – Part 4

NED NASH

The following article first appeared as part of a five-part series in the *American Orchid Society BULLETIN* Vol 52 1983. While it is over 25 years old remains an excellent source of information for today's orchid growers. It has been edited to conform to modern taxonomic nomenclature, insecticide/pesticide and potting media availability.

CATTLEYAS in modern collections are fortunate in suffering from very few pests. Their tough, leathery foliage is not as attractive to sucking pests as a tender phalaenopsis or masdevallia, for instance. Sensible use, as needed, of today's readily available insecticides will take care of any minor infestations.

It is never a good idea to spray insecticides as a prophylactic measure for the simple reason that one is encouraging the creation of resistant strains of insect by this type of usage. An analogous situation exists with antibiotics. Most doctors will not prescribe their usage as a preventative measure, only when the substance is indicated for by a disease.

I should stress very early on that although today's insecticides are of relatively low-toxicity, great care must be exercised with their use. The storage and preparation of any insecticide should be according to the instructions on the label. Full clothing, gloves and a mask should be worn when spraying to avoid any splashing or drift. The insecticide concentrate should be poured into the water to avoid splashing of concentrate on the mixer. A good point to remember about most insecticides is that they will accumulate in the body over a period of years and will not be broken down. If they reach a critical concentration after many years, the symptoms of insecticide poisoning may appear. Always be careful and alert while using insecticides!

Things were not always so easy for Cattleya growers. Before Dr. Knudson's work on asymbiotic germination enabled us to grow large populations of hybrids from seed, jungle-collected species were grown in vast numbers. Before the turn of the century, large consignments of plants would be imported for use in cut-flower production. In many cases, the plants would be forced for several years until their jungle vigor was exhausted. When this occurred, the plants were discarded and fresh ones imported. This practice, besides constituting ecologic rape, led to the importation of many jungle insects along with the plants.

In those days, the science of pest control was not as sophisticated as it is today. Most pesticides were either basically petroleum distillates that would essentially smother the insects, or nerve poisons that were as fatal to people as they were to insects. Leo Holguin tells some very entertaining "horror stories" about life with cattleyas before OSHA, EPA, etc.

Many older growers remember the nicotine smoke bombs that were so effective against aphids and other sucking pests. One simply lit the fuse and vacated the greenhouse. Before the smoke bombs were manufactured, liquid nicotine sulphate was used to produce the fumes. The boiler would be started, thereby heating the under-bench steam pipes. Men with paintbrushes and buckets full of nicotine sulphate would be stationed at the far ends of the steam lines in the greenhouse. They would then more or less simultaneously paint the nicotine onto the hot steam pipes as they backed quickly out of the house. The rising fumes worked well on insects, but they rapidly turned the slower painters green!

Perhaps the most severe measure was the use of cyanide crystals on wet walks. Mason jars with perforated lids were filled with cyanide crystals. The concrete walkways in the greenhouse were hosed down and the men were stationed at the far end of the house. Again, the men

walked quickly backward, sprinkling the cyanide crystals on the wet walks. The use of cyanide naturally made the men nervous, and one would occasionally drop his jar. Leo has always said it was interesting to see just how fast the men could move if they wanted to!

Nicotine painting and cyanide sprinkling were extraordinary measures for extraordinary infestations. A more common practice was the use of Red Arrow, which was basically an oil preparation. All cattleyas (millions and millions of them, as Carl Sagan would say) were routinely stripped of the dead sheathing on the bulbs and scrubbed with a toothbrush dipped in Red Arrow to take care of minor scale infestations. This was generally done every year to every mature plant. Red Arrow was also used as a dip for a pest we thankfully do not have to deal with anymore. The "orchid beetle" was a tiny (1/8") weevil-like insect that would bore into both flower buds and pseudobulbs. Flats of plants would be brought out of the greenhouses and the entire flat dipped into a tank of Red Arrow solution.

