

Communicating With Your Cattleyas

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MOST OF US WHO GROW plants have, at some time in the process of education, taken a primer course in botany. We basically understand the birds and the bees, perhaps even the terms monopodial and sympodial, but seldom have I read a simplified translation of exactly how cattleyas grow. Being a person not easily deterred from his goal once it is set, I have taken that responsibility upon myself. Having no formal knowledge in botany, my efforts may appear oversimplified to the trained botanist. But it's time someone endeavored to state as simply as possible the complex growth process of our orchid plants.

In order to understand the *Cattleya* plant more easily, I consider it a uniquely structured pump. As light energy comes into contact with the plant's leaves, photosynthesis occurs. Without doubt the most important function on earth, photosynthesis is the original food manufacturing process that turns light energy into chemical energy that can be used by plants. In effect, it "switches on" the green-colored chlorophyll contained in tiny chloroplast granules, combining light energy, carbon dioxide from the surrounding air, and water from the potting mix to make glucose, a sugar. This sugar then can be processed by the plant in order to release the energy stored in it.

Some of this energy is sent down to feed the roots. The roots, in turn, gather water. The outer tissue, the velamen, acts similarly to blotting paper, absorbing water. It stores water temporarily and makes it available to the inner root tissues that pump the water up into the plant's "storage tanks," the pseudobulbs.

In order to obtain the ultimate in plant and flower quality, we regularly supply an adequate amount of nitrogen, phosphorus, potassium, calcium, and magnesium along with trace mineral elements to the plant through the water supply. This regular diet of necessary food not only aids in maintaining the good health of our cattleyas, but it also ensures that our "plant pump" is working well.

A fact we should be reminded about frequently is that oxygen is actually a waste product of photosynthesis. The plant takes in carbon dioxide from the air and gives off oxygen. Your orchids need your byproduct, and you need theirs.

Cattleyas are epiphytic plants. That is, they grow upon other plants or surfaces without penetrating their substrate or absorbing any fluids from the host plant. Most cattleyas found in the wild have adapted to this way of life. Often perched high up in the air seeking light, they use their unique root systems to collect moisture and store it in the thickened pseudobulbs for sustenance during times of drought. When we remove these plants from their true epiphytic environment and stuff their roots into pots, we must endeavor to provide a controlled, stable environment, with adequate water and minerals that will encourage even better growth than found in the wild.

In restricting their roots to pots, it is absolutely essential for us to remember that the roots are still aerial roots requiring a good, steady supply of air. Placing broken bits of crockery in the bottom of the pots is not the entire answer. If the potting mix above the crock becomes waterlogged and breaks down, the crock is of little help because the air has been driven from the mix above it. Growers of epiphytic orchids should post a motto above their potting bench: Overwatering is not *too much* water; it

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All Photography: Charles Marden Fitch

New roots emerging on a *Cattleya* plant one month after repotting.

is *too little* air. It is absolutely essential that there is a free flow of air around the roots so that oxygen (for respiration) and carbon dioxide (for photosynthesis) are continually available. Without sufficient air, the roots die, and anaerobic fungi and bacteria cause them and the surrounding potting mix to decay. It's a bit ironic that, although water is essential to a plant's survival, overwatering is the No. 1 killer of plants.

When the potting mix retains an overabundance of water that does not drain through the mix or is not absorbed by the roots, it fills up all the spaces in the mix and drives out the air, preventing the roots from "breathing" properly. Unfortunately, a *Cattleya* cannot let you know that it's drowning until it's too late. So you must look for signs. "Listen" with your eyes as the plant tries to speak to you through its sign language. Some of the best observations about root growth that I've come across were passed along in an article by Hugh Hunt of Dorset, England, published in the April 1975 issue of *The Orchid Review*. I include it here as an excellent guide:

1. If the green tips on the roots of your orchid plants are in active growth and are not longer than 1 centimeter, then growing conditions can be improved. Try more humidity, a little more heat, and, if necessary, more light.
2. If the new root is beginning to look like a string of sausages with its thicks and its thins, then your cultivation of the plant is intermittent and not consistent. Try to even out your cultivation technique, maintaining more moisture in the air and less in the pot.
3. If the healthy green tip of the root decides to stop growing when it touches the top of the compost, it is probable that the acidity of the compost at its surface is in excess of that which the plant can tolerate. In the old days, even the osmunda composts were regularly resurfaced with fresh moss. Modern composts can be treated in exactly the same way, and the plants will show their appreciation immediately. (A modern compost will act as a filter bed and rapidly will build up a lethal salt level in the top centimeter or so of the pot if allowed to do so.)

