

CATTLEYA SPECIES AND THEIR CULTURE

BASED ON AN ARTICLE BY WILLIAM P. ROGERSON

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THE INFORMATION I SHARE here about *Cattleya* species and their culture is based mostly on observations accumulated over a 20-year period as a hobbyist grower.

Cattleya species are important to our understanding of the genus and the hybrids. The species are the fundamental building blocks of hybrids, and one of the best ways to understand hybrids is to appreciate the growth habits and characteristics of their species ancestors. Species are interesting because they comprise a wide variety of distinctive and unusual flowers. All sorts of unique shapes, fragrances, textures, and colors have evolved in nature, and it is fascinating to experience them all. Most *Cattleya* species are very fragrant, with broad ranges of different and unusual fragrances across the genus. Finally, *Cattleya* species exhibit a variety of distinctive and different growth cycles. Many *Cattleya* hybrids send out one growth after another whenever there is enough sun. In contrast, most species have quite sharply defined annual growth cycles. These different growth patterns can be intriguing to learn about. Of course, such distinctive growth patterns can be a double-edged sword to the grower. While this makes them intellectually more interesting, growing them well becomes more of a challenge. You can basically water most hybrids without worrying about rest periods, and simply replot them in the spring. Most species however, need distinct rest periods and are quite particular about when they are reotted. You must understand this to grow them successfully.

Bifoliate and Unifoliate

Cattleya species are often divided into two broad subgroups based on the number of leaves on top of each pseudobulb. Unifoliate have a single leaf; those with two (or sometimes three, leaves, depending on the species) are bifoliate. It is useful to further divide unifoliate into two subgroups, which I call "large-flowered unifoliate" and "small-flowered unifoliate." Withner (1988) lists 48 *Cattleya* species; of these, 15 are large-flowered unifoliate, 22 are bifoliate, and 9 are small-flowered unifoliate. Today, due to recent taxonomic reclassifications, 42 species will be addressed in this article.

My classification of each species is shown in Table 1.

The large-flowered unifoliate group includes all of the large-flowered, mostly lavender, species that were avidly collected by Europeans in the nineteenth century, and which were used to create the traditional large-flowered unifoliate "corsage" hybrids so popular until the 1970s. Individual flowers on these species tend to be large (from five to more than nine inches across) and

plants generally bear three to five flowers per inflorescence. Each bloom tends to display the round, flat form that orchid judges view as desirable. These plants are quite robust and grow well in cultivation (notable exceptions are *C. dowiana* and *C. dowiana* var. *aurea*). Size of the vegetative parts does not vary dramatically among the various species. In general, pseudobulbs and leaves are between one and two feet tall for all these species; pseudobulbs tend to be quite full and stout.

Bifoliate generally have smaller, waxier flowers, and many more blooms per inflorescence. They exhibit a much broader range of colors, and many species have spotted petals and sepals. Flowers of bifoliate are much less likely to show the round, flat form considered ideal in judging. Plants generally have thinner pseudobulbs, and show a much larger range of plant sizes than large-flowered unifoliate. The smallest species, such as *C. forbesii*, are only around six inches tall, while the largest species, such as *C. tigrina* (*leopoldii*) and *C. guttata*, can grow five to six feet tall. Generally speaking, bifoliate tend to be a little more finicky to



