



INTRODUCTION TO MACRO PHOTOGRAPHY

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I. INTRODUCTION AND OVERVIEW—

As humans, we tend to believe that we are the norm in terms of size, body type, etc. However, this just isn't so. In the natural world we are, in fact, looming giants gazing out across a thriving world that largely goes unnoticed by most. In his book, "The Smaller Majority," biologist, author and photographer Piotr Naskrecki writes:

"Most of animal life on Earth is small. Over 90 percent of known species are smaller than a human finger, smaller, in fact, than your fingernail. Our perspective on reality is severely handicapped by our gargantuan size, rare giants surrounded by the smaller majority. Our enormous size prevents us from appreciating, or even noticing, most of what shares this planet with us..."

For the nature photographer this is exciting news! For the nature photographer who wishes to pursue macro photography, it is even more exciting! One's awareness of this amazing fact opens up a portal into a world of many incredible photographic opportunities which lie just outside our back doors. In fact, I truly believe that there is as much beauty, action and excitement within walking distance of any our homes as that which is found on the Serengeti () plains of Africa; we just need to learn how to embrace this new perspective. Over time, I feel certain that it might just change your way of looking at life as we know it.



Dwarf Crested Iris, Jones Gap State Park, Marietta, SC: Fuji S2 Pro, Nikon 50mm Macro, Tripod, Cable Release, © Clay Bolt, 2007

The purpose of this class is arm the beginner with the knowledge to 1) define macro photography, 2) learn how to select the right tools for most macro photographic opportunities, 3) apply the basic compositional and technical approach to making an image and 4) select some of the best times and ways to approach a given subject.

Before you get started on this adventure you first need to understand the true **definition of macro photography** which is: The process of photographing a subject at life size (1:1) up to 25x. This means that if you were shooting a lady bug on film, for example, you could hold the living subject next to the subject captured on film and the sizes of both would be identical.

II. EQUIPMENT FOR MACRO PHOTOGRAPHY—

Many thousands of dollars can be spent on gear for macro photography. However, with a few initial investments many great images can be made.

I.) Cameras:

Today's market is flooded with an overwhelming selection of camera styles, makes and models. When searching for a camera, be sure to first define what you will be using the camera for and take the time to do the appropriate research that is needed to make an intelligent decision. Otherwise, one may be tempted to purchase a camera based on 'bells and whistles' that may prove to be unsuitable for a particular application.

There are two main types of camera body styles: Point-and-shoot and S.L.R. (Single-Lens-Reflex). Most pros use the S.L.R. style of camera because of the flexibility that it offers the user. However, if the price of an S.L.R. doesn't fit within your budget then I would recommend purchasing a point-and-shoot which comes packaged with the following features: 1) A macro or close-up setting 2) a tripod socket 3) a timer (to alleviate camera shake on long exposures) 4) an option to



Katydid Molting by Pond, Clemson, SC: Fuji S2 Pro, Nikon 50mm Macro, Tripod, Cable Release, © Clay Bolt, 2007

shoot high-resolution images (preferably raw files for the more serious amateur) 5) The option to shoot in manual mode and 6) a variety of flash settings. Many fine macro images can be made with an off-the-shelf point-and-shoot camera if it is loaded with at least some of these features.

The advantage of S.L.R. style cameras is that they allow the budding macro photographer to have more control over the types of images that they make. They are designed to give the photographer an opportunity to swap and stack lenses as needed to improve or alter magnification. This very important feature (which I'll address in more detail later) is very desirable for the macro photographer. Other important features found on most S.L.R. cameras are 1) Depth of Field Preview: This allows you to view what the camera is actually "seeing." 2) Through the Lens Metering (may only work

with automatic lenses) 3) Cable Release Socket: Allows a cable release to be attached which helps to eliminate 'camera shake' during long exposures 4) Professional style tripod socket. 5) Metering mode options 6) Raw capture: essentially a digital negative format which is very flexible when outputting images. The following items are not critical for the macro photographer but can certainly enhance images if they are used in conjunction with the items above: 1) Mirror lock-up 2) Through-the-lens-flash (TTL) and 3) a motordrive.



