St. Augustine Orchid Society
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Air Movement

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by Dr. Courtney Hackney, hackneau@comcast.net

Orchid Growing Tips

The general mantra among orchid growers is that there is no such thing as too much air movement. Unfortunately, most hobbyists and commercial growers suffer from not enough air movement somewhere in their growing area. In “Nature”, most orchids growing on trees have continuous air movement around them. More importantly, the air is not recycled air, but is fresh air without loads of disease spores.

Good air quality and movement serves several purposes in a greenhouse or growing area. First it provides a continuous supply of carbon dioxide, from which plants make more tissues. At night plants require oxygen supplied by the same moving air. Airflow also pulls water vapor from small openings on the bottoms of leaves, which cools the leaf surface. This is especially important when the air temperature is high and the leaf is receiving direct light. The warmer the leaf’s internal temperature, the faster it can photosynthesize up to some limit. Above that limit and chlorophyll stops working. Plants compensate for heating by cooling themselves via evaporation. The degree to which they can do this depends on the habitat in which they originated.

The degree of cooling at the leaf surface depends on the relative humidity of the air and the rate at which air moves across the leaf. The higher the relative humidity, the less the cooling effect. In the dog days of summer here in the South, high humidity is normal, requiring as much air movement as possible. In the daytime, if you can keep a match burning in the greenhouse, there is not enough air movement. Orchid leaves will burn if the orchid cannot cool itself adequately. This happens under a variety of different scenarios, not all of which require high light. Besides air movement, the plant must have water delivered to each leaf. Without water to evaporate, orchid leaves may burn, even under lower temperature and light conditions. In the wild, orchids have extensive root systems, thickened leaves, and even pigments on leaves to limit internal temperature. They also have only as many leaves as the plant can maintain under the ambient water and temperatures at that location.

In cultivation, a very different situation occurs. The mass of roots changes dramatically after repotting, while the volume of leaves stays the same. Increased nitrogen levels lead to increased growth of leaves, which also require more water, especially under high light and heat conditions. Hence, the recommendation to lower light and heat levels after repotting.

Indoor growers can still burn orchids for the same reasons, but there is an additional problem. Humans prefer lower humidity than occurs outside, meaning that orchids inside have a greater ability to cool themselves via evaporation indoors. However, increase airflow on orchids grown inside and the low humidity may increase the evaporation so much at the leaf surface, that there is not enough water getting to the leaf, resulting in leaf burn. This is commonly found on Phalaenopsis grown on the windowsill.

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Greenhouse growers often have the same problem in late winter and early spring when the sun's intensity increases, but humidity is very low. Increased air movement under these conditions can increase water loss to such an extent that flowers wilt, buds drop and roots wither. Thus, air movement must be reduced, but only during the day when air is entering the greenhouse from outside. At night, high humidity in the greenhouse combined with cool nights causes water to condense on cool leaves; the perfect recipe for bacterial rots such as Pseudomonas on leaves and Botrytis on flowers. When nights are cool, air movement should be sufficient such that flowers move noticeably to prevent bacteria from establishing on wet surfaces. Windowsill growers often have the same problem because they often mist their orchids to compensate for heating or air conditioning. While this is generally a great idea, it should never result in leaves or flowers being wet at night.

Thus, the answer to questions about air movement is to adjust based on the problem you are attempting to solve and to remember that the amount of air movement needed changes with the season.

At this time of year most homeowners prepare for hurricanes. Dedicated orchid hobbyists also prepare for the associated power outages, heavy rains, and secondary damage from rots that show up on orchids days or weeks after a hurricane passes. One preventative measure is to spray plants with a general fungicide/bactericide, such as Kocide, occasionally during Hurricane Season. This prevents exotic bacteria and fungi that always accompany hurricanes from invading your orchids when the power is off and there are no fans to cool or keep spores at bay.