

Taking Close-up Pictures of Your Plants: Part I

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There have probably been many times that something exciting happened in your CP collection that you would have liked to record; perhaps a *Drosera* in full growth, a delicately coloured *Utricularia* flower, or a richly painted *Dionaea* trap. A good close-up picture of your plant would have been an ideal way to capture the event, but you might not have known how to take one.

Common misconceptions are that conventional camera lenses cannot achieve the magnification necessary to capture fine details on our often small CP subjects, that to take close-up pictures of plants requires expensive equipment, and that the photographer has to become versed in complex and arcane technical terminology. Fortunately all of these ideas are wrong. If you are daunted because this article looks long, it is because it treats the subject in detail, and not because the topic is difficult. If you have access to an SLR camera and a tripod, you are probably much closer to taking close-up pictures than you think. The additional equipment needed to convert your camera to this purpose is relatively inexpensive. You can also take close-up pictures in 3-D, using the method described by Tilbrooke (CPN 17:4, plIO), except that the distance you should move your camera between pictures should be very small.

To get started, there are four common ways to take high magnification pictures. They are all ways of enabling the camera to focus on much closer subjects than the camera could before, so the size of the image on the film will be larger. The first methods are by using special "macro" lenses that are designed to take high magnification pictures, or even to use "bellows." These options are expensive, and so let's disregard them. The second method is to attach inexpensive "close-up" glass lenses to the front of a normal camera lens. These magnify the image, but they also degrade it so that the result is not always very good. Fine camera lenses are designed very carefully with many glass elements to correct for optical distortions. Close-up lenses are not as complex, and the result is an inferior image. Because of this, these lenses should be used only for low magnifications. The third way is through something called a "reversing ring" which is useful especially if you are planning on taking pictures with magnifications greater than about 1x. A reversing ring is also the cheapest way to do close-up photography. However, if used by itself it only gives you one magnification to play with. I will discuss reversing rings briefly, but I will concentrate on the fourth method, the use of "extension tubes."

Extension tubes (I will just call them tubes) are very versatile. They can be used with any of your camera lenses. They come in different lengths, and can even be used together to make new extension lengths, to give you a wide variety of magnifications from which to choose. A tube is just a metal ring that mounts as a spacer between your camera lens and camera body. The bigger the spacing (or extension), the greater the magnification.

Since it has no glass lenses, it does not degrade the image. The cost for tubes depends upon what kind of camera you have, and the details of the frills you decide to get with them, but they are not too expensive. For example, a new set of three different tubes for a Pentax camera may cost about \$70 (USA). The best thing to do is to buy them second hand since there are no lenses that might be scratched, and a used set costs a fraction of what a new set does. There is a lot of used camera equipment available—check the yellow pages or a camera club to find it.

A typical set of tubes includes tubes of three different sizes. The sizes of my tubes are about 10, 20, and 30 mm. This size is the distance that the lens is held in front of

its normal mounting position. In addition to your tubes and camera body, you need a camera lens. In this article I'll discuss using a standard 50 mm lens. We will use sunlight as the light source because it is bright and cheap. You'll also need film. For the best images, a slide film like Kodachrome 64 is excellent. If you use a "faster" film, like Kodachrome 200, the pictures will look grainier. I use slide film instead of print film because it is cheaper to buy and develop a roll of slide film than it is with colour print film. The last important item you'll need is patience. Remember at the start that you will make mistakes, but you will also be rewarded with successes.

