

## CLOSE-UP AND MACRO PHOTOGRAPHY NOTES

### I. CLOSE-UP VERSUS MACRO PHOTOGRAPHY

According to Bryan Peterson, the technical definition for macro photography is photography that is at 1X (times) magnification (i.e., life size) and greater. In this definition, macro photography is when the actual size of the subject and the size that it appears on a piece of film or the CCD (where the sensors are in a digital camera) is exactly the same. Anything less than 1X magnification is defined as **close-up photography** and not true macro photography.

A 1X magnification is often termed as 1:1 or one to one ratio of subject to photograph object size on the sensor. For example, if a honey bee is life size at 1/2", when photographed on film at life size, it would take up a 1/2" long space on a piece of 35 mm film.

On a digital camera, such as a Nikon D300, although it would seem that a 1:1 magnification on a CCD sensor would be up to 1.5 times life size because the digital sensor on a DX camera is much smaller than the 35 mm film. However, the 1.5X life-size image of the honeybee is just a cropped-in tighter version of the same honeybee photographed at 1:1 on 35 mm film.

Some ratios to consider using the example of the 1/2" life size honeybee:

- 1/4 (or 1:4 ratio of magnification) will produce a photo with a 1/8" bee (i.e.,  $1/4 \times 1/2 = 1/8$ " )
- 1/2 ratio (or 1:2) will produce a 1/4" bee on a photograph

Many photographs that you see with small objects that appear to be quite large are actually between 1/2 to 1/10 life size, which makes these classed as close-up images. Thus, the term close-up photography encompasses a much broader range of work than macro photography.

Close-up photography also includes the use of wide-angle lens as a close-up lens (not a macro lens), which provides all sorts of opportunity to convey more information.



Standard US dime photographed with 200 mm macro lens at 1:1 reproduction ratio. Regular dime is only .7 inches in diameter (17.9 mm). At closest focusing distance, dime filled the frame.



200 mm non-macro, Standard US dime photographed at 1:6.1 with 70-200mm lens set at 200 mm. This picture was taken at closest focusing distance of 5 feet (compared to 19.4 inches for macro lens). This image is about 16.4% of life size or a reproduction ratio of 1:6.1.

## II. CLOSE-UP AND MACRO PHOTOGRAPHY EQUIPMENT

There is a considerable amount of equipment available for macro and close-up photography, which can range greatly in price and complexity. The following sections briefly describe some of the more common equipment used for close-up and macro photography, as listed below:

- Camera Equipment: macro lenses, lenses with a macro setting, extension tubes, close-up filters and lenses, reversing rings, digital point-and-shoot cameras, wide angle lenses, macro and ring flash units, tripods, macro focusing rail, remote shutter release
- Additional Accessories: reflectors, knee-pads, props for backgrounds

### A. Camera Equipment

#### Macro Lenses

If you want to focus on shooting life-size images on a regular basis, consider investing in a true 1:1 macro lens. Macro lenses enable you to focus from infinity all the way down to a small object, such as a honeybee and record it as life-size.

Macro lenses are commonly available in the 50-60mm, 90-105mm, and 150-200mm focal length. Nikon brand macro lenses are called Micro-Nikkor lenses.

There is an advantage of using a macro lens with a longer focal length. Using a 150-200mm macro lens will enable you to record life-size magnifications from about 12" away from the subject, whereas a 50-60mm lens would require you to be 2 to 3" away. Being further away from moving subjects, such as insects, butterflies, or reptiles is easier with a longer focal length. However, longer focal length macro lenses are generally more expensive than those with a smaller focal length.

One advantage of a dedicated macro lens is that you can use the same lens to take regular photographs without having to add/remove an extension tube or close-up filter, since all macro lenses have continuous focus down to life-size magnifications. Moreover, you retain auto-focusing with modern macro lenses, which can be another advantage.

Another unique feature of a dedicated macro lens is that is optically corrected for flat-field viewing, allowing one to record sharper-than-normal images at all apertures. In other words, you can record edge-to-edge tack-sharp images of any objects that lie within the plane of focus without the normal edge "falloff" found when shooting with a regular prime lens.



Photograph of a  
Tamron 90mm  
macro lens

### Extension Tubes

If you want to try out close-up or macro photography without buying a new lens, there are several other accessories to consider. For example, extension tubes are hollow tubes that you can put in between your camera body and your lens to get extra magnification. Since these tubes are hollow, you do not have to worry about putting additional glass elements that will affect your photo quality.

Extension tubes usually come in a variety of size, such as 12, 20, 25 and 36mm. They can be used individually or stacked. Extension tubes can also be used with a dedicated macro lens. You can buy name brand extension tubes; however, third party tubes from manufacturers, such as Kenko, have dedicated pins on the tubes to enable metering with Nikon and Canon cameras. Extension tubes can be put on a zoom to record close-ups or even macro photographs.

How does an extension tube work?

