Photographer's Focus

Depth-of-Field Considerations In Photographing Mushrooms

Edward Matisoff

By definition, depth-of-field is the zone, or range of distances, within a scene that will record as sharp. Depth-of-field expands and contracts depending primarily upon the f/stop setting and the lens-to-subject distance. The closer the lens is to the subject and/or the larger the aperture, the more shallow will be the depth-of-field. Inversely, the greater the lens-to-subject distance and/or the smaller the aperture, the more expansive will be the depth-of-field. This article presumes the use of a Digital Single Lens Reflex (DSLR) camera for the photographing of mushrooms.

Photographing mushrooms, in most instances, involves photographing a subject close-up. This poses some challenges in creating an image where the entire subject will be in sharp focus. Two factors that influence depth-of-field while photographing this subject are its size and its parasol shape. Mushroom sizes will vary from as small as a glass pinhead to over twelve inches across a fully opened *Amanita muscaria* cap. The smaller the size, the closer the lens must be to the subject. The closer the lens is to the subject, the shallower is the depth-of-field. On the other hand, a larger mushroom permits a greater lens-to-subject distance, but the larger size of the subject requires more depth-of-field to get the entire "parasol" in focus.

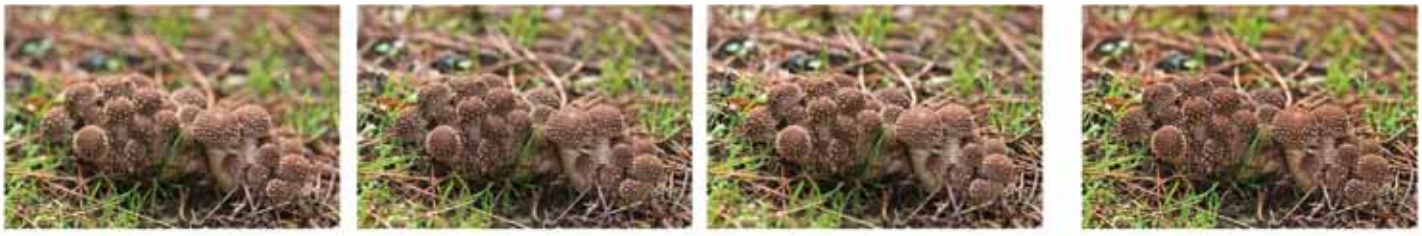
Whether shooting mushrooms at ground level or from an elevated position, an important range of focus is the distance between the front edge of the cap and the stalk. If these two areas are in focus, the mushroom will appear sharp in the photo.

Small subjects require a shorter camera-to-subject distance in order to fill the frame with that subject. Focusing that close will require either a macro lens, lens extension or close-up lenses. When focusing on a cluster of mushrooms, for example, try to position the camera so that the viewable mushrooms in the composition will be approximately the same distance from the lens. Using a longer focal length lens at a greater distance from the subject will also provide an advantage in maximizing depth of field.

Lenses designed for digital cameras do not have markings on them to gauge depth-of-field as did lenses designed for 35mm camera systems. This makes it somewhat problematic to determine the correct lens setting in order to obtain the amount of depth-of-field required for a particular subject. One can use the **depth-of-field preview button** (if your camera has one) and the following technique. With the lens set to manual focus, look through the viewfinder and focus on the object/element that is closest to the camera that is to be in sharp focus. For this exercise, let's assume that the subject is a singular mushroom with the cap fully opened, and that the front edge of the mushroom is the closest object/element in the picture that is to be in focus. After getting the front edge sharply focused, set the aperture to the desired setting, depress the "depth-of-field" preview button, and with your eye to the viewfinder, slowly rotate the focus ring

Figure 1.