As soon as you get your tubes, just play with them for a while to become familiar with them. When you put a 10 mm tube on a 50 mm lens on your camera, one of the first things that you'll notice is that focusing your camera is different. When you're using tubes, you focus the camera by moving the camera nearer or farther from the subject—at most the camera lens focusing ring is a fine adjustment. You'll also notice that the distance from the camera to the subject is much smaller now that you're using a tube. With a 10 mm tube, my 50 mm lens gives me a very nice view of a large *S. flava* flower, at a focusing distance of about 7.5 inches. With a 30 mm tube, the subject distance is smaller (about 3.5 inches), and a flower of *S. rubra* nicely fills the viewfinder. Using 60 mm of extension (all three tubes at once), I have difficulty fitting all of a *D. capensis* flower (at a focusing distance of less than 2 inches) in the viewfinder! To estimate the magnification of your lens/tube combination, divide the extension length by the focal length of the lens you are using. That estimate is exact if you set the focusing ring on your lens to infinity while focusing. For example, if I use a 30 mm tube with a 50 mm lens, I'll have a magnification of $30/50 = 3/5x$. In other words, a leaf 10 mm long would produce an image on the slide that is 6 mm long ($3/5 \times 10 \text{ mm} = 6 \text{ mm}$). Make a print of that slide, or project it on the wall, and the result is something much bigger than life. Strictly speaking, if you are taking pictures with a magnification greater than 1, then you are doing *macrophotography*. It is easy to get magnification crazy, but there's not much point to it. Once a *Sarracenia* petal completely fills the field of view, you don't get anything new by continuing to magnify it. Past that limit is called "empty magnification."

After all that introductory information, the best way to get some experience with closeup photography is to take some pictures of your first subject. As an easy first candidate I chose a cluster of *D. rotundifolia* hibernacula (Figure 1). The plant was completely flat against the soil in its pot, so I opted for an overhead shot instead of a profile. Experimenting with my tubes, I decided that using the 20 and 30 mm tubes together (50 mm of extension) was nice—it framed the dormant plant well, included some background *Sphagnum* and previous season's leaves, and generally pleased me. Then I had to do a bit of clean-up, pushing back obtrusive *Sphagnum*, weeds, or whatever else that I thought would detract from the final picture. After these preliminaries, I positioned the pot and camera so that the subject was in good focus and was framed well in the viewfinder. I kept in mind the following factors:

- 1) The subject must have the sun shining on it as directly or brightly as possible. Shadows from parts of the subject, camera, or you, should be avoided.
- 2) The camera and the subject both must be very steady. Do not try to hand-hold your camera. A tripod and a shutter release cable help keep vibrations to a minimum. Most consider these two items essential.
- 3) The finished picture from a camera usually includes a slightly bigger field of view than is visible in your viewfinder. Is something annoying (like a name tag) just out of the field of view? It might appear in the final picture.

In this example, I satisfied these considerations by laying the pot on its side and keeping the camera (held in a tripod) level. The hibernacula were strongly illuminated, and the camera's shadow fell off to the right. Focusing is the next step and it can be

tricky. When you're ready to take an exposure, look through the viewfinder critically and think about the focus. Perhaps your subject is in focus, but what about the rest of the soil surface? If the pot is facing the camera at a crooked angle, large areas of the view will be slightly farther from (or closer to) you, and will appear out of focus. Straighten that pot out—it will pay off in the end. Set the "f/ratio" of your camera to around $f/5.6$ (I'll discuss f/ratios in detail in Part II). On the sunny day I did this, my camera's light meter told me that I needed a 1/30 second exposure. A final check on focus, shadows, and composition (all OK), and I took a picture. Not being overly confident, I set my camera to manual mode and also took pictures at 1/15 and 1/60 second exposures. This is called "bracketting," and is a wise precaution if you are unsure if you want to believe your camera's light meter. Since slides do not duplicate well, if you want extra copies you should take them now. Look at the final picture (Figure 1) critically to see what could have been improved. The composition is OK, but not astonishing. The smaller hibernaculum is covered by a dying leaf—if I had moved the leaf aside the picture would have more to offer. There are no interesting subjects cut in half by the edge of the slide, which is good. The sharpness of focus on the large hibernaculum is very good (on the original slide), but the smaller hibernaculum is somewhat out of focus. Later I'll talk about how this could have been avoided. It is important that you record the camera lens, extension, exposure time and f/ratio combination that you use, especially when you're starting out so that you can later figure out what went wrong/right.

