

# Photographer's FOCUS



## Essential Equipment for Mushroom Photography PART I: CAMERAS AND LENSES

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This is Part I of a two-part article on equipment to use for photographing mushrooms. The goal of these articles is to present a discussion on photographic equipment that will provide the mushroom photographer with the ability to efficiently, effectively and conveniently capture images of mushrooms. Because of where, when, and under which conditions these life forms grow, specialized equipment and techniques are needed to maximize the ability to create interesting and technically sound images.

Photographing mushrooms is a most rewarding experience. Whether you are shooting this subject matter to create art or you are on a scientific quest, you are going to need some skills and tools to get the job done. Although mushroom photography is a form of macro photography, most mushrooms are not so small that they require great amounts of magnification. What you will need, however, is the capability of getting the camera close enough to the mushrooms so that you can fill the frame with that subject. While it is possible to photograph mushrooms with a “point-and-shoot” or “prosumer” type camera, the Digital Single Lens Reflex (DSLR) camera is far and away the more flexible and efficient tool for the job. This discussion, therefore, will be confined to the use of a DSLR for the photographing of mushrooms.

### **Cameras**

Most any DSLR can create satisfying photographs of mushrooms and there are many reasons to use a DSLR for mushroom photography. DSLRs have

the ability to use interchangeable lenses, thereby providing many options for focal length, composition, and controlling focus and depth-of-field. A DSLR can connect with remote flash units and even macro flash systems for creative lighting effects that are simply not doable with most point-and-shoot cameras. All DSLRs can be attached to a tripod to insure rock solid camera support while shooting with small apertures in low light conditions.

There are a couple of special settings that can be made in the menu options of your digital camera that will be useful for photographing mushrooms. The first recommendation is that “Image Quality” be set for RAW. A RAW file is, in essence, a digital “negative.” It contains the maximum amount of information from the camera’s sensor, but must be processed before it can be printed. In other file formats, such as jpeg files, the camera processes the digital file, discarding a lot of digital information in the process, thereby substantially

reducing the image potential of that file.

If you are using Adobe Photoshop or Adobe Lightroom for post-processing, there is a “RAW Converter” in each of these programs that will allow you to process RAW files. The RAW Converter will allow you to substantially refine and enhance the image file before it is opened in your image-processing program. You may need to determine which version of Photoshop or Lightroom you have on your computer so that you can verify that your camera model is supported in that version. To do this go to your search engine and type in “Adobe RAW converter” (and the version of Photoshop or Lightroom that you have) followed by the word “downloads.” That will get you to the Adobe website where you can verify whether your camera is supported by the Photoshop or Lightroom version you have.

These converters provide many options to fine tune exposure settings, recover exposure errors, adjust color balance, as well as sharpen and enhance color



Figure 1. Camera menu #1: Two side-by-side views of the camera’s menu for selecting the RAW file setting in the “Image Quality” category of the “Shooting Menu.”



Figure 2. Camera menu #2: This shows two side-by-side views of the camera's menu for "Custom Settings" for selecting the slowest shutter speed that can be set when shooting with flash. Here, that shutter speed is set for 30 seconds.

and saturation. Most major camera makers include software with a RAW converter in the box with the new camera. These are pretty rudimentary converters that don't have anywhere near the versatility and control afforded by the Adobe products, but they will allow you to process RAW files taken with their cameras. If you are hesitant about committing to shooting RAW files, most cameras will permit you to shoot both RAW and JPG files simultaneously. That capability will have to be set in your camera's shooting menu under the subheading of "Image Quality" (Fig. 1).

The second recommendation for a menu setting is setting the "Flash Shutter Speed." If your camera has this menu option, it allows you to set the slowest available shutter speed when using flash. This should be set for the slowest shutter speed possible on your camera. In doing so, you will then have the ability to shoot flash with very slow shutter speeds, which will facilitate the balancing of flash illumination with ambient light (Fig. 2).

### Lenses

Most mushrooms are small and require the photographer to move in close in order to sufficiently fill the frame with the subject. Generally, "normal" fixed focal length lenses (45 mm to 60 mm) do not focus any closer than two to three feet from the subject. Therefore, in order to fill the frame with the subject, one must move in closer than the minimum focus distance of the lens. Because the size of most potential mushroom subjects will range from under an inch tall to well over 6 inches in height, one needs the ability to fill the frame with the subject and still allow sufficient

distance between the lens and subject to effectively illuminate it.

Many zoom lenses will work quite well in this regard. Some zoom lenses have a "macro" feature that allows them to focus relatively close so that the frame can be filled with a fairly small subject. You'll need to do some testing with your lens to see how close it will focus on small

mushroom-sized subjects to determine if you will need additional accessories to get the camera closer to the subject.

Typically, a "normal" focal length lens, using close-up accessories to fill the frame with your subject, will put the lens so close to the mushrooms that there is an insufficient distance between the lens and the subjects to easily illuminate them. For that reason, a moderate telephoto lens (between 100 mm and 200 mm) is preferred. This will permit more distance between the lens and the subjects so that flash units can be effectively positioned.