Cattleya dowiana var. *aurea*

Table 1
Cattleya Species in Three Categories

Large-Flowered Unifoliate	Small-Flowered Unifoliate	Bifoliate
<i>Cattleya dowiana</i>	<i>Cattleya araguaiensis</i>	<i>Cattleya aclandiae</i>
<i>Cattleya dowiana</i> var. <i>aurea</i>	<i>Cattleya iricolor</i>	<i>Cattleya amethystoglossa</i>
<i>Cattleya gaskelliana</i>	<i>Cattleya kerii</i>	<i>Cattleya bicolor</i>
<i>Cattleya jenmanii</i>	<i>Cattleya lawrenceana</i>	<i>Cattleya elongata</i>
<i>Cattleya labiata</i>	<i>Cattleya luteola</i>	<i>Cattleya forbesii</i>
<i>Cattleya lueddemanniana</i>	<i>Cattleya maxima</i>	<i>Cattleya granulosa</i>
<i>Cattleya mendelii</i>	<i>Cattleya mooreana</i>	<i>Cattleya guttata</i>
<i>Cattleya mossiae</i>	<i>Cattleya walkeriana</i>	<i>Cattleya harrisoniana</i>
<i>Cattleya percivaliana</i>	<i>Cattleya wallisii</i>	<i>Cattleya intermedia</i>
<i>Cattleya quadricolor</i>		<i>Cattleya loddigesii</i>
<i>Cattleya rex</i>		<i>Cattleya nobilior</i>
<i>Cattleya schroederiae</i>		<i>Cattleya porphyroglossa</i>
<i>Cattleya trianae</i>		<i>Cattleya schilleriana</i>
<i>Cattleya warneri</i>		<i>Cattleya schofieldiana</i>
<i>Cattleya warszewiczii</i>		<i>Cattleya tenuis</i>
		<i>Cattleya tigrina</i> (<i>leopoldii</i>)
		<i>Cattleya velutina</i>
		<i>Cattleya violacea</i>

grow than the large-flowered unifoliate. In particular, they seem more resentful of repotting.

Small-flowered unifoliate are probably the least well-known group of cattleyas. While they share with large-flowered unifoliate the trait of having only one leaf per pseudobulb, their flowers are generally more similar to those of the bifoliate, i.e., they are often smaller, with poorer shape, and a larger number of flowers per inflorescence. While some of the members of this group are fairly large plants, comparable in size to the large-flowered unifoliate, many are virtually dwarfs. For example, *C. luteola* and *C. kerrii* are, on average, less than six inches tall. Some of the larger species, such as *C. maxima* and *C. iricolor*, are fairly robust, easy-to-grow plants with cultural requirements comparable to those of large-flowered unifoliate. Some of the smaller species, though, can be more difficult to grow successfully.

Growth Patterns and Repotting Time

An essential rule when cultivating *Cattleya* species (or most other sympodial orchids, for that matter) is to “repot only when new roots emerge.” In this article I explain what this means and why it is so important, then review the various growth patterns of cattleyas—in particular, when new root growth occurs. The bloom times or other stages of the annual growth cycle provided here are based on observations of my own plants in a greenhouse in the Chicago area. From conversations with friends living in more southern areas of the U.S., blooming times for many of the species can likely be a few weeks earlier in more southern areas.

The “repot only when new roots emerge” rule fol-

lows from two basic facts about cattleyas. First, each lead sends out a single flush of roots once—and only once—in its lifetime. Roots grow down into the medium for the next few months, until they reach maturity and stop. No new roots will emerge from the old lead, and, furthermore, very few, if any, new roots will grow from the existing roots once they have matured. Even when plants do send out new root branches from existing roots, this tends to happen at the same time as new roots emerge from the new pseudobulb. The only way for the plant to grow new roots is to send up another lead, and for new roots to emerge from this new lead. Second, the repotting process is generally very hard on roots, resulting in extensive damage even when done carefully. Since roots are tender, and tend to intertwine and cling to pieces of the potting medium and the pot, dislodging roots from the pot and from the decayed potting medium generally causes substantial damage. Since repotting so extensively damages existing roots, it is critical to repot cattleyas only when they are about to send out new roots that can replace the damaged roots.

The ideal time window for repotting is fairly brief. If you repot earlier than a few weeks before new roots emerge, the plant may suffer dehydration stress during the period between repotting and emergence of new roots. However, new root tips are extraordinarily tender, and brushing the emerging tips even very lightly against the side of a new pot is likely to crush them or break them off. It is therefore almost impossible to repot the plant without damaging new roots if they have emerged more than a quarter of an inch from the lead. About a one-week period exists from when the first emerging roots are visible until they have grown too



Cattleya iricolor

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long for repotting to occur without risk of significant damage.

You can cope with this narrow time window of repotting opportunity in two ways, and I recommend both of them. First, constantly inspect your orchids for signs of new root growth, and be ready to repot them immediately. Second, learn about each plant's growth pattern, so you can anticipate when to repot. The precise point in the growth cycle at which new roots emerge can vary dramatically among different cattleyas (as I explain below), but any particular plant tends to exhibit the same pattern over and over again. Once you know an orchid's growth cycle, it is simple either to repot it a few weeks before it will send out roots, or to be vigilant so you can repot it at the first sign of new roots. I generally keep an eye on entire groups of orchids that I know root at the same time; the emergence of new roots on any one of these plants is a signal to repot all of them.