Another serious pest of that era that has been eradicated on the mainland is the "Cattleya Fly". This insect inserted its eggs into the new growths of cattleyas. The grubs would feed on the developing growths until ready to hatch, whereupon they would emerge as flying adults. Control of these flies was possible only just as they emerged from the bulbs. Fortunately, this event tended to be synchronous throughout the house. By placing a sample plant in a glass box, the emergence of the tiny flies could be closely monitored and measures taken at the correct time. Much experimentation with available insecticides was necessary before truly effective methods were found. Initially, Black Leaf 40 spray in conjunction with nicotine smoke was used. Later, both DDT and Chlordane were tried with DDT found to be the most effective. It took nearly two years before the pest was eradicated from the Armacost range. Because the pest attacked the new growths only, ruining them in the process, one of the remedies (?) was to walk the aisles of the houses looking for the characteristic swelling of the new growth and simply cut off the new growth. This pest still pops up occasionally in tropical areas where plants are grown out-of-doors the year around. Ease of access to the plants makes it nearly impossible to adequately control the pest in these situations.

A third serious pest that has become relatively scarce today is boisduval scale. This rapidly spreading soft scale forms cottony masses on the underside of the leaf where it joins the bulb. Boisduval scale is a fairly ravenous scale and its depredations can be observed as yellowish blotching on the upper surface of the leaf. Thanks to Cygon, a systemic pesticide, boisduval scale is not the serious problem it was twenty-five years ago [other systemic insecticides that are effective against this scale insect are Orthene, Safari and one of the neonicotinoids like Merit]. Because boisduval scale spreads unbelievably quickly, entire blocks would become infested before it was noticed. The infestations necessitated not only a Red Arrow scrub, but a cyanide treatment as well. Today, when the rare infestation is found, a single thorough spraying with an effective systemic is usually sufficient to mop it up.

Malathion, Orthene or one of the neonicotinoids are the insecticides of choice today for most sucking insects. The tough foliage of cattleyas is not too adversely affected by the oil carrier (Malathion), and Malathion is effective against scale and mealy bugs, as well as aphids. Mealy bugs are usually a more serious problem on young seedlings and dwarf hybrids because of their softer foliage. Wettable Malathion or Orthene powder may be indicated in these cases, as they do not utilize the oil carrier. Aphids tend to attack only the flower buds, and these are easily damaged by either the oil base or the physical force of spraying. Insecticide residues are also not desirable on the flowers. We use a Carmel Fogger in these situations. A Carmel Fogger is essentially a gasoline-powered ramjet that produces a dense fog of insecticide. The stream of fog is directed up into our fanjets and the house quickly fills with the fog. This is quite effective against aphids and does not seem to affect the flowers.

An important point to remember is that one application of an insecticide will rarely take care of the problem. Most commonly used insecticides affect one stage of an insect's life-cycle. For this reason, three to four applications at seven- to ten-day intervals are recommended. We have not found systemic insecticides to be generally effective for cattleyas (except Cygon for boisduval scale). I suspect it is because cattleyas grow so slowly that the systemic is poorly or weakly distributed throughout the plants [Editor's note: Orthene and the newer neonicotinoid have proven effective in Cattleyas but were not available when this article first published].

Soil-dwelling pests are a relatively minor problem for cattleyas. Snails and slugs do not care for the tough foliage, but they do relish flower spikes and buds! Regular applications of metaldehyde granules or one of the "green" alternatives will stop this pest. Sowbugs and/or millipedes will occasionally infest potting medium. A Diazinon drench will take care of this type of problem. Sowbugs can wreak havoc on mounted orchids by eating the fresh root tips. Spraying with Diazinon or Sevin will prevent this.

Perhaps no other subject raises so much controversy as virus in cattleyas. With the recent thrust in research and the many articles being written by people of much greater expertise, I will not dwell too long on this subject here. Yes, virus is a serious problem in many *Cattleya* collections around the world. No, it cannot at this time be reliably cured. Yes, it is really easy to spread it from plant to plant. No, you cannot reliably diagnose a virused plant from foliar symptoms (although you can make a good guess). Yes, you must disinfect your cutting tools between each plant (heat is the only sure method). No, virus does not necessarily affect the vigor of a plant, although it may. Unfortunately, the more we learn about virus, the more plants we find infested with it, plants apparently "free" of the disease. This, to me, is the most disturbing aspect of the virus problem. How many "Typhoid Marys" are there throughout the orchid world?

