CLOSE UP: Tools and Techniques

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There's not doubt about it: capturing the fascinating details of insects and intricacies of flowers is exciting and rewarding. There is also little doubt that it can be frustrating and aggravating to get discouraging results. The pursuit of close up photography requires patience, knowledge, and most of all practice to gain the skills and instincts that ensure good results.

Making images of small objects and areas require special tools and techniques. To get close up images you have to get close to the subject. Other than that, the general rules of photography hold true; the science of how an image is captured remains, only some aspects are accentuated by the magnifications involved.

Factors to consider when acquiring these tools and developing your technique are:

- The greater the magnification, the more limited the depth of field.
- Greater depth of field results from smaller apertures.
- Smaller apertures require more light, or longer exposure times.
- Longer exposure time require a rock solid camera mount and no subject movement.
- Exposure time can be reduced by adding light.

Getting Closer

Getting closer to the subject requires the addition of tools to your camera bag which allow your camera physically get closer to the subject, and/or magnify the image your lens "sees". There are advantages and disadvantages to each tool, and the choices are numerous. Many of the tools I have experimented with over the years can be combined with each other to permit even greater magnifications. In most cases adding one of these tools to your lens will allow closer focusing, but eliminate the ability to focus to infinity. You will find that when you are concentrating on close up subjects, you won't be paying attention to what is happing at any great distance.

Supplemental lenses, also known as close up filters or diopters, can be added to your standard lenses to change the optical formula of the lens and allow closer

focusing, are generally low cost, do not reduce the amount of light thought the lens, and can be used on any lens (even zooms) with the compatible filter size. While they are often sold as sets of three (+1, +2, and +4 diopters) these single elements lenses are often of poor quality. Dual element lenses provide better optical correction, and are available in several sizes. Canon 250D and 500D series lenses are available up to 77mm, and Nikon 3T and 4T (52mm), 5T and 6T (62mm) supplemental lenses are all excellent choices.

Extension tubes allow your existing lens to focus closer by inserting a space between the optical group and the image recording plane, thereby changing the optical formula. These relatively low cost tools come in a variety of sizes, often as sets of three with extension of 12, 25, and 36mm are typical and can be mounted between any lens you have and the camera. Most major manufacturers as well as independent manufacturer offer several types. Modern lenses have electronic contacts to provide information to the camera as well as control the autofocus feature and it is advantageous to purchases tubes which have these contacts. You will find autofocus to be not very useful for close up work, but you will need these contacts to set the aperture at time of fire. There's no concern of using independent manufacturer's extension tubes as there are no optics involved. Kenko makes electronically coupled extension tube sets compatible with most camera manufacturers.

Teleconverters magnify the central part of the image without changing the focus point of the lens on which it is attached. They maintain the meter coupling and can be of high quality if matched to the lens. There can be some loss of quality with independent manufacturers when used with mismatched lenses and may not fit all lenses, particularly shorter focal lengths. One disadvantage of teleconverters is the loss of light; one stop for a 1.4X and two stops for a 2X converter. Another disadvantage is that they are often designed to fit longer lenses and will not mount on shorter lenses, but there's a way around that.

The **close focusing** feature of many zoom lenses provide some close focusing ability by usually less than one-quarter or one-third life size. It's a good place to start and build from by adding one of the three tools above.

Macro lenses are designed with close up photography in mind. They retain the ability to focus to infinity while being able to focus to the point where a life size

image is recorded on film. “Life size” means that if you take an image of a penny at life-size, it will be the size of a penny on the film. Macro lenses come in three ranges; short (50-60mm), medium (90-105mm) and long (180-200). Nikon made a 70-180mm zoom macro lens which provides flexibility in perspective and is still available in the used market. Since (mostly) all macro lenses close focus to life size, the two features that change with focal length are minimum focusing distance and perspective. The 50mm lens will be only 5 inches away from the subject at closest focus, and the 180mm will be 20 inches with the same image size. The angle of view with the long macro lens will be very narrow compared to the 50mm. The greater working distance of the long macro lens allows working with subjects that would be disturbed by close encounter, but let you get the close up image.

Combining lenses and tools described above increase the opportunities by allowing extreme close focusing ability. One combination I frequently use is a 1.4X teleconverter on a 100mm macro lens. The lens already focuses to life-size so the converter gets me 1.4x life-size. As mentioned earlier the 1.4X converter does not mount to the macro lens because the front elements of the converter protrude out the lens mount. The way around this is to mount a short 12mm extension tube between the teleconverter and the macro lens. Using a teleconverter in combination with longer extension tubes also works well with other lenses such as prime lenses or zooms. Just keep in mind that both extension tubes and teleconverters reduce the amount of light hitting the film or sensor, that loss adds up quickly when tools are stacked up.

There are other tools available such as reversing rings and bellows, but if you have mastered the tools listed above, you’ll be able to figure out how these other tools work.

Camera Support

The image magnifications involved and the need to be parallel to the subject to overcome limited depth of field require a steady support. Long exposures caused by diminished light as a result of adding close up tools beg for a steady camera and many close up subjects require getting low to the ground to get close. There are many tools available to help keep the camera steady.