Figure 2.



to sharpen the stalk. Continue rotating the focus ring until the front edge of the mushroom starts to go out of focus. Stop and rotate back the other way until the front edge is again sharp. If the stalk now appears sharp, there is sufficient depth-of-field to take the picture. If the stalk is still out of focus, a smaller f/stop will be required. If the lens is already stopped down all the way, or using a smaller aperture does not remedy the problem, then the lens-to-subject distance will have to be increased, which may mean that a longer focal length will be required to sufficiently fill the frame with the subject. Using a longer focal length may also require the use of a close up lens if that longer focal length lens will not focus close enough to the subject.

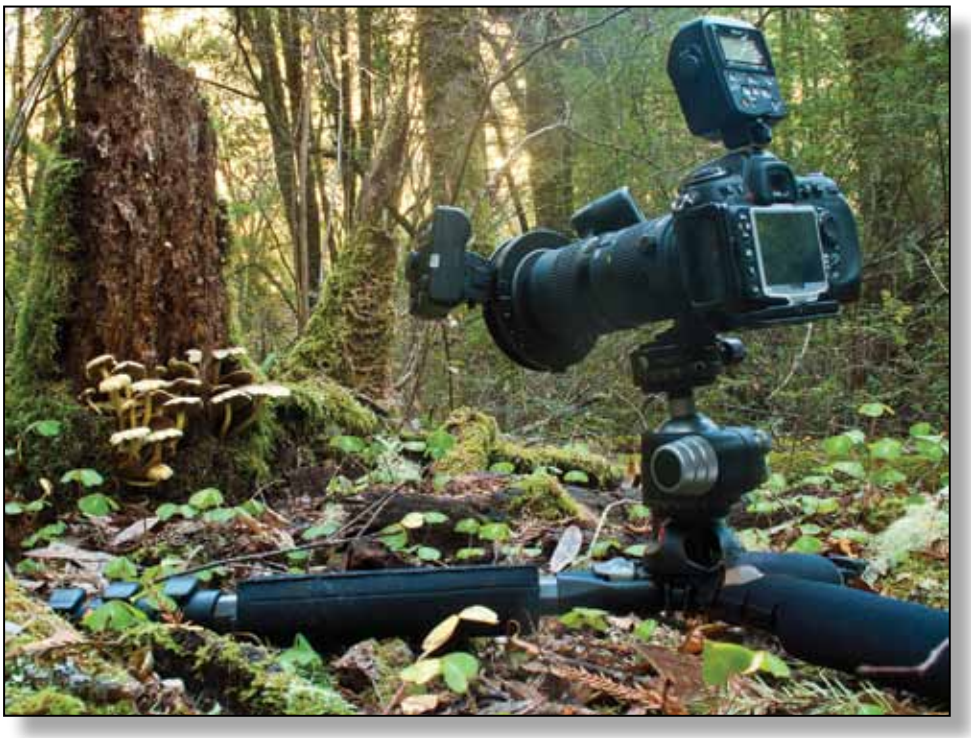
Utilizing the technique described above can often be very challenging because as the lens is being stopped down, the viewfinder is becoming darker, making it more difficult to see if the objects in the viewfinder are sufficiently sharp. In the alternative, one can take a "shotgun" approach to this problem by stopping the lens down to its smallest aperture, focus on the front edge of the cap and then focus back towards the stalk about 1/3 of the way. Checking the results on the LCD screen with the magnifying button will let you know if that approach worked. The tradeoff, however, in using apertures of f/22 to f/32, is a theoretical loss of image quality, but that loss will be quite negligible.

In addition to the mechanical solutions discussed above, there is also a digital solution. That is, using a "focus stacking" type of software. One such program is Helicon Focus. This software works on both Mac and Windows operating systems. There is also a Windows-only program available called "CombineZM," but I have never used the program as all my image editing is done on a Mac.

When using either program, one takes multiple exposures of the subject at sequential focusing points and then processes all the images in the software. The software compresses all the sharpest elements of the images into one very tack-sharp photo. The results are quite amazing, and the software really eliminates all the painstaking efforts that one must suffer in trying to get everything in focus in one exposure.