The next article in this series on the culture of cattleyas will deal with growing conditions and flowering. — Armacost & Royston, 3376 Foothill Road, Box 385, Carpinteria, California 93013.

Cattleya Culture – Part 5

NED NASH.

The following article first appeared in the *American Orchid Society BULLETIN* Volume 52, Number 7, July 1983 as the last part of a five-part series. While now over 25 years old it still remains an excellent source of information. It has been edited to conform to modern nomenclature.

THE SUBJECT OF HOUSING for cattleyas, especially its historical development, really warrants an entire article. From the earliest "stoves" of England where the plants were smothered in sweltering heat and humidity, to today's energy-efficient greenhouses that do everything for you except enjoy the flowers, cattleya accommodations have taken many and varied forms.

The earliest American greenhouses copied the English design. Insofar as the northeastern United States is similar in climate to England, this was a satisfactory solution. These earliest houses were typically long and narrow with relatively low-pitched roofs. The side- and end-walls were of block construction to at least a height of 4 feet, often to the eaves. The roof and side-walls above the block were glass. Top vents may or may not have been used, but bottom vents were usually present. Heating was by under-bench pipes fed by a steam boiler. Shade was supplied by roller blinds suspended above the glass. These blinds were quite practical, as they could be raised and lowered quickly to take maximum advantage of the often scarce sun.

As orchid growing moved west and south, it was found that lighter and airier greenhouses could be utilized. Because the burden of snow needn't be borne in more temperate areas, structures could be built using light-weight materials. Glass was extended to the ground to maximize light factors. This was possible as heating was not as great a problem. With the lighter materials, longer, wider and taller structures were possible. While outrageously large and complex conservatory-type glasshouses have been around for years (the Palmengarten, Kew Gardens, and New York's Enid A. Haupt Conservatory are good examples), perhaps the best commercial examples of large greenhouses were built by Lord & Burnham. These majestic, steel and glass structures paralleled American industrial progress, and were fine examples of 20th-century American functional architecture.

Hobbyist greenhouses have typically followed commercial structures for their form. English greenhouses in the mid-1800's were smaller copies of the often elaborate Victorian conservatories. Many of the "hobbyist" greenhouses of the period had an almost baroque appearance from the elaborate ironwork that supported the many, relatively small panes of glass. As the orchid growing fever spread to the less-advantaged masses, newer and lighter-weight methods of construction helped to keep initial costs down. With the dramatic rise in both energy and material costs of the last 10 to 15 years, hobbyists are turning less and less to older commercial structures for examples to follow. Because smaller hobbyist growers can more easily afford to rebuild and/or experiment with greenhouse engineering than can larger commercial growers, today we see the amateur taking the lead in new and efficient greenhouse design. The AMERICAN ORCHID SOCIETY BULLETIN has been a valuable showcase for many of these projects.

What does one need to look for in a greenhouse? A description of the "ideal greenhouse" will give us an idea. This greenhouse is longer than it is wide, with the long axis running north-south. There are no large trees or buildings nearby to obstruct the sun. It is relatively high, around 12 feet at the peak, and constructed out of wood or steel with glass glazing. The glass or fiberglass should extend to ground level. Shade is provided by saran suspended above the glass or by roller blinds. Under-bench pipes supplied with hot water or steam provide the heat.

Benching is heavy-wire mesh or wood slatting and is designed to allow easy access to all corners. (If you can't reach it, you won't take care of it!) Gravel or crushed rock covers the floors, helping to conserve both humidity and heat as well as keeping shoes from getting muddy. Ventilation is best provided by a ridge vent, and by bottom vents in addition, if at all possible.