Whether one should use a fixed focal length lens or a zoom lens is an issue of convenience. With a fixed focal length lens, whether it is a 60 mm, 85 mm, 100 mm, or greater, the camera/lens position must be precisely set in order to obtain the desired composition. This usually requires repositioning the camera a few times in order to get the subject satisfactorily framed. With a zoom lens, one can set up the camera in the



Figure 3. *Craterellus tubaeformis*: This was a shot where I wanted keep the foreground and the subject mushrooms in sharp focus, but render the background moss out of focus so as not to be a distraction. Using a 70-180 mm zoom lens allowed me to precisely compose the image with the camera on a tripod by zooming in until the mushrooms were properly framed in the viewfinder. By depressing the depth-of-field preview button on the camera body and observing the image in the viewfinder, I adjusted the aperture and the focus setting until the mushrooms and the foreground were in sharp focus. That point was reached when the aperture setting hit f/20. The exposure was based upon that f/stop setting: f/20 @ 4 seconds using electronic fill flash balanced with the ambient light.



Figure 4. Close-up Lenses: These are close-up lenses manufactured by Canon and Nikon. The larger one is the Canon 500D and the smaller one is the Nikon 5T. The Canon close-up lens is available in 52, 58, 72 and 77 mm screw thread sizes and the Nikon is available in 62 mm. They attach to the front of a primary lens and allow that lens to focus much closer. Close-up lenses are also available from third party manufacturers for considerably less money, but they are also of lesser quality.

approximate location of the subject and then use the zoom feature to precisely frame it without having to reposition the camera (Fig. 3 on page 47).

There are two basic methods for getting your camera and lens closer to the subject. You can attach a close-up lens to the front of your primary lens or you can add an extension device between the camera body and the lens.

**Close-up Lenses:** Supplemental close-up lenses attach to the front of the camera lens like a filter and permit greater magnification by permitting closer focusing (Fig. 4). These lenses come in different strengths, measured in “diopters,” and can be attached singly or in combination to yield greater magnification. A larger diopter rating will yield higher magnification. These lenses can be purchased individually or in sets. The cost of close-up lenses will vary from \$10.00 to over \$150.00, depending upon the quality of the product. Canon produces close-up lenses that are extremely high quality optics (having two elements), but are a bit pricey. The Canon 500D close-up lens is a real favorite among nature photographers. It is rated at +4 diopters, comes in screw thread mounts of 52, 58, 72 and 77 mm, and is designed to work on lenses between 70 mm and 300 mm. Close-up lenses can also be purchased in sets of three

or more from third party manufacturers and they will cost less than one third of a single Canon close-up lens. These lenses, however, are generally of inferior quality, having reduced sharpness at the edges and creating color fringing known as chromatic aberration.

A positive attribute of close-up lenses is that they do not affect the amount of light reaching the digital sensor. That means that no exposure compensation is required. The “down side” to using close-up lenses is that you are putting another glass surface in front of your primary lens and that could degrade image quality if you use a “bargain priced” close-up lens (Figs. 5 and 6).

**Lens extension:** Lens extension allows you to focus closer by placing a device between the camera and the lens. The most common method of doing this is with extension tubes (Fig. 7). Extension tubes can be purchased singly or in sets. Extension tubes are the least expensive method of achieving close focusing without impairing image quality, but probably the most inconvenient. It should also be noted that some modern lens designs do not permit the use of extension tubes, so you will need to check the manufacturer’s specifications of the lens you want to use for mushroom photography to verify that an extension tube will work with that lens.



Figure 5. Pair of Orange Mushrooms: These subjects were so small that I had to use a supplemental close-up lens on the 70-180 mm macro zoom lens in order to get close enough to fill the frame. Because of the amount of magnification involved in this shot, the smallest  $f$ /stop setting would not be adequate to render the subject, the foreground and the moss immediately behind the subjects in sharp focus. In this instance, I used the technique of focus stacking to insure that everything would be in focus. A series of six exposures were taken of this subject at  $f/22 @ 1.3$  seconds, at different focus settings and then combined in post-production software that resulted in one very sharp image.

The most significant limitation of extension tubes is “convenience.” Subjects of differing sizes will require a different amount of extension in order to obtain the desired magnification. Also, the longer the focal length of the lens used, the more extension will be required to obtain the same amount of magnification. For example, if you attach 15 mm of extension to a 60 mm lens, you will be able to obtain



Figure 6. Honey Mushrooms: This shot was taken using an 85 mm f/2.8 Portrait Lens. In order to focus close enough, it was necessary to use a supplementary close-up lens. It was also necessary to use a very small f/stop for maximum depth-of-field so that all the details in this image would come out in focus. Of course, small f/stops mean longer exposures. This one was shot at f/32 @ 10 seconds using electronic fill flash balanced with the ambient light

magnification of 1:4, which is one-quarter life size. (The image in the frame is one fourth the actual size of the image.) In order to obtain the same magnification with a 200 mm lens, you would have to add 50 mm of extension. One might feasibly have to change the amount of lens extension for each new composition depending on the size of the subject. Also, extension tubes don't come in a large variety of lengths, so one may be stuck with only one or two lengths that will work for a particular subject. Because many mushrooms are fairly good size subjects, you may not need very much extension (depending upon the focal length of your lens) in order to get the camera close enough to fill the frame with the subject.