4. If the new growing root shows an inclination to adhere to the outside of the pot or the staging, provided it is not unduly inconvenient, encourage it. The orchid root appears to be much more efficient when adhering to a solid surface.
5. If the plants in pots show a tendency to get the majority of their roots outside into the air rather than into the compost, think in terms of a basket or a raft when next you repot them. (*Laelias*, in particular, respond to shallow compost and an airy environment into which they can spread their roots.)
6. You cannot imitate exactly the natural environment of the plant in your greenhouse, so exploit the tolerance of its roots, using your own observations and common sense.
7. At all times, "listen" to what the plant is saying through its roots.

When we grow *cattleyas* in pots, they become totally dependent upon us for providing their needs. We are hindered by the roots being out of sight, and it becomes difficult to know if the root system is functioning properly. Nothing is more frustrating to the beginning orchid grower asking the question, "How often do I water my *Cattleya*?" than to receive the answer, "As often as necessary." While this isn't a helpful answer, it is truthful. There can be no absolute measurement of the quantity of water or the frequency of application your plant will need due to the numerous variables that make up its environment. The amount and intensity of light, humidity, the type of pot used, whether the plant is newly potted or is pot-bound all affect watering frequency. Regarding the quantity of water poured around the roots at any given time, the rule is always: When you water, do so thoroughly, with copious amounts, being certain the water is flushed through the potting medium evenly, without channeling down one side.

Most hobbyists tend to intermingle different pot sizes together due to lack of space, often placing newly potted plants with non-established root systems next to plants with excellent, vigorous root systems. In addition, sometimes a few plants with deteriorated mix find their way into the group. And all are being watered more or less the same. This is a mistake.

Here are a few helpful hints for better growing:

- Place all newly potted plants together in a more shaded area for a period of two months. If potting in fir bark, the plants will require more frequent watering to moisten the new, dry bark. Remember that some roots will be damaged during potting and must have time to heal. Many will begin to branch above the damaged area. An airy, humid atmosphere within the pot encourages this.

- "Flag" specific plants that retain water longer than desired due to potting mix breakdown. Attention is called to them and they are watered accordingly. The flags also pinpoint those plants that need repotting first.

- Plants that show robust root and foliage growth require water more frequently because they use more water during their growing processes.

- Placing plants together by pot sizes enables you to water more efficiently. Some very vigorous plants may require watering every 2-3 days, providing they completely use the water applied.

The obvious environmental factors to watch carefully are well-known: light, heat, and air movement. Generally, the brighter the light, the higher the temperature surrounding the plant. Also, the higher the temperature, the more rapidly the plant grows and the more water it uses. Light and heat are great dehydrators, and their negative results can be more apparent on plants directly after repotting than at any other time. This is especially true if the plants have been divided and thus are experiencing a shock to their root systems as they endeavor to heal the root damage



A Cattleya plant in need of repotting.

and begin new growth. During this critical time, the pseudobulbs are called upon to provide plant food stored within them until the root system is re-established fully. At this time, you will notice the front bulbs (as well as the rear bulbs) shriveling as they supply that needed food. Shade the plants moderately well for 1-2 months so that the respiration process won't be overworked, causing the front bulbs to shrivel excessively. Respiration is the reverse process of photosynthesis. Respiration oxidizes and breaks down stored sugars and fats, releasing carbon dioxide, water, and energy to be used by the plants. During times of peak plant stress, it is necessary to mist the foliage in midday to prevent excessive dehydration. Do not allow moisture to remain in leaf areas at night. Terra-cotta clay pots lose moisture more rapidly

The same plant as above just after potting.



than glazed ceramic or plastic pots and will require more frequent watering.

The size of the potting container is important when thinking of the watering factor. The larger the pot, the less frequently water is required, simply because it can hold more water, not necessarily because the plant uses less water. Too many novices eager to save time on potting chores think they can cut down on watering time by putting small plants into large pots. This overpotting is a bad move. Roots on the overpotted plant are apt to rot because the plant probably does not have sufficient roots to utilize the excess water, and the roots "drown."

Certainly all good growers "listen" to their plants speak through sign language. When new growths begin to develop and roots are noticeably active, it makes good sense to increase watering and feeding. When growths are fully formed and flower sheaths have appeared, you may want to curtail watering a bit. You also might want to lower the nitrogen in your fertilizer and increase phosphate and potassium levels to strengthen roots and flowers. While the latter works well in cymbidiums, most hobby collections contain *Cattleya*-alliance hybrids, the plant growth and flowers of which are not totally seasonal. It becomes a much more difficult chore to regulate fertilizer if many of your plants vary in their growth cycle. It works in cymbidiums because most of them initiate and mature their growths at approximately the same time.

