Taking Close-up Pictures of Your Plants: Part II

By Barry Meyers-Rice (Steward Observatory, University of Arizona, Tucson, AZ 85721, DUNWICH@solpl.as.arizona.edu)

In part I of this article, I discussed the ins and outs of extension tubes, magnification, the values of bracketting, and how to take pictures of plants from straight overhead and from the side. In this article I will finish your introduction to close-up photography with some words on the all important "depth of field," as well as on telephoto lenses, reversing rings, and picture composition.

The f/ratio at which you take your pictures is very important. If you use an f/ratio like f/1.4 or f/2.0 you are letting a great deal of light into your camera, and so your exposures will be shorter—minimizing the chances of the subject moving during the exposure and blurring the picture. However, it is much better to make sure that both camera and subject are stationary, and wait for a windless moment to shoot at an f/ratio like f/16. The reason for this is that you get a much greater "depth of field" with these f/ratios. Depth of field measures how far in front of or behind the main subject an object will still be in acceptably good focus. Getting an adequate depth of field is arguably the most important thing to consider when you are framing your shots. In everyday life, your eyes are constantly refocusing as you look at things at different distances, so you tend to take depth of field for granted. In each photo you have to choose only one and so you should pick the best you can. You set the depth of field by focusing and by setting the f/ratio to as large as you can. For example, with a 50 mm lens and 50 mm of extension, my depth of field at f/1.4 is 0.6 cm (1/4 inches), at f/8 it is 1.4 cm (0.6 inches), and at f/22 it is 2.5 cm (1 inch). In practice, you should avoid the highest f/ratio of your camera because the image is slightly degraded because of diffraction effects. My 50 mm lens can shoot at f/22, but I usually shoot at f/16. With some cameras or tubes, when you set the f/ratio to a high value like f/16, what you see through the camera viewfinder becomes faint. If so, you'll probably find it easier to focus at an f/ratio like f/2.0 and then return to the f/ratio for your picture. The photograph of the D. *rotundifolia* that was discussed in part I of this article would have been better if I had used a larger f/ratio—the second hibernaculum would have been in better focus. When I took care to keep the soil surface square with the camera lens I was ensuring that the entire image would at least be at the same focus. In other words, the soil surface was at the "plane of focus."

Using this information about f/ratios, let's try a shot that requires a large depth of field. I wanted to take a series of pictures of CPs, evoking how they might look from an insect's perspective. My first try was with a S. *psittacina* pitcher. With 50 mm of extension, I found that I had to snip the pitcher off the plant and anchor it in a pot so I could get at it from the angle that I wanted. Even then it took me a while to get the lighting right so the pitcher was well illuminated and didn't have any deep shadows in bad places. As a trick during the exposure, I held a peanut-sized piece of white styrofoam on a toothpick behind the pitcher. This ensured that the fenestrations on the backside of the globose hood would light up. Since this was a difficult shot I bracketted at several exposure and f/ratio combinations, refocusing at each shot. The best (Figure 1) was at f/16 and has a pretty good depth of field. The foreground just starts to lose its focus but it is not too objectionable. The backside of the hood (seen through the opening) is also slightly out of focus, but in this case is helpful as it establishes that as a background surface farther in the distance.

The *Sarracenia* picture illustrated that a small depth of field can actually be used to your advantage. Having some picture elements appear slightly out of focus can create an illusion of depth in your photos. Figure 2 is a photo of *B. Iiniflora* that has