Cattleya species exhibit two sharply distinct patterns of growth. In one growth pattern (which I call "root before bloom"), roots emerge as a new lead grows; blooming occurs only after the lead and roots are mature and basically finished growing. In the other growth pattern (which I call "root after bloom"), a new lead sends out roots only after it has fully matured and bloomed. Cattleyas that follow the "root before bloom" growth pattern often bloom in fall, winter or spring. They typically send out new leads and roots during the spring and summer months so the leads are generally fully mature by the time fall arrives. At this point the orchid enters a rest phase that lasts until the plant's internal clock tells it to bloom. After blooming, the plant perhaps enters another rest period and begins the cycle anew. Plants in this group sometimes send out successive leads during the summer growing period. The plant stores up all

Table 2 Blooming Seasons for Unifoliate <i>Cattleya</i> in the "Root Before Bloom" Group	
Repot these when they begin to send up new growths in the Spring/Summer	
Species	Blooming Season
<i>Cattleya maxima</i>	July to November
<i>Cattleya labiata</i>	October/November
<i>Cattleya mooreana</i>	November
<i>Cattleya jenmanii</i>	December/January
<i>Cattleya percivaliana</i>	December/January
<i>Cattleya quadricolor</i>	Late December/January
<i>Cattleya trianae</i>	January/February
<i>Cattleya schroederiae</i>	March/April
<i>Cattleya lawrenceana</i>	March/April
<i>Cattleya iricolor</i>	April/May
<i>Cattleya mossiae</i>	April/May
<i>Cattleya luteola</i>	April/May
<i>Cattleya mendelii</i>	April/May/June



Cattleya forbesii

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Table 3
Blooming Seasons for Bifoliate
Cattleyas in the “Root Before Bloom”
Group

Repot these when they begin to send up new growths
in Spring/Summer

Species	Blooming Season
<i>Cattleya loddigesii</i>	November to March
<i>Cattleya amethystoglossa</i>	January/February
<i>Cattleya intermedia</i>	March/April/May

of these leads and then they all bloom simultaneously during the blooming period. Table 2 and Table 3 list some of the unifoliate and bifoliate species that follow the ‘root before bloom’ growth pattern, and their period of blooming. Most large-flowered unifoliate species follow this growth pattern. Almost all of the fall/winter/spring-blooming unifoliate hybrids descend from these species and follow the same growth pattern.

Cattleyas that follow the “root after bloom” growth pattern often bloom in late spring, summer or fall. An



Cattleya aclandiae



C. intermedia f. *orlata*

Table 4
Blooming Seasons for Bifoliate
Cattleyas in the “Root After Bloom”
Group

Repot these immediately after they bloom in Spring/
Summer/Fall

Species	Blooming Season
<i>Cattleya schilleriana</i>	April/May
<i>Cattleya forbesii</i>	April/May
<i>Cattleya porphyroglossa</i>	May/early June
<i>Cattleya granulosa</i>	May/early June
<i>Cattleya harrisoniana</i>	June/July
<i>Cattleya tigrina (leopoldii)</i>	June/July
<i>Cattleya schofieldiana</i>	July/August
<i>Cattleya velutina</i>	August
<i>Cattleya bicolor</i>	August/September
<i>Cattleya elongata</i>	September
<i>Cattleya guttata</i>	September
<i>Cattleya tenuis</i>	September

orchid in this group sends up new leads in late winter, spring or summer and blooms almost immediately as the leads reach maturity. Roots emerge immediately after blooming. Many of them, particularly bifoliate, enter a long rest period after rooting. In this group of plants, if a plant sends up successive leads in the same season, each lead will bloom as it matures. Some bifoliate and unifoliate species that follow this growth pattern are listed in Tables 4 and 5. Most bifoliate species and hybrids derived from them follow the “root after bloom” pattern. While orchid growers often associate this growth pattern only with bifoliate, a number of large-flowered unifoliate exhibit this pattern. For example, *C. lueddemanniana* sends out new leads over the winter months, then blooms in March. Only after blooming do leads send out new roots. It is more typical for unifoliate in this group to send out new leads in spring, which then bloom in summer or early fall. This group includes *C. warscewiczii*, *C. dowiana*, and *C. rex*. Many summer and fall blooming unifoliate hybrids follow this pattern. For example, the very famous yellow hybrid *Rhyncholaeliocattleya* Toshie Aoki has almost exactly the same growth pattern as *C. dowiana* var. *aurea*, which figures prominently in its parentage.