R/c. Horizon Flight 'Happy Landing', JC/AOS;
Grower: Fordyce Orchids



R/c. Horizon Flight 'Fancy Free', AM/AOS;
Grower: Armacost & Royston



R/c. Horizon Flight 'Fiery Rainbow', HCC/AOS;
Grower: Stewart Orchids

This "ideal greenhouse" is best suited for mild climates. In warmer areas, a simple shade house of saran or lath is often preferred. Glass or fiberglass may be necessary to protect the plants and flowers from the elements. In cold areas, the house can be lower and the glass need only extend to bench level. This will help to conserve heat by reducing radiating glass area. Many other measures can be taken in cold areas to reduce heat loss. These include caulking seams, double-glazing, berming, and passive heat-storage methods.

Of course, not everyone can afford the money or space for a greenhouse. With the modern trend toward smaller-growing hybrids, it is becoming increasingly easy for the windowsill and under-lights growers to enjoy cattleyas. A bright east or west exposure, or a lightly shaded south exposure work best for cattleyas. Plants grown in the home will really enjoy being summered out-of-doors if conditions permit.



C. Beaufort 'Claire', AM/AOS;
Grower: South River

The smaller Cattleya alliance hybrids available today in increasing numbers have many advantages for home orchid growers. That they occupy less space goes without saying. Their more compact growth habit allows them to more easily receive sufficient light without burning, always a problem with standard-size hybrids. Because the dwarf Laelia, Sophronitis and other species that go into these types are generally more tolerant of a wide range of conditions, their hybrids also tend to be more tolerant. Many will endure both cooler and warmer conditions than

their larger cousins. Another advantage is that the smaller types as a whole tend to be more prolific in the production of new growths. There are few sweeter things in the "Orchid World" than a 4-inch pot filled with a brightly flowered, dwarf *Cattleya* hybrid!



Ctt. Orglade's Early Harvest 'Lenette #2', AM/AOS; Grower: Lenette Greenhouse

As another of my hobbies is cooking, cookbook titles that relate to the various articles of this series have gone through my mind. For example, "I Hate to Pot Cattleyas" would have been a good title for the article on potting. This article would probably be best titled "The Joy of Cattleyas". After all, why do we grow the darn things anyway? Sure, some are a challenge to grow; and it is certainly challenging to grow any of them really well. However, I doubt that anyone would grow cattleyas for the foliage alone. It's those flowers!

Before discussing the aspects of what to look for in a cattleya flower and the plant that produces it, some hints on how best to flower cattleyas are in order. First and foremost, one needs to grow the plant to its maximum potential. Obviously, a less-than-well-grown plant cannot produce flowers that demonstrate full potential. The first four articles of this series should help you to grow better plants.



C. Amber Glow 'Magnificent', AM/AOS; Grower: Kensington Orchids

There are a few "grooming" (not a safe word to use around A.O.S. judges!) tips that can greatly enhance the display of flowers. While it must be admitted that there definitely are techniques to make a flower better than it really is, for judging purposes, these are clearly illegal, immoral and unethical. We will not discuss these techniques here. Helping a plant to display its flowers properly is not prohibited, however. We find that plants positioned so that their leads face toward the maximum light (usually south) have less trouble with new growths and/or flower buds becoming trapped under foliage. Since spikes naturally tend to orient toward the maximum light, this allows them to grow straight and tall with the buds well-spaced and separated. Unless a plant has been earmarked for specimen culture, where good light is needed all around the plant, it is a good idea to place the plant facing south or the maximum light, and to leave it. If it must be moved, mark the pot so that it may be kept in the same basic orientation when it is put back.



C. William Farrell 'Bernice', HCC/AOS; Grower: Armacost & Royston, Photographer: R. Clark

If the flower spike requires staking, do it progressively as the stem elongates. Waiting until the stem is already bent or crooked usually renders the project impossible. Once the flower stems begin to grow, do not move or rotate the pot just to watch the buds. Rotate the pot only if the buds are trapped under foliage. If a plant should be unnecessarily moved at this stage, the flower stem will tend to grow toward the new direction of the light source, giving it an unnatural twist. The plant should be left in its flowering area until the flowers are fully ripe before being moved. Only in this way will they mature fully and properly.