A large number of steps to take this picture? Not really. Take a few pictures and it becomes second nature. You can use these steps to photograph the whole range of ground hugging *Drosera*, *Pinguicula*, and other CPs in your collection.

Now we'll try a different kind of subject. A friend sent me a clump of *U. graminifolia*. When it first flowered I pulled out my camera. A tall, erect inflorescence is best captured by a profile shot instead of from straight overhead. Since the flower was only about 15 mm long, I decided on using 60 mm of extension to magnify the flower greatly. I positioned the flower and scape so that they were both in sharp focus. If the background in side shots is very busy and complex, the plant will be camouflaged and the impact and value of the photograph will be much reduced. This is a chief difficulty with field shots of plants. You can remedy this problem by hanging a uniformly coloured fabric a few feet behind the subject. I used a piece of black velour (which doubles as a robe when I'm not taking pictures) in the background. I like black, because it offers a great deal of contrast and makes the plant appear to pop out more—Don Schnell frequently used a grey card background in his CP book (i.e. *Dionaea* on pl7.) The tuberous *Drosera* in Allen Lowrie's first book were often growing on white sand—producing the same effect.

After positioning the subject and checking the focus and backdrop, I set the f/ratio to $f/11$, and my camera's light meter (back on automatic) indicated an exposure of 1/4 second. I waited for the wind to die down so the scape stopped waving around, and took some exposures. The results were good (Figure 2), with an excellent focus on the flower and the scape—it would have been easy to forget about the scape. The black background is a bold contrast to the flower. When I got my pictures back from the lab, I noticed that the 1/4 second exposures looked slightly overexposed. In contrast, the 1/8 second picture (that I took because I bracketted) was properly exposed, and the colours were richer and less burnt out ("saturated"). The camera's light meter was fooled because it calculated the exposure needed to correctly expose the entire picture. Since the only light entering the camera was from a flower that filled barely a fraction of the view, with black background filling in the rest, the camera computed an average exposure that was too long. The result was a subject which was slightly overexposed. Fortunately I was saved by bracketting, but you can anticipate this happening and

save film. In fact, I bracketted at 1/4, 1/8, and 1/16 seconds. If I had used a grey card background, this compensation would not have been necessary.

Tips: When you are faced with subjects that are at the end of a long spindly scape (like the one in Figure 2), there must be no wind or else the picture will be blurred by motion. I find that it's worth my while to work indoors on shots like these, using light streaming through a window. Also, when you take your exposures, if you pull your head away from the camera, light can leak in through the viewfinder and trick the light meter into underexposing your picture. Keep your eye near the camera or cover the viewfinder opening.

Now it's your turn to try your hand at taking some pictures. In part II of this article, I will discuss close-up photography with telephoto lenses and the value of reversing rings. I will also explain the significance of the *f*/ratio you shoot at. Until then, take your pictures using large *f*/ratios (like around *f*/8—*f*/16).



Figure 1. *D. rotundifolia hibernacula*

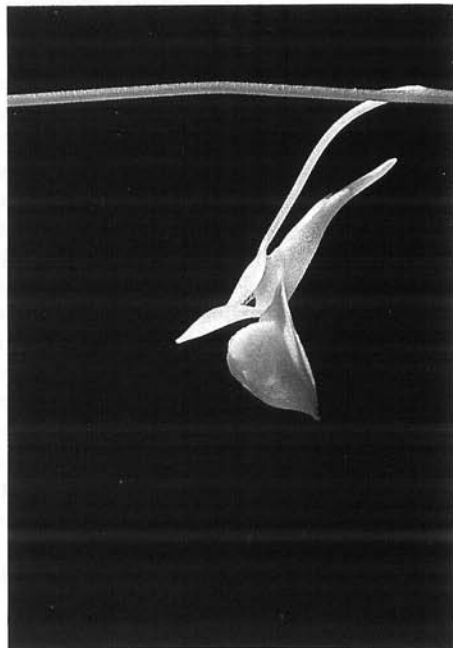


Figure 2. *U. graminifolia*