Table 5
Blooming Seasons For Unifoliate
Cattleyas in the “Root After Bloom”
Group

Repot these immediately after
they bloom in Spring/Summer/Fall

Species	Blooming Season
<i>C. lueddemanniana</i>	March
<i>C. warneri</i>	May
<i>C. warscewiczii</i>	June/July
<i>C. dowiana</i>	June/July late
<i>C. rex</i>	July
<i>C. gaskelliana</i>	July
<i>C. aurea</i>	July/August/September

Orchid growers who aren't aware of the difference in these two growth patterns tend to repot all of their orchids in the spring or early summer when new leads are emerging. Of course, this is precisely the correct time to repot those in the “root before bloom” group. However, results are much less satisfactory for the “root after bloom” group; these species make their largest and most heroic growth effort of the year in a very short period of time by sending out a new lead that blooms almost immediately. The new lead sends out no new roots during this explosion of growth and instead relies completely on the existing root structure from older leads to sustain itself. Repotting these cattleyas at this time of year effectively destroys many of the plant's existing roots at just the time it is going to depend most heavily on them. Plants repotted at this time of year often become severely dehydrated and do not recover fully for years. In my view, it is no coincidence that most of the *Cattleya* species that people view as being difficult to grow belong to the “root after bloom” group. Many people routinely repot these plants at the wrong time in their annual growth cycle.

Some of the species in the “root after bloom” group



Cattleya amethystoglossa

are not completely reliable in their rooting behavior and occasionally send out new roots either while the new lead is growing or while it is blooming. These plants should be repotted when the new roots emerge, even if they emerge before the plant blooms. Therefore, one needs to be particularly vigilant with this group and check for early root growth.

I list four species in Table 6 that are “oddballs” in the sense they do not follow either of the two growth patterns discussed above. Although *C. aclandiae* and *C. violacea* are very similar in many respects to the “root after bloom” bifoliate, they are perhaps best classified as having their own growth pattern, which I call “root while blooming.” They send up new leads in spring/summer; these bloom almost immediately as they mature, without any rest. However, roots sometimes emerge from new leads while they are still growing or blooming, and only sometimes wait until after leads finish blooming. It is therefore best to repot these two species when a new lead emerges, instead of waiting for it to bloom. Another unusual feature of these two bifoliate is that after their first growth finishes blooming, *C. aclandiae* and *C. violacea* almost always send out a second new growth which blooms a month or two later.

Table 6
Blooming Seasons for Some Cattleyas with Oddball Growth Patterns

Species	Blooming Season	Repot
<i>Cattleya aclandiae</i>	First bloom peak in April/May but re-blooms over entire summer	Send out successive new growths over the summer. Each growth blooms immediately after the growth blooms. Repot as a new lead is emerging.
<i>Cattleya violacea</i>	First bloom peak in May but re-blooms over entire summer	Same as <i>Cattleya aclandiae</i>
<i>Cattleya walkeriana</i>	December to April	Generally send out leafless growths in winter or early spring from which blooms emerge. Roots may or may not emerge from these leads. The plants then send out regular leaved growths later in March/April/May after they finish blooming. Repot in March/April/May as the leaved growths begin to emerge.
<i>Cattleya nobilior</i>	March/ April	Same as <i>Cattleya walkeriana</i>

Many of my plants bloom three times during the summer period. In contrast, most of the 'root after bloom' bifoliate bloom only once per season. Only rarely do they send up a second lead that blooms later in the summer. Plants grown in more southern areas than Chicago may be more likely to send up a second growth that also blooms.

Cattleya walkeriana and *C. nobilior* have perhaps the most unusual growth pattern of all. They generally send out special leafless growths in winter and early spring that bloom immediately as the leads mature. Roots may or may not emerge from these blooming growths. Then, after the plants have bloomed, regular leaved growths begin to grow in March/April/May that generally do not bloom. Roots tend to emerge from these non-blooming growths as they grow. Therefore, the best time to repot these species is after blooming, when the new leaved growths emerge in March/April/May.