Another factor to consider when using lens extension is that the light reaching the sensor diminishes as the lens is extended from the camera. If you extend the lens by one fourth its focal length, you will lose one half stop of light. That means more light will be required to correctly expose the subject.

**Macro Lenses:** From the standpoint of convenience and image quality,



Figure 7. Extension Tubes: OEM extension tubes can be obtained individually from the camera maker and can also be purchased in a set from third party manufacturers. Extending the lens from the camera body permits closer focusing without risking image deterioration that may occur when using close-up lenses.

a macro lens is hard to beat. Macro lenses come in various focal lengths ranging from 40 mm to 200 mm. The shorter the focal length, the shorter will be the distance between the lens and the subject. For this reason, a macro lens of a 100 mm or greater is preferred. Larger lens-to-subject distances improve depth-of-field and provide more working room for lighting equipment.

Generally, macro lenses are optically superior to a normal lens or mid range zoom lens and will permit focusing continuously to one half-life size magnification, and in some cases, all the way to life size. You will rarely need that much magnification when photographing mushrooms unless the subjects are extremely small. Macro lenses often stop down to smaller apertures (f/32), permitting greater depth-of-field, which is an important consideration when shooting macro subjects (Fig. 6).

Canon makes six different fixed focal length macro lenses ranging from 50 mm to 180 mm. Nikon also makes six different macro lenses with focal lengths from 40 mm to 200 mm. Quality macro lenses are also produced by a number of third party lens makers such as Sigma, Tamron, Tokina and Vivitar.

If you have the ability to obtain a macro lens, this is the preferred solution for mushroom photography. You don't have to fuss with finding the right length of extension to put between the camera and lens, or determining how strong a close up lens to use in order to focus close enough to the subject(s).

The absolute ideal macro lens for mushroom photography is one that also zooms. With such a lens, you then have the best of both worlds: a lens that provides the convenience of using the zoom feature to compose the subject, and then the ability to focus on it without the addition of close-up accessories. Neither Nikon nor Canon currently has such a lens in their optical arsenals (Nikon discontinued their 70-180 mm Zoom Micro Nikkor several years ago), however Tamron currently manufactures a 70-200 mm zoom macro lens. This lens will fit several brands of DSLRs, has received excellent performance reviews, and can be purchased brand new for about \$769.00.



*Marasmius* Cluster: A good macro lens will have excellent edge-to-edge sharpness that permits the making of finely detailed images from the center to the edges. Because this subject really stood out from its surroundings by reason of its color and texture, it wasn't necessary to blur out the background to keep it from being a distraction. In fact, keeping all the leaves in focus added to the realism and sense of presence in this Oak forest. Again, the zoom lens was racked in and out until I saw the composition I wanted in the viewfinder. Because of the significant distance from the closest foreground oak leaves in the composition, to those in the background, focus stacking was utilized to get everything in sharp focus. Eight images shot at  $f/13 @ .3$  seconds were stacked using Helicon Focus software. Exposure was based upon the lighter color of the mushrooms, which resulted in a slight underexposure of the surrounding oak leaves. This helped keep the background from distracting attention away from the main subject.

**Auto Focus vs. Manual Focus:** Most all the new macro lenses, as well as zoom lenses that are available today are auto focus lenses. Auto Focus for macro photography, however, is often more of a hindrance than a benefit. In Auto Focus mode, the camera will often "hunt" throughout the focus range for what seems like an eternity before locking on to the subject, and even then, there is no assurance that the area of the image it locked onto is the correct place to set the focus. With the shallow depth-of-field that is inherent when an image is magnified, it's actually

easier and more accurate to use Manual Focus to pin point the precise spot where the focus should be set.

When shooting macro subjects, depth-of-field is critical. It requires the point of focus to be precisely set to maximize what little depth-of-field is available, even at stopped down apertures. You simply cannot rely upon one of a number of random focus points on the viewfinder screen to set the focus. An exception to this would be those cameras that have a "floating focus point," a cursor that can be manually navigated in the

viewfinder and set at the precise point that you want to be the sharpest point of focus. If shooting a DSLR in "Live View" mode, one can, utilizing the LCD screen, zoom in on the subject and manually set the focus at the desired position in the frame before capturing the image.

In Part II of this article, I will discuss some new technology that opens up a whole new experience in focusing and controlling the camera remotely as well as discuss other items of equipment that are essential to taking good mushroom photographs. 🍄