Northern Black Racer, Greenville, SC: Fuji S2 Pro, Nikon 80-200mm zoom lens, 27.5 Ext Tube, Tripod, Cable Release, © Clay Bolt, 2007

2.) Lenses (for the S.L.R.):

There are a variety of different ways to get close to your subject matter. However, the best methods always start with selecting the appropriate lens for the job.. Since this workshop is based on macro photography, I am going to discuss the lenses that will give you the best shot at that unforgettable image.

Macro Lenses: These specialized lenses can often be one of the most expensive pieces of gear in your bag. Fortunately, a great majority of these indispensable tools offer incredible clarity and image quality. One of the best focal lengths for clarity is the 50mm macro lens (it also makes an excellent portrait lens). However, the shorter the focal-length, the shorter the working distance. **Working Distance** is defined as the amount of space that exists between the lens and your subject. This factor becomes very important when you are dealing with live specimens. If you don't believe me, try walking up to a dragonfly in mid-day. Although field craft and knowledge of your subject-matter can greatly increase your odds of making a nice image –regardless of the working distance– some situations simply require a longer focal-length. 100mm and 200mm lenses offer a great amount of working distance and the quality will usually be there depending on the make and model.

Zoom Lenses: Zoom Lenses are incredibly popular amongst pros and amateurs alike because they typically present a great deal of flexibility when it comes to how a subject can be approached. A very popular range of zoom is 80-200mm. With this focal-length, most 'macro-worthy' subjects can be approached with relative ease. If used in conjunction with an extension tube (see below) and/or a teleconverter (see below) greater magnifications can be achieved. Another advantage

of zoom lenses is that they 'compress' your subjects. For example, if you are photographing a group of wildflowers which are spaced apart, a zoom lens will create the illusion that the subject matter is closer together than it actually is.

Standard Fixed-Focal Length Lenses: Although fixed focal length lenses (50mm, 120mm, 200mm, etc) aren't especially suited for macro photography, with the addition of supplementary diopters, teleconverters and extension tubes it becomes very possible to create some really nice images. This is especially true with longer lenses around 300mm.

3.) Extension Tubes:

Extension tubes are literally what they appear to be; tubes of differing lengths which extend the length of a lens. The extension tube moves the rear of the lens further away from the film plane or digital sensor. When this distance is increased, it allows a lens to focus more closely than when used in its normal range of focus.

4.) Teleconverters:

These handy devices –which are basically extension tubes with glass elements– can be a great way to increase the magnification capabilities of your lenses. They are available in two powers: 1.4x and 2x. By connecting a 2x teleconverter to a 300mm lens, for example, you will essentially upgrade your magnification to 600mm. This same multiplier (a term also used to describe teleconverters) can also allow you to increase a 1:1 ratio to 2:1 (or 2x life-size) when making a macro image. The downside of teleconverters is that they decrease the amount light coming into to the camera (because of the extra glass) which forces the photographer to either open up the aperture or slow down the shutter speed to compensate for this loss. There is also an increase in the amount of noise in the image. I have personally found that the issue with noise isn't as noticeable with digital captures.



Dusky Birch Sawfly Larvae, Defense Posture, Greenville, SC: Nikon FM2N, Nikon 50mm macro lens, 27.5 Ext Tube, Flash © Clay Bolt, 2007

5.) Tripods:

A great tripod cannot be underestimated when it comes to making professional quality images. Although sharp images can be created by hand-holding a camera (especially when flash is used), a tripod becomes quite handy when photographing close-up subjects with available light. There are many, many models to choose from and choice is based on personal preference. However, for the macro photographer, a model that allows the legs to be extended to so that the camera can sit just inches above the ground is a very nice option. Most professional tripods do not include a tripod-head and, once again, a wide array of options are out there for the choosing.

