



St. Augustine Orchid Society

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Temperature Variations in the Growing Area

February 2003

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[Orchid Growing Tips](#)

One of the best new gadgets on the market today is the infrared laser thermometer. By pointing the laser at any surface, an instant measure of temperature can be obtained. Many orchid books discuss microclimates found in greenhouses and how growers can use these to place cool-loving orchids where the temperatures are lower and warm growing ones in their ideal location as well. Most experienced growers have a sense of where these locations can be found in their growing space. My new gadget seemed the ideal instrument to test my assumptions about temperature in the greenhouse.

With thermostats set at 65 deg. F, I expected most plants to experience that minimum temperature at night. Imagine my surprise to find that plants were always cooler than the air temperature at night. Leaves were as cool as 59 deg. F at night when the air temperature was 64 F. Had I discovered this before the onset of cold weather, the thermostat setting would have been increased.

Within the greenhouse, there was a surprising variation of temperature. In early evening on a below freezing night, the inside of the polycarbonate glazing was 53 F and individual spots inside were as low as 59 F when air temperature was 65 F. Cool spots were not in the corners where I expected or even farthest from heaters. Instead, they were located where air movement was least. These areas were places where rots had turned up each year during winter. Clearly, the problem for plants in these still spots was more related to temperature than air movement as there were seldom problems with rots in summer at these same locations.

Minimum temperatures occurred in the greenhouse just before dawn. Exterior glazing was 46 F and plants were 53-61 F, despite the air temperature of 64 F. Cool-loving paphs were moved to these cool spots as they are supposed to require lower temperatures to bloom well. Whether these paphs respond to such an approach will be the subject of a later "Tips" column.

The following bright day produced 118 F on the glazing that lasted until mid afternoon. Air temperature in the greenhouse was 92 F most of the day. Plants warmed slowly with leaves of one vanda near the glazing reaching 96 F. Pots also slowly warmed and by late afternoon every surface, plants, pots, benches, etc, were at least 79 F. The range each plant experienced depended on the degree and duration of direct sunlight each received. Given the low angle of the sun this time of year, there were many locations where orchids experienced a much lower range of temperature over 24 hours than in locations that received direct sunlight.

Phalaenopsis seedlings in one part of the greenhouse had produced spikes early, while others that were larger had not. Most Phalaenopsis require a daily temperature change of 20-25 degrees to stimulate spiking and the ones getting an hour or two of direct light on their leaves experienced the appropriate range. Surprisingly, it was the leaf temperature not the pot temperature that seems to be most important as pots always experienced less of a temperature range than the leaves. How much different depended on the type of pot.



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Clay pots were always cooler than plastic pots when I measured their temperature. The difference was even more dramatic during the day because of the evaporation that occurs along the clay surface. Plastic pots do not allow water to seep out and so do not experience evaporative cooling effects. Black plastic pots were a couple of degrees warmer than green ones if they received direct sunlight. Clay pots were often among the coolest surfaces in the greenhouse at night, especially where fans moved lots of air by them. For years these locations housed bifoliate cattleyas, such as *C leopoldii* and *C granulosa*, where they have always thrived because they dry quickly. They would have never been placed there if I had known that night temperatures were so low because these are considered warm loving species.

Light is the other variable that is in short supply this time of year. The low angle of the sun and short days limits how much light strikes an orchid in the greenhouse. Most orchids in my greenhouse likely get less than a couple of hours of optimum sunlight this time of year. Indoor growers have a great advantage, as it is possible to provide optimum light levels all day long. Most orchids have a maximum light threshold above which they actually photosynthesize less. For *Phalaenopsis*, that level is around 1000 foot candles. Excellent growth can be obtained by providing 8 hours of light at this intensity. However, the same growth can be obtained by providing the same amount of light over a longer time period, e.g. 14 hours at 600 foot candles. The most asked question via email this time of the year is, Why is my orchid (mostly *Phalaenopsis*), not flowering? In some cases light levels were inadequate, but often the problem was that the plants were not experiencing the temperature variations each day needed to bloom.