When misting or watering, try to keep water off buds and blooms, as it may spot or bruise them. Any sort of chemical spray or dust should be avoided for the same reason. Flower buds are very tender and great care must be exercised not to bruise or damage them. What may seem an insignificant nick on a young bud will grow many times larger as the bud expands into a mature flower. Flower stems are also quite brittle as they grow and are all too easy to snap. Many an enthusiastic grower has had to wait another year to see that promising seedling flower because he was careless in examining his "baby".



C. Peters Creek 'Superb'; Grower: Armacost & Royston, Photo: John Royston

Again, we see that proper observational habits and (un)common sense are the answers to many of the flowering "problems" that might arise. Well, how do we avoid the other type of flowering problems? The poor, weakly colored, shapeless blooms? The blooms that won't appear? The flowers that are crippled and streaked two bloomings out of three? The flowers that only appear on enormous plants not justified by the flower quality? The flowers that last only a few days before folding?

At the outset, it needs to be understood that a bad orchid requires just as much time, effort and money to grow as a good one. This has two important ramifications. First, with energy at such a premium today, you simply cannot afford to grow plants that do not perform satisfactorily. Second, your time is worth something. Why waste it growing an inferior clone when you can grow a superior one just as easily? After all, you have spent time reading this series to learn how to grow your plants better. It only makes sense to study hybrid lines and growth habits so that your purchases may be more intelligently and, hopefully, successfully planned.



C. Ruth Gee 'Goldkist', AM/AOS; Grower: Armacost & Royston

It is the responsibility of growers and hybridizers to provide plants that not only have attractive flowers, but good growth habits as well. How the plant itself grows is an often-overlooked facet of a "good orchid". There has been increasing emphasis on "dwarf hybrids, as well as those with a more compact growth habit. While this is laudable indeed, especially insofar as these

hybrids are generally quite brightly colored, there are clouds to go with the silver lining. Many of the species being utilized to "miniature" hybrids are not orchids that fit into the "easy-to-grow" category. The ruficolous laelias [now considered to be members of a greatly expanded genus *Cattleya*] can be especially intractable. Fortunately, the other parent, if properly chosen, in combination with the miniature species can help to mitigate the poor growing habit.



C. Starting Point 'Unique', AM/AOS; Grower: Armacost & Royston

When we evaluate a plant's growth habit, whether dwarf or standard, we look for several things. A relatively compact and freely branching habit is essential. Pseudobulbs and rhizome should be in proportion to the general size category of the hybrid. A 2-inch pseudobulb size is no good at all if the rhizome measures 2 inches between pseudobulbs and doesn't branch. We also look for plants that are easy to grow. If we find that a particular hybrid grex or clone is "twitchy" about when it is potted, or otherwise, we are very leery about using it/them for further breeding. Of course, a fabulous flower does tend to interfere with one's better judgment. In cases such as this, we mate the difficult grower with one we know from experience is dominant for "growability". Lastly, does the plant flower easily from every pseudobulb, or is it a hit-or-miss bloomer? Productivity is obviously an important factor, as the world's best cattleya is no good if it won't flower.



C. Starting Point 'Blaze'; Grower: Armacost & Royston, Photographer: John Royston

What else can you look for in a hybrid besides flower quality? Vigor is an important asset to a hybrid grex. Breeders of experience know that there are clones that are dominant for their vigorous growth habit. Vigor is expressed not only in how the mature plants grow, but at the seedling stage as well. Many of the smaller-growing hybrids will bloom one to two years sooner than their standard-size cousins, but there are wonderful exceptions to this. Guaritonia (Cattleytonia) Why Not 'Upstart', AM/AOS (Guarianthe (C.) aurantiaca X *Broughtonia sanguinea*) bloomed less than four years from the pollination date! About the third clone to bloom, it is still clearly the best of the hundreds we have seen. *Rhyncatlaelia* (Potinara) Coastal Joy (*Laelia anceps* X *Rhyncholaeliocattleya* (Potinara) Metal Creek) first bloomed 27 months from pollination! Approximately 20% of the seedlings of *Rhyncattleanthe* (Potinara) Lemon Buttons (*Rhyncholaeliocattleya* (Potinara) Lemon Tree X *Rhyncattleanth* (Blc.) Bouton D'Or) have bloomed within five years of the December 1977 pollination date.