- The farther away the rear element of a lens is from the CCD or film plane, the closer distance to the subject that the lens will focus. So by putting an extension tube on a lens, you reduce the effective focusing distance of the tube. In essence, you are putting a spacer between the lens and the camera enabling it to focus closer.
- By placing an extension tube between your lens and the camera body, you push the rear element of the lens farther away from the film plane, which also gives you a greater magnification of your subject.



One disadvantage of extensions tubes is that they decrease the light available to the camera, which in turn affects viewfinder brightness and exposures times (i.e., slower shutter speeds are needed).

Note: while extension tubes can be used on a variety of lenses, they are not suitable for use on a wide angle lens for a digital camera. This type of lens will not be able to focus with any extension tube because the focus point is put too close to the camera.

One final point: do not confuse an extension tube with a tele-converter. A tele-converter does have optical glass in its tube and it increases the focal length of a given lens.

### Close-up Filters and Lenses

Close-up filters are the cheapest camera accessory for enabling macro or close-up photography. However, one must be very careful in considering the use of close-up filters. Many of the cheap close-up filter sets are optically inferior products.



You are much better spending more money on a set of extension tubes or the highly recommended Canon 500D close-up filter/lens.

Canon offers three close-up filter/lenses:

- the 250D for focal lengths of 35 to 150mm
- the 500/500D for focal lengths of 70 and 300mm

Consider getting the slightly more expensive 500D, rather than the 500, as it is a double-element constructed filter and has a little sharper image quality. Depending on the lens size, the Canon close-up filter will fit on other non-Canon lenses. The only drawback of the Canon 500D is that it will only enable 1/3 life-size magnification, which is just fine for flower and butterfly close-ups.

The Canon 500D enables continuous focus, which makes it well suited for use on a telephoto zoom, such as a 70-200mm lens. With this filter, you don't have to readjust the focus each time you zoom to a different focal length. The Canon 500D used in combination with a wide-angle lens such as a 12-24mm will give you the opportunity to take some wonderful close-up photographs.

### Reversing Rings

Various camera manufacturers used to produce a reversing ring that enabled photographers to reverse-mount a standard lens, such as a 50mm lens, on your camera body. Using this accessory can give you up to 4X magnification with a standard lens. Reversing rings are intended for single-focal-length lenses and should not be used on zoom lenses. These adapter rings are no longer all that common.

### Digital Point-and-Shoot Cameras

Many of the newer point-and-shoot cameras have the ability to take reasonably high resolution images. Moreover, some of these models enable selection of aperture and shutter priority modes, as well as full manual override.

Some point-and-shoot cameras enable a very short focusing distance to the subject, which in some cases can be as close as 2 inches when at an effective focal length of 28mm. Due to the digital point-and-shoot camera's smaller sensor size, the depth of field at its smallest aperture of say f/8 is actually closer to an aperture setting of f/16 to f/22 on a 35 mm camera. This enables you to gain anywhere from 2 to 4 stops of exposure and light compared to a digital of film SLR .

This enables digital point-and-shoot camera users to have a combination of amazing depth of field along with relatively fast shutter speeds for taking close-up photographs.

**Wide-Angle Lenses**

Wide-angle lenses can be very effectively used for creating interesting close-up photography images. Such lenses enable you to capture a much wider angle of view than other lenses, yet you can still focus down to a distance of 6 to 10 inches, depending on the lens model.

**Macro and Ring Flash Units**

Dedicated macro flash units are available to enhance lighting of subjects for close-up and macro photography. Ring flash units are a common type of camera flash used for macro and close-up photography. Shooting close-ups and macros with a ring flash can soften and spread your flash's light in a pleasing effect. A ring flash is comprised of two half-circle flash tubes put into a hard plastic circular housing. Newer types of ring flash devices take light from an existing flash and distribute it around a circular plastic device.

The idea of a ring flash is to provide diffuse lighting on your subject without shadows. It also enables you to shoot with very small apertures, such as f/16 to f/32. A ring flash allows you to shoot at a fast flash sync. speed of at least 1/125 sec., which can permit hand-held photography.

**Tripods**

A tripod is one of the most important pieces of equipment for close-up and macro photography. When taking close-up or macro photographs, you want try to obtain the sharpest image possible. The very nature of close-up photography is designed to show details and texture as clear as possible. This means that you should be using the lowest ISO possible to keep the digital noise levels as low as possible. Moreover, the focus adjustments for close-up and macro photography very small since the depth of field is quite limited due to the close working distance to the subject. For example, when using an aperture of f/22, the depth of field may only be 1 inch. A low ISO and a large aperture (i.e., a small lens opening) will require a long exposure time of 1/30 sec to 1 second. Such exposure times for a digital SLR is too long to handhold your camera. Thus, the use of a stable platform for your close-up photography is critical.