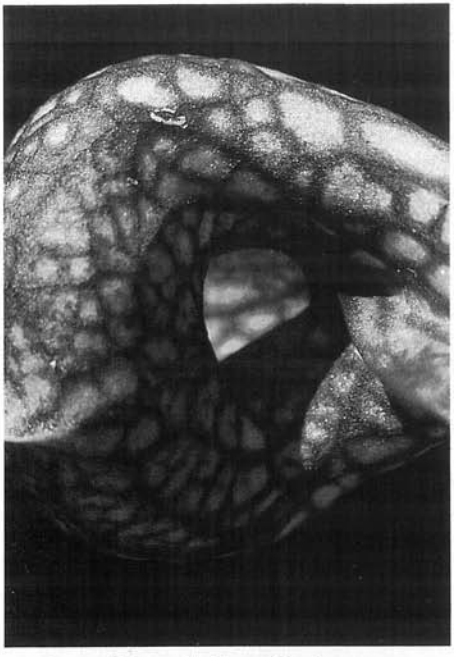

Figure 1. S. *psittacina*

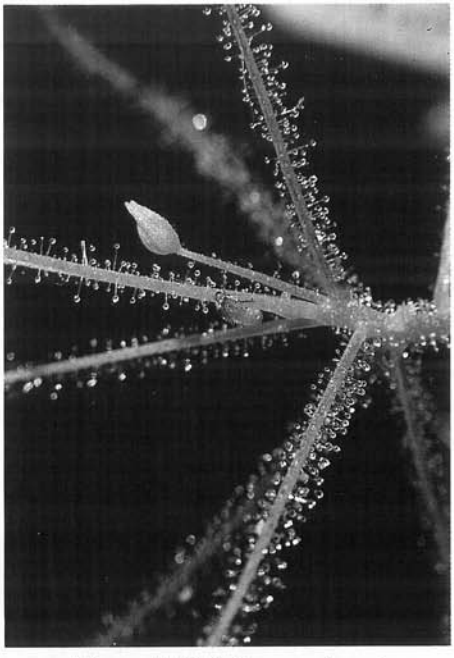

Figure 2. *B. liniflora* and gnat

a degree of 3-dimensionality because of the depth of field. It was taken with 50 mm extension at f/11. In the foreground and background the leaves defocus, while on the stem a gnat is in good focus. In this example having the foreground noticeably out of focus worked, but it is usually better to have only background objects out of focus. The main flaw in this picture is that I included a bit of a white name tag (which wasn't visible in the viewfinder). A small depth of field can also be used to your advantage when you are composing your shot. Intentionally having some objects extremely out of focus smears them out beyond recognition or even to the point that they disappear entirely. For example, in his recent CPN article (18:3, p79), Don Schnell's photos of *Sarracenia* work against a busy background because the irrelevant background is very blurred. If the background was in focus, the plant of interest would be lost in the confusion. This is a technique that comes with practice, and should be used by field photographers more than it is. In overhead shots of *Drosera,* a vertical scape that you might not want in your picture can be blurred to invisibility by using a small f/ratio.

Until now, I've restricted this discussion to short-focus lenses (such as 50 mm). If you have a telephoto lens you should certainly use that in your close-up work too. Since telephoto lenses have much longer focal lengths than short-focus lenses, a given length of extension results in less magnification. Then why use them? The chief advantage is that with telephoto lenses the distance from the camera to the plant is usually a few to several feet (instead of inches!) and the depth of field is proportionally bigger, too. If a particular close-up shot calls for a depth of field of a few inches or more, a telephoto lens is the way to go. The low magnification is usually not a disadvantage because if your subject (perhaps a thick clump of *U. sandersonii* flowers) is three inches in depth, it is probably comparably large in breadth as well, and you would need a low power to fit them all in the picture anyway! Telephotos are particularly well suited for taking portraits of *Sarracenia* and *Nepenthes* pitchers and flowers.

Figure 3 is a picture that I took of a *P. primuliflora* specimen the day before its blossom opened. I was interested in the way that the developing flower and the plant

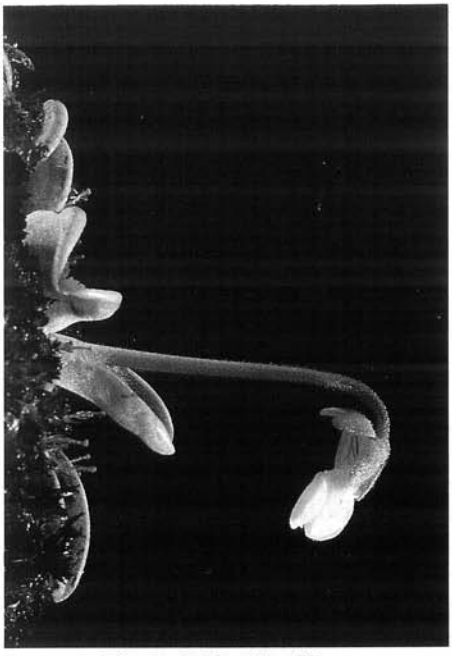

Figure 3. P. *primuliflora*

appeared as a whole, and I decided to photograph it in profile. From this perspective the plant evoked for me the image of a swan, viking ship, or mythical sea monster navigating a body of water. Since I needed a depth of field of at least two inches, I used my 135 mm telephoto at f/22 with 60 mm of extension. The background was black cloth. Since the depth of field was great, flecks of lint or dirt on this cloth were likely to be visible, so I took care that it was clean. The camera indicated an exposure between 1/2 and 1 second and I took several pictures at slightly different exposures—the best was at 1/2 second. I was particularly careful about the exposure time on this picture because the blossom was almost pure white (with just the faintest hint of blue) and if the picture was overexposed the blossom would look burnt out, and if underexposed it would look dull grey. The colour of pure white subjects like this blossom can be shifted by their surroundings. When I was taking this picture, I was perplexed by an mysterious red sheen that I kept seeing on the petals, until I realized that it was catching glare from the red shirt I was wearing. I put on a white shirt. The delicate colours of translucent subjects such as this can be the most challenging to capture faithfully.