Helicon Focus is quite user friendly and does all the "heavy lifting" in combining the sequentially focused shots into one sharp, detailed image. Details about this program can be obtained by going to http://www.heliconsoft.com/heliconfocus.html. With this program, one is almost guaranteed of getting virtually every element in a close-up image as sharp as a tack.

In preparation for using this software, one, as previously stated, must take multiple captures of the subject. The amount of rotation on the focusing ring between captures will vary based upon the f/stop one is using. The wider the aperture, the smaller should be the focus adjustment between exposures. After using the program for a while, one will develop an intuitive sense as to the amount of focus adjustment between exposures that is required.



Camera Set-up.

Figure 3.

In the sequence of images of the pair of pink and tan mushrooms (see **Figure 1**) and the cluster of Pholiotas (see **Figure 2**), the goal was to include an in-focus foreground in order to show the subject in the context of its environment, yet at the same time, blur out the distractions of the background. In Figure 1, the subjects were growing in an oak forest outside the seaside town of Ventura, California. Photo 1(a) was focused on the foreground leaves with the subsequent captures focused further and further into the scene. The last photo in the sequence, photo 1(e) focused on the acorn and leaves immediately behind the subjects.

The cluster of young Pholiotas (Figure 2) was photographed at Patrick's Point State Park in Trinidad, California using, essentially, the same methodology as in Figure 1. As can be seen in the final rendering of each group, everything from the front edge of the image through the backside of the mushrooms came out very sharp. Each image in Figure 1 was photographed at f/11 @ 1/3 second, and the images in Figure 2 were photographed at f/20 @ 1/2 second. Both sets were photographed, balancing ambient light with artificial light, which will be the subject of a later article.

For this software to be effective, both the camera and the subject must be stationary. A tripod takes care of freezing camera movement, and unless one is photographing some long-stalked fragile mushrooms in windy conditions, there shouldn't be a problem with subject movement. (See **Camera Set-up** photo)

While I do a fair amount of mushroom photography at ground level with the camera mounted on a beanbag, this multiple exposure focusing technique is not advisable with this type of camera support. Rotating the focus ring between exposures and pressing the shutter release button invariably moves the camera when it is simply perched on a beanbag. Even if a remote release is used, one simply can't get around camera movement occurring when re-focusing, and it almost always results in a disappointing final product after the images are rendered in the software.

Compositional Considerations: Depth-of-field is not only a factor in obtaining sharp images, but may be also employed to impact composition. One can exclude foreground and background distractions by using larger apertures. Inversely, when using smaller apertures, one can include foregrounds and backgrounds in order to help tell a story, enhance perspective, or create the context in which the subject is depicted.

A material difference in composition occurs as depth-of-field changes. Using wider apertures for shallower depth-of-field, creates softer, more ethereal looking images. For example, move in close to a mushroom at ground level growing in the grass. Observe the depth-of-field effects in the viewfinder as you open and close the aperture with the depth-of-field preview button depressed. At f/16 and f/22, many of the blades of grass surrounding the mushroom will be rendered so sharp and well defined, that they become distracting. On the other hand, at f/3.5 to f/5.6, those same blades will be rendered as a soft smear of color around the subject. See **Figure 3** (the two Mycena mushrooms in the grass) demonstrating this technique. Another similar technique is demonstrated in **Figure 4** (the two Coprinus mushrooms growing on the log). This photo demonstrates how to use the sky as

