Black or Brown Leaf Tips on Orchids

by Sue Bottom, sbottom15@hotmail.com

Discoloration of orchid leaf tips can occur as a result of bacterial, fungal or cultural issues. The discoloration can be brown or black, sometimes with a leading yellow edge. Trying to decipher the causative agent can require a little detective work. Here are some reasons for leaf dip discoloration along with pictures to help you diagnose problems you may be having.

Fungal Infection - Anthracnose. In thin leaved orchids, such as many oncidiums, gongoras, stanhopeas, and dendrochilums, the symptoms of Anthracnose usually begin at the leaf apex and move toward the base of the leaf, with alternating bands of dead tissue and sporing bodies in the dead area on the leaf upper side.

Anthracnose in Soft Leaf Orchids- Characteristic bands of dead tissue with abundant spores.

Anthracnose in Cattleyas- Sometimes the damage is sharply delineated with abundant spores

Anthracnose in Cattleyas- Yellow to brown blotches extending down along leaf edges

The damage seen in thick leaved orchids like cattleyas is not so easily identified. In some cattleyas, the damage begins at the leaf tip and moves downward relatively slowly. The damaged portion of the leaf becomes necrotic and eventually papery. Younger sections have a dark demarcation line with a yellow advancing edge, with tiny dots, the spores, in the dead tissue. In other cattleyas, affected leaves have discoloration from the leaf tip advancing downward without a strong demarcation line. Leaf tips have discolored yellow to brown blotches, extending mostly along the leaf edges.

The first step in treatment is to sanitize the plant by removing infected tissue, down about an inch below the discoloration. You can protect the remaining part of the plant with a protective spray with a systemic fungicide labeled for treatment of Colletotrichum. Both Pageant and Phyton (contains copper, so don't use on dendrobiums) are highly rated in Ann Chase's 2022 Guide to Ornamental Fungicides.

Bacterial Infection - Psdeudomonas. Bacterial infections tend to be fast moving as the bacteria invade the plant leaves and dissolve cell walls rapidly spreading the disease. When the symptoms appear first on the leaves, the damage caused by water molds is difficult to distinguish from the damage caused by bacterial organisms, both can cause black, water-soaked lesions on the leaves that spread rapidly, though the ooze produced by bacterial infections can be quite offensive. These symptoms are often described as black rot, although the term black rot is reserved for the disease caused by water molds as opposed to bacteria. Black rot caused by the water molds typically starts in the roots and moves upward through the rhizome and pseudobulbs causing the leaves to yellow and drop.

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In the pictures below of bacterial infections, the leaves did not have a bad odor as is common with Pectobacterium (syn. Erwinia) infections. The suspicion is this damage is caused by Acidovorax (syn. Pseudomonas) cattleyae, although it is also possible it is some other as yet unidentified bacterial pathogen infecting the orchids. The leaves rapidly discolor from the tip to the base of the leaf.

Bacterial infection traveling up vanda leaf, remove entire leaf and try to reduce leaf wetness

Bacterial brown spot on young cattleya leaf causes loss of leaf, try to reduce leaf wetness

Bacterial brown spot on mature cattleya leaf causes localized damage, plant walls off damage

The first step in treatment is to sanitize the plant by removing infected tissue, down about an inch below the discoloration. You can protect the remaining part of the plant with a protective spray with a bactericide. Both KleenGrow and Phyton (contains copper, so don't use on dendrobiums) are highly rated in Ann Chase's 2022 Guide to Ornamental Fungicides. Hydrogen peroxide is a good home remedy that can be sprayed or poured on the leaf full strength.

Calcium Deficiency. Calcium deficiency manifests itself in black necrotic leaf tips and other expanding tissue. Calcium is an essential plant element that helps build strong cell wells. Calcium is not translocated through the plant like some other elements, so calcium must be provided in amounts commensurate to the growth rate. Calcium uptake via the roots requires a strong transpiration stream. If the root system is compromised, by bush snails, repotting, salt build up, etc., the plant may not be absorbing enough calcium to build new tissue. In their article *Leaf-tip Die-back of Cattleya – What's the Real Cause,* Poole and Sheehan postulate that unusually high temperatures in the absence of the cooling effects of frequent watering can interfere with calcium uptake.

Cattleyas can suffer from calcium deficiency after repotting.

It is always best to repot orchids when the new roots are growing.

Expanding tissue becomes necrotic from lack of calcium.

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Some cattleyas seem more prone to calcium deficiency in the hot summer greenhouse. Try keeping temperatures down with good air movement and an underbench misting system, repot as new root growth is occurring and try watering twice an hour apart, along with supplying adequate calcium, to prevent calcium deficiency.

Excess Salts. Leaf tip burn is not unusual in orchids grown in the home or under very dry conditions. It is not necessarily indicative of overfertilizing, but rather salt related damage. When the salt concentration in the soil solution reaches a certain critical point, either through being concentrated by overly dry conditions, the excess application of fertilizer or irrigating with a high soluble salt content water, salt toxicity can occur. Salt toxicity is more common in salt retentive mixes containing Pro-Mix and sphagnum moss, so regular flushing of the media is often recommended.

Leaf tip burn in habenarias, is it from overfertilizing?

Leaf tip burn in habenarias, is it from not flushing with water?

Leaf tip burn in habenarias, is it from lack of humidity?

The leaves on some of my habenarias look burnt. The plants are grown indoors under lights in clay pots filled with high quality sphagnum moss in pebble filled humidity trays. It seems to be a slow moving problem that began early in the growth process, and strangely some varieties exhibit no leaf tip damage. The first guess was the discolored leaf tips were a salt toxicity problem, from a combination of potting in sphagnum moss and using quarter strength fertilizer with every watering, so I started alternating fertilizing with a reverse osmosis water flush. The more I looked at the damage, the more it began to look like a fungal problem, even though the leaves are never wet (which would help the spores invade the leaves). Of course, those habenaria leaves are soft and tender with no waxy cuticle, so fungal invasions are easier. The jury is still out on what caused the leaf problems. I'll hedge my bets, flushing with RO water with every other watering and drenching with a systemic fungicide.

A related problem may be the low humidity in the house. We average about 45 to 50% humidity in the house when the AC is running, so the plants are grown in water filled humidity trays with carpet padding covered with pebbles. The water in the humidity trays wicks up through the clay pots to provide another source of humidity. The humidity meters read an almost perfect 60 to 70% when set at the base of the humidity trays, but when moved to the same height as the leaf canopy, the humidity readings dropped down to 50 to 60%. Apparently the humidity trays have a very localized impact; the humidity decreases rapidly with distance above the trays. The 50-60% humidity is probably at the low end of acceptable for habenarias.

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Brown or black leaf tips can occur on orchids for a variety of reasons. You will have to determine whether the damage is from a bacterial or fungal infection or some cultural misstep. You can compare the damage on your plant with some of the images provided to help guide you in your diagnosis. Think about your growing conditions and whether they are contributing to the types of problems that are known to cause discoloration on your leaf tips to see if there are some simple changes you can make to make your growing environment more hospitable.

References:

Poole, Hugh A. and T.J. Sheehan. 1973. Leaf-tip Die-back of Cattleya — What's the Real Cause? *Am. Orchid Soc. Bull.* 42(3): 227-230.