Other Aspects of Culture

My goal in this section is to highlight particular cultural practices I recommend, rather than to present a complete discussion of all aspects of orchid culture suitable for a beginner. When asked to summarize the key aspects of cattleya culture in a few simple rules, I tell people the following: (a) repot only when new roots are emerging, (b) provide a lot of sunlight, (c) let plants dry out between waterings, and (d) do not over-pot, otherwise the potting medium decays too quickly.

Light

One of the most common and serious cultural problems I observe in cattleyas grown in the United States (other than the Southeast and California) is they do not receive enough light. In Chicago, where I grow my orchids, my greenhouse is roofed with acrylic that transmits approximately 85 percent of natural sunlight. It has full southern exposure and I generally use no additional



Cattleya schroederiae



Cattleya labiata

shading even during the summer. My plants have very sturdy light green leaves and generally bloom their little hearts out. Dark green leaves, weak growths, and few or no blooms are signs of too little light. I encourage you to experiment (carefully) with giving your cattleyas more light, and observe any changes this brings about. Keep in mind high light levels in summer can be maintained only if a greenhouse has a correspondingly powerful cooling system.

Although I have grown orchids in a greenhouse for the last ten years or so, I previously grew under lights. In my experience, smaller-growing cattleyas thrive under fluorescent lights, but larger-growing species, including many large-flowered unifoliate, need high intensity discharge (HID) lights to grow to their full potential. I was able to successfully grow even the largest and most light-demanding (*Cattleya*) species under HID lights. Plants often benefit from going outside and getting a little fresh air and sunshine in summer; keeping plants outdoors under 50 percent shade cloth worked very well for me.

Watering, Potting, and Repotting

Watering and potting are integrally related. The most common reason to repot a cattleya is because the potting mix has begun to rot, becoming soggy and block-



Cattleya tigrina (leopardii)

ing air to the roots. By watering no more than necessary, a grower can delay decomposition of potting medium, pot less frequently, and produce more vigorous plants. Cattleyas are adapted to live in environments where their roots dry out between rainfalls and are exposed to air. So, most cattleyas in cultivation grow better if allowed to reach a point of dryness for a day or two before they are watered.

I suggest the grower consistently monitor the wetness/dryness of his plants to get a good sense for when plants of various sizes and types of mix approach dryness during the year. This can be done by poking a finger in pots, or gently slipping a plant out of its pot, and picking up the pots to assess how heavy they are. (Wet pots are heavier than dry pots.) Mix that appears completely dry on top may be very wet a few inches down. The need for water varies considerably through the seasons, as well as week-by-week in the same season, depending upon ambient sunlight and heat. The watering schedule must be adjusted in response to changing conditions. Be sure to run quite a bit of water through the pot in order to leach out minerals and salts that can affect the health of roots.

It is a mistake to overpot a cattleya under the premise that it will fill the pot in a few years like a geranium; instead, it will decline and possibly die. I generally pot my plants to allow for one or two years' growth at most; the roots will fairly quickly fill the pot and little or no rotting of the medium occurs. Sometimes, when a plant in a five or six inch pot is watered correctly, the medium decays very little over a year's time. In this case, the entire root ball can be removed and slipped into a larger pot without significantly disturbing roots. In my experience, the absolutely best blooms are often produced on plants whose roots have been undisturbed for three or more years.

One word of warning about my advice to disturb plants as infrequently as possible; this applies **only** if the medium has not begun to decay. Once decomposition sets in, the mix quickly becomes toxic to the plant, and this can be even more detrimental than root damage during repotting. So if you are unsure about the condition of the medium, my recommendation is to re-

pot. Carefully observe the condition of the medium in plants as you clean off the old mix, and you will develop a better ability to judge from external appearances whether the medium is decayed or not.

I grow most of my mature *Cattleya* species in plain medium bark. For seedlings and small plants in pots four inch or smaller, I make up a 'fine bark mix' consisting of 5 parts fine fir bark, 1 part perlite, and 1 part fine charcoal. For plants in 4 1/2" pots, I use a 50-50 mixture of the above "fine bark mix" and medium bark. These media tend to dry out fairly quickly and thus decay more slowly. I have begun to grow some of the most finicky species that are unusually prone to rot (e.g., *C. dowiana* and *C. dowiana* var. *aurea*) or unusually sensitive to having their roots disturbed (e.g., *C. schilleriana* and *C. granulosa*) in expanded clay pellets. These pellets dry out more rapidly than bark, and because they are inorganic, never rot.