To round out your introduction to close-up photography, here are a few more tips to help you produce top notch photographs. Camera lenses are designed to work their best when the distance from lens to subject is larger than the distance from lens to film, but when you're taking high power shots (1 x or more) with tubes, you violate this design assumption. So it is wise to use a "reversing ring," which is an adapter that lets you mount your camera lens onto your camera backwards. The advantage with this is that you can do macrophotography with the subject at a distance of several inches from the camera. Not only does your lens produce better images, but you will also have a greater depth of field, and fewer cases of sundew goo on your lens. You can also use a reversing ring with tubes to produce extremely high power images, but you will have to use strong artificial lighting to avoid very long exposure times (incidentally, "bellows" are just expensive, adjustable tubes combined with a reversing ring).

A word on photographic style—be inventive. A cleverly framed shot can be dramatic or even humorous as well as illustrative and informative. While a *D. binata* plant might photograph well in profile, angling the camera so that it points upward slightly can transform the plant into something almost tree-like in appearance. Avoid framing a subject in the exact center of the picture. This produces a static, lifeless product—the origin of the term "dead center." If your intended picture would include a lot of plastic edges of a pot in the frame, submerge and hide the pot in a larger container filled with a similar planting medium to produce a more attractive photo.

Try the methods I've discussed and tricks of your own devising to take all sorts of excellent photos of your own small CPs. Experiment with your camera—since the resolving power of your camera is greater than that of the human eye, you're guaranteed to see things you couldn't see before. If you are interested in learning more

about close-up photography, a fine book to read is Basic Guide to Close-up PhotographY (HP Books). There is also a good article on inexpensive lighting tricks, even for use in the field, called Low-Tech Macro Lighting in the April 1990 issue of PHOTOgraphic Magazine (a U.S. based magazine that may be archived at your local library). I am also willing to discuss further macrophotography hints and troubleshooting with other growers—my address is in the 1989 ICPS directory.

More On The Evolution Of Drosera

By John D. Degreef (6 rue Libotte; B-4020 LIEGE; BELGIUM)

Professor S.E. Williams has kindly drawn my attention to a pollen study by TAKAHASHI & SOHMA (1982), which contains valuable information on the evolution of the genus *Drosera* . Results can be summarized as follows:

1. The primitive sections **Psychophila** (*D. uniflora, D. arcturi, D. stenopetala*) and *Drosera* are closely related.
2. Some sections still clearly show that they derive from these:
   -the African section **Ptycnostigma** (*D. cistiflora* e.a.)
   -the sundews from the mildest regions of Australia: *d. hamiltonii,* section **Arachnopus** (*D. indica, D. adelae...*), and to a certain extent, *D. banksii*. The link between section **Drosera** and *D. hamiltonii* is rather surprising condidering the floral differences. Yet the presence of the naphtoquinone plumbagin in this now appears less strange. The fact that a primitive member of the subgenus Ergaleium, *D. banksii* has pollen resembling that of section **Drosera,** is extremely important information. It confirms that the modern tropical or subtropical tuberous sundews can indeed be descendants of Antarctic immigrants.
3. There are definite links between the advanced Australian *Drosera*:
   -the close relation between the tuber-producing sections **Erythrorrhiza** and **Ergaleium** is confirmed.
   -these two are relatives of section **Phycopsis** (*D. binata*), section **Lamprolepis** (pygmies), *D. pygmaea*, and quite surprisingly, *D. petiolaris*. Until now the latter was considered as a very close reeelative of section **Drosera**, not as intermediate between this group and subgenus Ergaleium!
4. There were faint indications that *D. glanduligera* was related to the tuberous sundews. This study shows an affinity with section **Thelocalyx** (*D. burmanni*) instead! This section does not appear to be close to section **Drosera**. *D. glanduligera* is much more different from the South American member of this group, *D sessilifolia*, than *D. burmanni*. So we have to allow for a much longer evolution, and the migration of these plants to Australia need not be as recent as hypothesized earlier.
5. *D. regia* appears not to be related to any known section. Its pollen somewhat resembles that of... *Dionaea*! This is very important information, for we may have found the last palynological link between the modern *Drosera* and the archaic Fischeripollis, from which the sundews (and the Venus' Flytrap) may descend! The rather primitive flower of *D. regia* does not oppose this interpretation.
6. There are may abnormal pollen grains in some plants of *D. binata*. This confirms the heteroploid nature of this species.

Source:

TAKAHISHI, Hideki & SOHMA, Kankichi. (1982). Pollen morphology of the **Droseraceae** and its related taxa. Sci. Rep. Tohoku Univ., 4th ser., Biology Vol. 38:81-156.