6.) Cable Release:

This is a simple, yet invaluable, device that allows the photographer to activate the shutter without actually touching the camera. It basically consists of a long cord with a cable running through the inside. One end of the tool is screwed into the cable release socket and the other is held in-hand where a button is located. This serves to trip the shutter when it is pressed.

7.) Close-Up Diopters:

Diopters are glass elements which can be screwed onto the end of a standard focal length lens; essentially converting it into a macro lens. This option provides a photographer with a relatively inexpensive way to capture small subjects. However, the quality is often not that great and the resulting images often appear soft on the edges.

8.) Flash:

The use of a flash or flashes can really enhance a close-up image. Some subjects actually require the use of flash because of the lack of light that is often found at higher magnifications. There are many different ways to position the flash. When one off-camera flash is used the background will often appear black. Although in some schools of thought this approach has become undesirable I still believe that in many situations beautiful and striking images can be made. The black (or dark) background comes from light fall-off behind the main subject. For a more natural approach, dual off-camera or ring flashes can be used. This approach allows one flash to be focused in on the main subject and the other on the background which in-turn creates the impression of a more naturally lit scene.

Fill-flash is also a powerful effect to use on certain images. This technique employs a flash –not as a main source of light– but as an extra bit of illumination to fill in shadows and improve color definition.

9.) Using Reflectors:

Reflectors are white, silver or gold pieces of material which are used to bounce light into shadows or add warmth to an image. In macro photography –because of the small size of most subjects– something as simple as a piece of white card stock or the back of a hand can be used. If one is forced to make an image in mid-day harsh shadows can dominate your image. A reflector can really save the shot by opening up those blocked, dark areas with light

III. CRITICAL TECHNICAL SKILLS FOR THE BEGINNER–

1.) Understanding Depth-of-Field and Shutter-Speed:

Depth-of-field revolves refers to the sharply and softly focused parts of an image. If an image is mostly soft with only a small section –say an animal's eyes or the edge of flower's petal– in sharp focus then you could say that it has a shallow depth-of-field. However, if the image–let's imagine that it is a landscape, for example– has a sharp background, sharp middle ground, and a sharp image in the foreground then it has a great depth-of-field. In John Shaw's "Nature Photography Field Guide" he outlines the four factors which determine the area of sharpness.

"1.) The actual f-stop at which the picture is taken. 2.) The focal length of the lens being used 3.) The size of the subject being photographed and 4.) The distance between the camera and the subject."

If you examine your S.L.R. lens you will notice a series of f-stops which go around its barrel. This series of markings represent the size of the **aperture** –or opening– of the iris of the lens. This is determined by whatever f-stop is chosen by the user. This series of numbers typically run from f/2.8, f/4, f/5.6, f/8, f/11, f/16, f/22 and f/32.



Spring Frogling, Clemson, SC: Fuji S2 Pro, Nikon 50mm Macro, 27.5 extension tube, hand-held © Clay Bolt, 2007

Consider the following thoughts:

- The smaller the f-stop number (f/2.8, for ex.); the larger the aperture; the shallower the depth-of-field; the more light that comes into the camera.
- The larger the f-stop number (f/32, for ex.); The smaller the aperture; the greater the depth-of-field; the less light that goes into the camera.

This really confused me when I first began learning how to operate a pro camera until I realized that those numbers represented fractions, i.e.: f/2.8 divided by 2 = @ f/4 , f/4 divided by 2 = @ f/5.6 and so on.

Shutter-Speeds control how fast the camera's shutter opens and closes. This affects the amount of light that comes into the camera and also can determine whether or not an image is in sharp or in soft-focus. Shutter speeds are also listed in fractions (of a second). So, a shutter speed of 1 second is going to keep the aperture open longer than, say, one at 1/1000 of a second. If you are wanting to capture a sharp image of a moving subject you must typically set your aperture at 1/125 of a second or less.