Learning when to water takes practice. Lots of it. If you use fir bark as a potting medium, the bark on the top dries out far sooner than the bark in the middle of the pot. At first you may have to move several chunks of bark on the surface in order to see the moisture content 1½-3" below. Moist bark is darker in appearance. As a rule, adult plants potted in medium-size bark should be watered just as the moisture content becomes dry.

Here's a suggestion that may help you determine when to water plants potted in bark. Sharpen a wooden pencil so the wood surface is freshly cut. Stick the point 1½-3" into the bark and rotate it twice. Remove the pencil probe and examine the freshly exposed wood surface. If it's moist, don't water. If it's dry or practically dry, water the plant thoroughly. The pencil probe should not be applied on *Cattleya* seedlings that are not yet mature enough to have pseudobulbs large enough to store moisture. These plants should be kept slightly damp at the roots. But the mix should be airy and not soaking wet all the time.

Front pseudobulbs are an indicator of a plant's general health. In seedling bulb development, you generally can expect a size increase as each bulb develops. In a 4" pot, the original seedling bulbs may measure only 3" tall, but these will increase markedly until mature flowering size is reached. If such development is not evident, it is generally a sign that all is not well in the root zone.

You also can use the front bulbs as indicators of long-term moisture content of the root zone. If the front bulb is noticeably shriveled (has ridges and valleys), it is communicating to you that the root zone is either too wet or too dry. If it's too dry, the majority of the outer covering of the roots (the velamen) will be silvery white. Additionally, if the plant has been excessively dry for some time, its leaves will have lost some of their turgidity and will have become somewhat soft, with the appearance of wrinkled leather. Should this be the case, simply increase the frequency of watering until the plant responds by filling out the pseudobulb to a full, round appearance. However, there is one exception to this suggestion. If the plant is too dry, remove some of the top layer of bark to look for signs of the telltale stringy white mold that all too often is found in fir bark. This mold begins in the soft wood that unfortunately comes along with the fir bark in the bag. If present, it gradually covers the bark particles and prevents moisture from adhering to the bark. When

the mold covers a large portion of the bark, moisture no longer can be held for the roots to absorb, and the plant suffers from lack of water. I haven't found a preventative measure for the mold yet. The best solution is to remove all bark carefully, making certain you remove all mold. Then expose the roots to light and air for a day. After that, soak the roots in physan, and repot the plant. The mold did not attack the plant, only the bark.

Returning to your conversations with your plants, should the front bulb be shriveled and the surface roots mossy green, soft, and decayed, remove the plant from its pot and you undoubtedly will discover that the majority of the roots have rotted. This usually is caused by breakdown of the potting medium, thereby allowing water to remain around the roots, constantly replacing the much-needed air. The roots have "drowned." The best solution for this situation is to divide the plant into smaller sections of 3-4 bulbs per division and pot each piece in a container that is somewhat smaller than you normally would choose. This should stimulate the dormant eye at the base of the bulb to begin to grow. The smaller pot will dry more rapidly due to the plant utilizing the moisture within. Plants kept somewhat dry at the roots tend to stimulate dormant growth "eyes" to become active. Root growth will develop as the plant "searches" for moisture. As new growths appear and roots re-establish themselves, wait until the pot is well-filled with roots, then gently remove the entire root ball intact and move the plant into a pot sufficiently large to accommodate the plant for another year.

Growing plants of any kind is a satisfying link between man and nature. Those who do it best are the ones who are observant and seek out the sign language of their plants, making every effort to supply their needs. In doing so, they are rewarded handsomely by well-grown plants and gorgeous blooms.

Have you talked to your plants today?



Forecast — the BULLETIN for November

ONE OF THE MOST practical issues of the year will be finding its way to your mailbox next month. For cattleya lovers (who is not?), Ernest Hetherington will lead us through the history of hybridization with the remarkable bifoliate *Cattleya guttata*, *C. leopoldii*, and *C. aclandiae*. "Kitten" fans will turn first to Frank Fordyce's growing tips for miniature cattleyas. Rebecca Northen, the great and grand lady of orchids, will provide construction details for a beautiful redwood screen house that makes growing orchids outdoors possible in many nearly frost-free areas. Harold Koopowitz will show us doors in *Phalaenopsis* breeding newly opened by *Phal.* Golden Buddha. Finally, those hybridizers tired of losing seedlings to infection when replating will appreciate an alternative method that is inexpensive and worry-free.