A Varying Lighting Scheme and Its Effects on Some Easily Grown CPs

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One of the more popular ways of raising CP's inexpensively is under fluorescent lights in small terraria. A 20 gallon terrarium, equipped with two double-bulbed fixtures can immediately create conditions suitable to a wide variety of plants. The largest difficulty with this arrangement is achieving adequately intense light levels while maintaining low temperatures.

The last few years I have been experimenting with variations on this scheme, and have a few valuable tips and preliminary results for the space conscious grower. It should be noted that since different growers will do things differently, what may work for one won't necessarily work for another. Although this is certainly a function of the grower's experience and technique, some of this inconsistency may arise from the materials used—variations of the heat output even from one fluorescent fixture to another can be substantial. However, here are a few guidelines and experiences.

First, the light sources must of course be fluorescent, as incandescent lights produce far too much infrared (heat) radiation. Another grower (De Franco, 1987) has recently reported success using various arc-lamps, and I am following his lead with varying degrees of success. The ballasts for all the light sources should be remoted by the proper gauge wire to decrease heat conduction to the terrarium. In order to minimize light losses, a reflecting material should be used on all terrarium surfaces except the viewing side(s). The best material I've found for this is aluminum coated mylar because it has a very high reflectivity. You can buy it at hobby shops, and it is also available seasonally as wrapping paper for a customized look. If you intend to use this, make sure that it is mylar and not just wrapping foil. Keep the side without any patterns as the reflective surface. Some cheaper forms of mylar have a aluminized layer that is not thick enough, and allow some light losses. You can look for this by seeing if you can see a bright light source through the film. The thicker material is better.

Aluminum foil is an adequate alternative. Aluminum of course does not tarnish. Somewhat more difficult to find are silvered surfaces. Unless the silver is coated with a protective film, it tarnishes, reducing its reflectivity, which is normally comparable if not slightly better than aluminum. Its chief advantage is that silver is a good absorber in the infrared, and so allows some unwanted radiation to escape through the terrarium walls. However, silver's disadvantages in practice outweigh this bonus.

Even using fluorescent lights with remoted ballasts, the heat produced by the bulbs via thermal losses and infrared radiation is considerable. I have found that during a sixteen hour photoperiod, the temperature inside the terrarium can easily exceed 38° C (100° F). While many plants, especially the rosetted sundews, don't mind this (probably from being close to the cooler moist ground), the taller plants such as *D. filiformis* and *binata* varieties get burnt, as do the scapes of *D. capensis*. This may be reduced by increasing the relative humidity by completely sealing the terrarium, but I haven't tried this yet for fear of promoting fungal growth.

An alternative method for decreasing the maximum temperature is by altering the photoperiod. Using a simple programmable 24-hour timer, I have been experimenting with simulating a sixteen hour photoperiod with an alternation of two hours of light, followed by one hour of darkness—repeated continuously. This resulted in the temperature of the terrarium ranging from the ambient 22° C (72° F) to a high of only 30° C (86° F). Here it must be emphasized that while other growers attempting to duplicate this will probably encounter different temperature ranges, the overall temperature decrease should be significant. During the winter months the number of light to dark hours are changed to simulate the changed number of daylight hours.

The alternating light/darkness cycle has been in effect now for more than six months, and the results on the plants are now visible. The strange photoperiod is not without effect on the plants. There is of course less burning, and the taller plants nearly grow right up against the bulbs. However, some of the plants are behaving oddly. The rosetted sundews, such as *D. capillaris* and *spathulata,* typically send out flowering scapes much sooner in the plant's development. Many of the plants are only 1.5-2 cm in diameter when they form scapes, half the size they were before the alternating light cycle was adopted. While the plant's flowers used to regularly open and close the same times every day, now they open and close at any point during the day, indicating that they do not have a memory as to when "day" occurs. Although there are many scapes and flowers, the seed production has decreased dramatically in these two species. The viability of the seeds that have been produced has not been tested.

The only other two species of plants showing possible adverse effects to the altered photoperiod are *D. intermedia* and *U. subulata.* The *intermedia* plants grow very nicely to a large size, but the flowers refuse to open, although they do produce limited seed. Since the implementation of the new light cycle, the *subulata* has stopped flowering, except for cleistogamous flowers.

In the coming months it will be interesting to see if the northern plants will respond to a simulated winter. In the past I have successfully induced hibernation in the plants by slowly decreasing the photoperiod. The plants may form hibernacula, or they may try to grow continuously. If the latter, they will probably exhaust and die, in which case the plants can always be propagated by seed or leaf cuttings from the few remaining leaves.

In summary, the species of plants that I have tested can be grouped into two classes. Class I contains the four species mentioned above, which are those that show some (possibly negative) side effects to the staggered light period. Class II contains plants apparently oblivious to the change, and includes the following: all *Sarracenia, D. filiformis* (all forms), *D. binata* (all except *multifida,* which I haven't tested), *D. rotundifolia, D. capensis, D. pulchella, D.* 'Lake Badgebup White Flower', *U. longifolia, Dionaea muscipula* and *Cephalotus.* The *Pinguicula* in this group are *caerulea, lutea, primuliflora, planifolia, ehlersae,* and *moranensis.* I have also propagated all of the Class I, II plants by leaf cuttings partially buried in sphagnum (which also grows well) except for *P. planifolia* and the two pygmies which I'm working on presently. I don't specifically try to propagate the *Utricularia,* but rather am forced to weed it because it is so prolific and weedy. *D. adelae* is also probably a Class II plant, as it shows no dramatic changes. However, since the change they have been developing more long, ropy roots that tend to resurface and form new plants. This is behavior that I've seen before, and the apparent increase in this activity may merely be an indication of the improved environment.

Since nearly all of the plants tested can be propagated by some means or another, I would suggest that growers having high temperature problems in their terraria experiment with some of these optimization techniques, or ones of their own. The results can be very rewarding, and are usually interesting. I would like to hear from other growers and of their results.

References

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