There are two approaches that you will most likely have to choose between when composing an image: aperture priority or shutter priority. A good example of a typical aperture priority image might be a "classic Ansel Adams" type of landscape. This is a situation in which you want every rock, tree and tumble weed from where you stand, to the distant horizon, to be in sharp focus. In order for this to occur you are going to want "stop-down" to your smallest aperture (f/22 - f/32 in most cases). Because this is a very small aperture very little light will be entering the camera which can affect the exposure time. So, you must compensate for this by choosing a much slower shutter speed in order to allow the needed light to enter the camera.



Eucalyptus Snag in Salt Marsh, Hyden, Western Australia: Fuji S2 Pro, Nikon 20mm lens, Tripod, Cable Release, © Clay Bolt, 2007

A shutter priority image is one where you want to freeze some sort of movement. It might be that you are photographing a sports event and want to make sure that the ball is frozen in mid-air or perhaps you are trying to capture a crystal clear image of a salmon leaping its way up some Alaskan river; either of these would be shutter priority images.

2.) Paralleling the Subject:

When you are creating a close-up photograph of a small subject camera position can have an incredible impact of the results that you get. Because depth-of-field is usually very limited when a subject is being photographed at 1:1 or greater, a movement of just an inch can drastically alter the composition. The photographer must identify the ‘important’ part of the subject that he/she would like to have in sharp focus and attempt to keep the back of the camera (or film plane/digital sensor) as parallel with the subject as possible. This process is very time consuming but can be made easier by using a sturdy tripod to hold the position of the camera.

III. COMPOSITION TECHNIQUES—

1.) The Rule of Thirds:

This is one of the most widely used ‘rules’ in photography: Mentally divide the image the image frame into three equal pieces horizontally/vertically and place your subject into one of these spaces. This will help you to avoid placing the image in the center (which is generally not a good idea but as with most rules, there are exceptions). This will put you on the right path towards creating an image that is interesting and visually pleasing.

2.) Horizontal or Vertical?:

Consider your subject before defaulting to a “horizontal” or “vertical” composition. Although we Westerners tend to scan information from left to right and find a horizontal composition to be a natural choice this isn’t always the best choice. Some images simply call for a vertical composition.

3.) Understanding the Relationship Between Positive and Negative Space:

It is human nature to just focus on the subject when making an image. However, the negative space –or space surrounding your subject– is often as powerful as the main focus area when it comes to affecting how an image appears. If used correctly, negative space can give the viewer's eye a chance to rest and serves to guide the eye throughout a composition. In order to take an image to the 'next level' every aspect of the composition becomes a factor in determining the final outcome.



Grey Tree frog on White Oak, Dacusville, SC: Fuji S2 Pro, Nikon 50mm Macro, Tripod, Cable Release, © Clay Bolt, 2007

4.) Pay Attention to Backgrounds:

I cannot tell you how many times I've taken what I consider to be a great image only to revisit it later and notice a twig that appears to pierce my subject's head. Often, only a minor adjustment in camera position is needed to make a mediocre image into a truly great one. Pay attention to what is behind your subject! Use aperture to control how much or how little of the background is in focus; little things done well add up to make a successful photograph!



Bluestem Grass with Dew, Dacusville, SC: Fuji S2 Pro, Nikon 50mm Macro, Tripod, Cable Release, © Clay Bolt, 2007

IV. SELECTED READING—

There are many great books which are available for the beginner. I can highly recommend the following titles:

- 1.) Close-Up & Macro: A Photographer's Guide
By Robert Thompson
- 2.) The Complete Guide to Close-Up & Macro Photography
By Paul Harcourt Davies
- 3.) John Shaw's Nature Photography Field Guide
By John Shaw
- 4.) The Sierra Club Guide to Close-Up Photography in Nature
By Tim Fitzharris
- 5.) The Smaller Majority
By Piotr Naskrecki