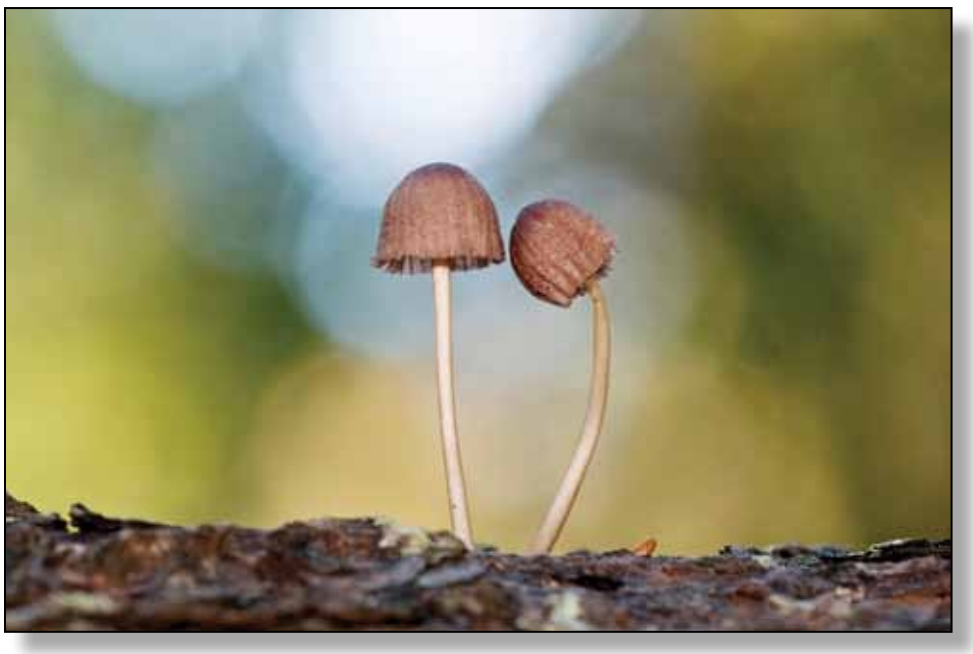


Figure 4.

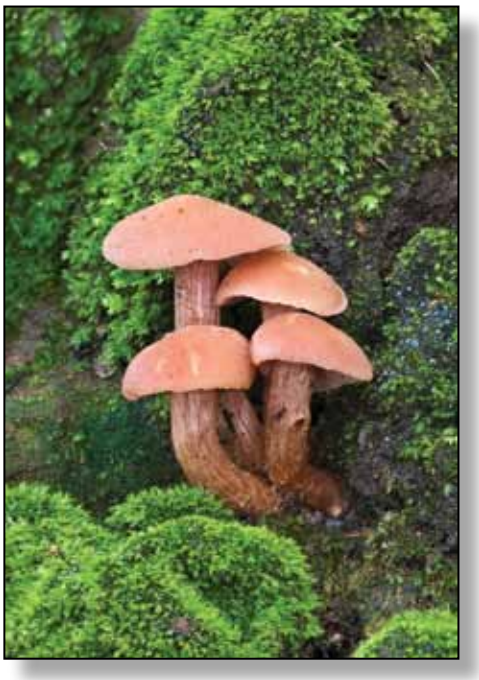


Figure 5.

a background with a shallow depth-of-field to isolate the subject, and add impact to the image in general.

An example of getting most everything in focus can be seen in **Figure 5** (the group of four small salmon colored mushrooms). As in Figures 1 and 2, multiple captures were made of the subject. However, in order to keep most of the background in focus, it is essential that the background be situated relatively close to the subject. Depth-of-field was particularly narrow in this case inasmuch as the subjects were very small (the caps were the size of pencil erasers), requiring the lens to be very close. Each of the sequential images was shot at f/32 @ 2 seconds in order to maximize depth-of-field.

The issue of composition also has some subtle implications when using Helicon Focus or a similar type program. If one wants to get every aspect of the subject mushroom perfectly sharp, but at the same time, keep the foreground and background out-of-focus, one would be well advised to use a moderate aperture size (f/5.6 to f/8) for each "Helicon Focus" exposure. In that manner, the depth-of-field will not extend far behind, or in front of the subject.

The next article in this series will be on lighting for mushroom photography; the pitfalls of shooting with only ambient light or with only artificial light and how to balance light sources for natural looking images.

hen of the woods

The infrequently seen maitake lookalike* Polyporus umbellatus*, courtesy U. Pascali.

Hens and chicks: a family of maitake, courtesy T. Lockwood.