I like to use clay pots in which I have drilled extra holes in the bottom with a power drill. Drilling extra holes is very important for two reasons: first, it allows the pot to dry out more quickly, eliminating standing water. Second, it becomes easier to run a lot of water through the pot to leach out excess salts and minerals. I like clay pots because they 'breathe' and because they are heavy, staying upright when a large plant leans over the edge. I expect plastic pots would probably also be adequate for someone who didn't want to take the time to drill extra holes in the bottom of all his or her pots. Be cautious and gentle when repotting to minimize damage. Since roots are more pliable and more resistant to being broken or torn when they are wet, it is a good idea to water a plant thoroughly before repotting it. *Cattleya* roots often cling to clay pots; breaking apart the pot on a concrete floor can help to detach the roots with less damage. While this means you cannot reuse the pot, in my opinion, clay pots should never be reused in any event to prevent spread of viruses and other diseases.

A few species, namely, *C. aelandiae*, *C. walkeriana*, and *C. nobilior*, definitely grow much better when mounted rather than potted. I mount these on cork and water them every day (less frequently in mid-winter); they grow like weeds, with no extra care required. When potted, they grow poorly and (in the case of *C. aelandiae*) sometimes die.

Over time, white mineral deposits can accumulate on leaves of mounted plants that are watered every day or frequently misted, especially in areas with high total dissolved solids (TDS) in the tap water. This white crust of insoluble salts is unsightly and likely interferes with photosynthesis. More importantly, these same salts could be accumulating on the roots, which could damage the sensitive growing tips and affect the plants' health. Although our Chicago tap water comes from Lake Michigan and is considered to be relatively low in minerals, in years past I would still notice white deposits on my mounted plants. Then I installed an RO (re-

verse osmosis) water system, and this has completely solved the problem. I continue to water mounted plants with tap water once or twice a week to guard against mineral deficiency due to ultra-pure water. As a bonus, I can now use RO water to mist plants, too

Temperature

According to most authors of orchid books, cattleyas are intermediate growers, requiring nights of 55- 60°F (13-16°C) with daytime temperatures rising 10 to 15 degrees higher. I find that in my northern climate of Chicago, however, plants do better when I maintain a nighttime temperature of 65°F (18°C) in the winter, and daytime temperature of 75°F (24°C) using a thermostat and timer. While many plants in my collection enter a resting period for at least part of the winter, they seem healthier when resting at a slightly higher temperature. In summer, the challenge is cooling instead of heating. I use two large swamp coolers all summer. I intentionally oversized the capacity of my swamp coolers relative to the size of my greenhouse so that, even on a sunny humid day mid-summer, the greenhouse is a few degrees cooler than outside. A common cultural error of many hobbyist growers in small greenhouses is lack of sufficient cooling capacity, resulting in the high spikes in daytime temperatures that can be detrimental to plants. Growers sometimes try to compensate with excess shading; this can also be unhealthy for plants. So, to grow your plants in optimal light, you must have an extremely good cooling system.

Propagation from Backbulbs

Cattleyas, like other sympodial plants, can be propagated by removing backbulb divisions when plants are repotted. Sometimes a grower may find it very difficult to induce a back bulb to make a new growth and roots, particularly with some of the more finicky bifoliate species. This is often because roots on the backbulb are destroyed during repotting. The double shock of division and losing all of its roots is simply too much for the poor backbulb, and it expires. The solution is to sever the backbulbs while they are still growing in the pot, so a new growth has emerged from the backbulb by the time the mother plant is repotted. In some cases, I sever the backbulbs a few months before I expect to repot; the backbulb has a new growth ready to send out new roots when the time comes. In other cases, I sever the backbulbs a full year or more in advance, yielding a separate, fully established plant in the back of the pot by the time I divide it. I can generally produce good divisions from even truly pitiful-looking backbulb divisions using this technique.*

About the Author

Bill Rogerson is an orchid hobbyist who lives in Chicago and specializes in growing and collecting Cattleya alliance species. He is an AOS Judge and has won over 100 AOS awards, mostly to Cattleya alliance species.

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