Most of us have, and use, tripods for our photography and close up photography is no exception. There are however, specialized tools which help out in these special circumstances.

I always put my camera on a **tripod** when photographing subjects that are not dynamic, that aren't moving much. Flowers and textures are typical of these subjects. You will find that occasionally the tripod makes close up photography challenging; every time you "tweak" the tripod position, the entire bed of flowers you are standing in starts to sway from side to side. Making small adjustments in height is the biggest challenge for those of us who have tripods without center columns.

For subjects which tend to move such as insects, I use the tripod in an unconventional way. I put a cushion on the tripod head, such as a small towel or a knee-pad, and use that to brace my wrist, elbow, arm, forehead or other body part to help steady my camera as I handhold the shot. This allows me to make small adjustments, or large ones, depending on whether the subject is moving around on one flower, or hopping from one flower to the next.

Another way to use a tripod to get close to low lying subjects is to spread the legs out. Many tripod leg sets can do this, but the down side is that now you have three widespread legs to get tangled with nearby vegetation. It's not possible to use this technique even on the edge of a flower bed without having at least one leg in the flower bed. An alternative is to **reverse the center column**. The camera is now suspended between the legs of the tripod and can be adjusted to the height needed. With a ball head, the camera will be upside down, but with a three-way head, the platform can be flopped over to allow the camera to be right side up. The downside of this technique is that the legs may get in the way.

A **short tripod** is handy and low cost, but is a fixed height. The other shortfall is that with a lens that has no tripod mount the camera and lens weight will be well forward of the ball head and be front heavy. I sometimes use the small tripod to hold a flash assembly off to the side of the subject.

Another tool I use to get close to the ground is a Bogen **clamp with a ball head** attached. The clamp can be attached to a tripod leg or other structure. Advantages are that the clamp can be located anywhere along the tripod leg and to the outside of the legs making it easier to get your eye to the viewfinder. The Bogen **articulated arm** is mentioned only in that it is a poor choice as a camera support; it is infinitely adjustable but is also infinitely wobbly. I use it on occasion to hold a flash head off to the side or behind the subject.

A **bean bag** makes an excellent close-to-the-ground camera support and is easily portable; it can be packed flat and filled with beans or bird seed once reaching your destination. The bag is folded in half with the center raised, and an indentation is made in the raised section. This makes a cradle for the camera to sit in. Small adjustments are made by pushing on a side to raise that portion, or pressing down on the camera to lower the position. A very handy way to get close to the ground.

By far the best tool you can get to make close to the ground images easier on your neck muscles is the **angle finder**. This device attaches to the viewfinder of the camera and provides a short extension at a right angle to the viewfinder. This extension can be rotated around the viewfinder to permit right side up viewing of the image and information in the viewfinder. Rather than try to get your face close to the ground in order to see thought the viewfinder, you merely look down or from the side.

Keeping the Subject Steady

Now that we've gotten the camera to stop moving, keeping the subject steady is a bigger challenge. When starting out, it is beneficial to pick subjects that don't move. Solid objects like moss on a rock, or textures in wood are easiest to work with; things that move on their own (like insects) are the hardest.

Start off with subjects that are easy to control like flowers (potted or cut) indoors and out of the wind. A tent made from sticks, plastic pipe, or even a tripod using a white sheet or clear plastic to block the wind for outdoor subjects. Specialized clamps to hold plants in place on flexible arms are available from Wimberley (the Plamp) and McClamp. The clamps work well in light breeze but wind can still be a problem.

There is less **air movement** early in the morning before the ground warms up. As the day gets warmer, the ground heats up causing air currents to move flowers. Live subjects get warmed up and more active. By shooting early in the morning air currents are at their minimum. Another opportunity is that insects stay put because they are cooled and in a state of minimum activity. If they are **dew covered**, they are unable to fly with the extra weight of the water on their wings. As the dew dries off, you can lightly apply addition mist using a small spray bottle. Keep the additional spray to very light mist to look natural. If you

happen to find a large drop that looks unnatural soak up the droplet by lightly touching the offending drop with the edge of a tissue.

Shooting indoors limits the prospects of air currents and increases the possibilities of good subjects. Greenhouses and arboretums provide an environment for plants and flowers. Some zoos and natural history museums have insect and/or reptile houses that can provide interesting subjects. An easy venue for photography is a butterfly house; many offer early hour access to photographers so that tripods may be used before the crowds arrive. Also, you can ask the attendant if they can place newly hatched butterflies on the vegetation of your choice to set up the most favorable setting and background.

Controlling the Light

Photography is all about capturing the light. This gets a little more difficult as the amount of light hitting the film or sensor is diminished by the tools used to get a close up image. Natural light is tough to arrange, but by far makes for the most pleasing images. Direct sunlight provides a lot of light, but also results in deep shadows that the photographer must be aware of in composing the image.

Backlighting can provide for creative imaging, the only caution being to consider that getting some light onto the shaded parts may help make a better image. Many times there is enough light from the sky or nearby objects such as walls

near gardens. If not, reflectors can be used to direct light into shadow areas to reduce contrast and light up internal details of flowers and insects.