C. Irene Holguin AQ/AOS: Grower: Armacost & Royston

Overall quality of a particular hybrid grex is a seldom-discussed topic. Many breeders are quick to brag about that one fabulous clone that appeared in their cross, but how many will own up to the many dogs that were produced from the same seedpod? Granted, hybrid seedlings are a gamble, and there are always those not worth the mix in which they are planted. The trick, nevertheless, is to minimize the gamble. Breeders who have worked with their plants for many years know the plants' backgrounds and breeding traits. This is why it makes sense not only to buy from experienced growers, but to acquire a basic knowledge of hybrid lines as well. Studying orchid company catalogs and the A.O.S. *Awards Quarterly* [the *Awards Quarterly* is no longer in print and has been replaced by the electronic version *AQPlus*] are two good ways to do this. Studying the awards records can be especially valuable in learning of "hot new crosses". If a particular hybrid has garnered several (or more) awards recently, seedlings of that cross are probably a good investment. That most uncommon of A.O.S. awards, the Award of Quality shows high uniform quality of a grex in two important ways. First, the award is given to 12 or more different clones of the hybrid with award- or near award-quality flowers. It also demonstrates a degree of uniformity that allows 12 or more clones to be in flower for a judging session. We have been fortunate to have been able to show several grexes of this nature recently, including *Guaritonia* Why Not, AQ/AOS, *Cattleya* (*Laeliocattleya*) Susan Holguin and *Rhyncholaeliocattleya* (Potinara) William Farrell.



C. Peggy O'Neill 'Grand Lady';
Grower: Armacost & Royston,
Photographer: Tina Lin

It is wise to remember that many of the top parents have never been exhibited, nor have some of the most interesting progeny. An excellent example of this is our recent hybrid *Cattleya* (*Sophrolaeliocattleya*) *Our Joy* (Salsa X Kevin Green). Neither of the parents have ever been shown, although *Cattleya* (*Laeliocattleya*) Kevin Green is our best splash-petal breeder. Sometimes you will just have to take the hybridizer's word that although a particular hybrid is speculative, it has potential. A similar case is where so few seedlings are produced that they are never publicly released. We obtained fewer than 75 seedlings of *Rhyncholaeliocattleya* (*Brassolaeliocattleya*) *Horizon Flight* (*Rlc. (Blc.)* Buttercup X *C. intermedia*) and have released none prior to blooming. Although only one clone has received an AM/AOS to date, none of the others have been exhibited for judging. We have kept about one-third of the twenty or so clones we have flowered for future mericlone release.



C. Canyonlands 'Monument'; Grower: Armacost
& Royston, Photographer: Leo Holguin

Generalities and exceptions aside, how do we select hybrid seedlings for purchase and growing on? A perusal of the A.O.S. Handbook on Judging and Exhibition [no longer in print version but available as a feature included in a subscription to *AQPlus*] is a good starting point, as it defines what A.O.S. judges, at least, look for in a flower. *Cattleya* flowers are basically of the round type, although this is tempered somewhat by type and breeding. Fullness of the flower

parts enhances the round form. Traditionally, large size was thought to also add to a round, full conformation. Judges have had to learn to modify this view with the exhibition of such clones as *Cattleya* (*Soprocattleya*) Beaufort 'Claire', AM/AOS (*coccinea* x *luteola*) and *Cattleya* (*Sophrolaeliocattleya*) Yellow Doll 'Mini Sun', HCC/AOS (*luteola* x *Psyche*). Both of these show excellent background for further breeding, although *C. (Sc.)* Beaufort 'Claire' is somewhat reluctant to produce seed.



C. Susan Holguin 'Bewitched', HCC/AOS;
Grower: Armacost & Royston,
Photographer: Richard Clark

Both of the above, as well as *Cattleya* (*Laeliocattleya*) Amber Glow 'Magnificent', AM/AOS (Derna x Anne Walker) and *Cattleya* (*Sophrolaeliocattleya*) Marie Barnes 'Autumn Glow' (Helen Veliz X Orange Gem), illustrate another facet of a "good cattleya"; clear, brilliant color. Pastel colors, if not muddy or weak, are equally acceptable. Type and breeding play an important role here, too. For example, pinks of the standard of *Rhyncholaeliocattleya* (*Brassolaeliocattleya*) Peggy O'Neill 'Grand Lady' (*Rlc. (Blc.)* Elizabeth Hearn X *C. Lynn Spencer*) and *Rhyncholaeliocattleya* (*Brassocattleya*) Rolling Thunder 'El Toro' (*Rlc. (Bc.)* Chesty Puller X *C. Old Whitey*) are still rare. Pink hybrids generally produce a relatively low percentage of quality clones. It is important here to stick with proven parents.

Even clones with proven breeding behind them can produce surprises. *Cattleya* (*Laeliocattleya*) Starting Point 'Unique', AM/AOS (Persepolis X Ahmad Sheikhi) is just about what you would expect from proven tetraploid parents. However, *C. Starting Point* 'Blaze' is quite another matter. After recovering from our shock and excitement, we realized that both parents of *C. Starting Point* had *Cattleya* Kittiwake 'Brilliance' as one of their parents. Other line-bred *Cattleya* Kittiwake hybrids had occasionally shown these "chip flares". "Aha!", we said, "A new avenue to shapely, non-deforming splash-petal types." Thus does observation play an important role in hybridizing.



C. Casitas Spring 'Big Boy', HCC/AOS; Grower: Armacost & Royston, Photographer: R. Clark

Improvement in already existing lines can prove more elusive. Here the breeder must carefully analyze the entire aspect of his subject. For instance, winter-flowering white cattleyas have reached what might be called a "plateau of perfection". However, a full, golden lip as in *Cattleya* Ruth Gee 'Goldkist', AM/AOS (Old Whitey X Esbetts) is certainly a welcome addition to "perfection"! The influence of *Cattleya mossiae* var. *wagneri*, a spring-flowering white species, has been felt through many generations of spring-flowering white hybrids in their poor form and weak substance. With selective breeding, we have obtained such shapely, rock-hard clones as *Cattleya* Peters Creek 'Superb' (White Chalet X Lynn Spencer) with which to breed on. Poor stem length and flower separation are perhaps the weakest points of spring-flowering, day-neutral whites. These are being gradually bred out.

Spring-flowering purples reached a pinnacle in the late sixties with the grex *Cattleya* Irene Holguin, AQ/AOS (Astral Beauty X J.A. Carbone). Indeed, lavender cattleya flowers of high quality are often called "Irenes" on the Los Angeles market: "When are we getting some more of those Irenes down here?" We feel that *Cattleya* Susan Holguin (Lc. Jose Dias Castro X C. J.A. Carbone) represents a real improvement in this type. The plants are equally free-branching, but the *Cattleya* Jose Dias Castro parent has cut pseudobulb size almost in half. The flowers of *Cattleya* Susan Holguin are slightly smaller overall, but have equally good form and much richer color. We have also flowered some more unusual types of spring-flowering lavenders. *Cattleya* Canyonlands 'Monument' (Mossy Beauty X Marti Lind) is as massive and full as any fall-flowering hybrid. *Cattleya* Casitas Spring 'Soft Touch' (Irene Finney X J.A. Carbone) with its lovely, soft, very pale pink color may pave the way to spring-blooming pinks. *Cattleya* Casitas Spring 'Big Boy', HCC/AOS, with its darker coloring but equally good form, is more typical of the cross.

In sum, cattleyas, though oft-scorned, are still the most popular of all orchids. An amazing array of colors, forms, sizes and flowering seasons adds up to a truly versatile group of plants. Outstanding cultivars are more easily and cheaply obtained than at any time in history. What will the future hold for cattleyas? You, the hobbyists, and we, the commercial growers, are even now working together to create and establish new types as popular and viable. Here's to tomorrow's exciting cattleyas! Armacost & Royston, P.O. Box 385, Carpinteria, California 93013. end.