Overcast skies result in a soft lighting of the subject, reducing contrast across the image, and allowing delicate details of the subject to come out in the image. The same effect can be created by diffusing the light so that it falls on the subject from many angles, lighting the little nooks and crannies to eliminate shadows. Window light can often be soft when using the sky to provide the source of lighting rather than the sun. Of course overcast days provide for soft window light. Greenhouses often provide a muted light which is diffuse.

Shooting outdoors in bright sun can be a challenge with the shadows it produces. However, portable light modifiers can help mitigate the downside of direct sunlight. Reflectors can be purchased that collapse to be kept in your bag or car, and come in white, silver, gold, black and translucent. The gold reflector adds a warm component to the reflected light but be careful not to overdo it; warm light is always good for landscapes, it's not always appropriate for close up subjects. The translucent panel can be used to diffuse the light hitting your subject, and the black panel can be used to block the direct light completely, letting only the light from the surrounding sky to softly light the subject.

You can also make good reflectors yourself from the center cut outs of mat board. I cover one with aluminum foil taped to the backside of the card. I usually have two handy; one which I left the foil flat and more mirror like, and the other I crinkle then flatten before attaching it to the cardboard. A small cosmetic mirror can be handy to redirect strong light into an intricate part of a flower, revealing details you many not have found otherwise.

Photofloods can be used indoors to provide a huge amount of light. Warm color temperature of these lights can be compensated by setting the correct white balance setting in your camera to match the lighting you are using. Florescent lamps and LED lamps can be purchased with daylight color balance and produce much less heat than the incandescent lamps.

Flash can be used to add a lot of light for close ups, freezing motion from the camera or the subject and making some images possible. In the studio, manual flash set ups are the norm, with measured outputs and light source locations

predetermined and measured with a flash meter. In the field, determining exposure settings for manual flash with ambient light contributing but variable in dynamic situations is sometimes complicated.

TTL flash is a godsend for insect and flower photography and is relatively easy to use since exposure is calculated from where light strikes the film or sensor, the amount of extension and light fall off is taken into account and normal exposure decisions can be made. The first challenge to address is the placement of the flash head. When the flash is mounted to the flash shoe on the camera, the flash projects light forward of the lens to cover an area at the normal lenses focus point. In close up photography the subject is often within the shadow area below between the normal coverage of the flash and the front of the lens. This shortfall can be rectified by mounting the flash so that the head is pointed at the close up subject. The most effective way to do this is to use an off-shoe flash extension. This cord, usually 12-18 inches long, preserves all the electronic coupling between the flash and the camera keeping all the benefits of TTL flash.

By placing the flash head near the front of the close up lens assembly, the flash is projected forward onto the subject. One benefit of this is that the size of the light source is large compared to the subject, reducing the harshness of shadows. To make an even broader source of light, I use a flash reflector attached to the top of the flash. This creates a large diffuse light source. While I started out hand holding the flash and the camera, it was an exercise in juggling until I purchased a flash bracket to hold the flash in the correct position near the front of the lens.

There are two techniques to consider when using TTL flash for macro subjects. For fill flash, in which the flash provides additional light into the subject, I set flash compensation depending on the subject. It's important to consider how the flash will reflect off the subject. If there are bright segments or hard shinny or reflective parts of the subject, I'll reduce the flash contribution by one to two stops. I set the camera on auto aperture and set the camera to expose for the background. The camera will adjust the amount of flash output hitting the subject. This technique requires that the background is lit sufficiently to expose the background. Many times I'll set the camera compensation to underexpose the background by one stop.

The second technique I use is setting the flash to be the main light. What this means is that all the light for the photo is provided by the flash. This technique works when the background is close enough to the subject to be lit by the flash as well as the subject. I set the flash compensation based on the subject, set the camera to manual exposure, set the shutter speed to 100th or 125th, set the aperture to f16, and let the camera control the output of the flash using TTL. This is my typical set up for photographing insects as I can handhold the camera; the flash durations are so short that it stops camera and subject movement.

Special Considerations

As with all photography, the background contributes to the success of the image. If the background of the subject is not suitable it can be replaced with one that is. This can be as simple as placing a card of the right color or texture. The background needs to be placed at an angle which will allow enough light to hit it for a proper exposure. The background can be natural materials. In one instance, I found a Black Oak Acorn Weevil under my birdbath. After taking a couple of images on the concrete base, the weevil was coaxed onto an oak leaf to provide a natural background. Be mindful of the background. Often just moving the camera slightly will improve the look of the background.

For backlit subjects, ensure that the background is exposed properly, probably one to one and a half underexposed to accentuate the edge lighting or the luminance of the subject.

Now it's up to you. The best way to learn about close up photography is to get out there and try it. Borrow extension tubes from a friend, or take the plunge and buy a macro lens. There are many subjects out there; I do 95% of my close up photography in my back yard. When doing yard work, I leave my camera, macro lens and flash set up near the door of the house so that I don't have to run too far when I find a subject that would make a good close up image

You won't be sorry.

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