When it comes to tripods, try to buy the best quality tripod you can. You will likely find that a good quality tripod will last much longer if used outdoors regularly, as well as providing a much more stable platform to reduce camera vibration. Cheap tripods are subject to much more movement than a good quality tripod. Properly taken care of, a tripod will last for years and as such, is a sound investment for improving your photography.

Several things to look for in buying a tripod include:

- Consider purchasing a tripod with carbon fibre legs rather than steel or aluminum to save considerable weight and still maintain stability.
- Buy a tripod that is correctly sized in terms of your height. The top of the tripod, without the centre column being extended, should be at least at chest height, so that with a tripod head and your camera mounted, it will be relatively close to your eye level.
- Purchase a tripod that you can fully open its legs to their maximum angle, which will enable the tripod to be lowered down close to ground level.

- Think carefully about the tripod head that is suitable for your use. Ball-head devices are quite common and quite useful when needing to adjust the tripod head quickly. However, some people have found that a geared head device is useful for shooting primarily still subjects, such as flowers or landscapes.

### Macro Focusing Rail

Any very useful item is a focusing rail, which provides a great deal of control for making minor adjustments forward and back or from side to side. This reduces the need to move a tripod when making focusing adjustments.



### Remote Shutter Release

To further help in obtaining sharp close-up images, several other accessories or techniques are considered very useful, including:

- Use of the digital SLR's mirror lock-up mode or feature (if available), which reduces the vibration of the mirror moving out of the way just before an image is produced.
- Use of the camera's self-timer to reduce vibration from pressure on the shutter release
- Use of a remote control cable or wireless shutter release to also reduce vibration

Your shutter speed will determine whether or not you have to use such features to improve your photography. However, mounting your camera on a tripod, along with use of a remote control device will help to greatly reduce camera shake from vibration.

As a general rule, for photographs below a speed of 1/60 sec. you should use a tripod rather than try and handhold your camera. Moreover, for shutter speeds below 1/15 sec., you should always use a cable release or the camera's self-timer, along with the camera's mirror lock-up feature if the camera has it.



If it is at all windy, avoid use of a self-timer to prevent problems with the wind unexpectedly moving your subject after setting up the focus.

## B. Additional Accessories

### Reflectors

Reflectors are circular pieces of highly reflective material stretched over a piece of collapsible metal ring. The fabric can be shiny or dull and white, black, gold, or silver in color. By pointing the reflector toward the light source, such as the sun, the reflector acts like a dull mirror, enabling you to reflect much of the ambient light onto the subject.

Using a reflector to brighten darker areas of your subject can add interest and reduce shadows in your subject. Such material enables you to bring out interesting details in the subject. You can also use a translucent reflector, positioned directly overhead, in bright conditions to block the sunlight and soften harsh lighting.



### Close-up Right Angle Viewfinder and Hood Loupe

Another very useful device is a close-up right angle viewfinder. You can either buy a brand name manufacturer's viewfinder or consider purchasing a unit from Hoodman Inc. at: <http://www.hoodmanusa.com/>



Hoodman also offer a device called a HoodLoupe, which enables you to preview your images more effectively on your camera's LCD panel.



### Other Devices

Other devices to help your close-up or macro photography include:

- Kneepads or a kneeling pad are very helpful when trying to get down near the ground.
- Ribbon to gently move natural objects out of the way when photographing in the field.

### III. RESOURCES AND REFERENCES

There are a variety of resources and references that will help to enhance your skills and knowledge in close-up and macro photography.

#### Books

- Understanding Close-up Photography (Creative Encounters with or without a Macro Lens) by Bryan Peterson.
- Nature Photography Close Up (Macro Techniques in the Field) by Paul Harcourt Davies.
- Digital Photography Expert - Close-up Photography by Michael Freeman

#### Websites and Articles

Tips for Macro Photography - The Extreme Close-Up

<http://www.thephotargus.com/tips/tips-for-macro-photography-the-extreme-close-up/>

Amateursnapper Photography Tips - Macro and Close-up

<http://www.amateursnapper.com/category/macro-and-closeup>

Macro Photography Tips for Point and Shoot Digital Cameras

<http://digital-photography-school.com/macro-photography-tips-for-compact-digital-camera-users>

Tips > Macro (Close-up) Photography

[http://www.photokaboom.com/photography/learn/tips/003\\_macro\\_photography.htm](http://www.photokaboom.com/photography/learn/tips/003_macro_photography.htm)

How to Take Macro Photo with a Basic Point-and-Shoot Camera - Tips and Techniques

<http://www.brighthub.com/multimedia/photography/articles/2557.aspx>

TableTop Studio - Jewelry Photography

[http://www.tabletopstudio.com/documents/jewelry\\_photography.htm](http://www.tabletopstudio.com/documents/jewelry_photography.htm)

Close Up Photography

<http://www.ephotozine.com/article/Close-up-photography-4693>

Learn Close-up Photography (Macro) with Pro Photographer Roy Todd (You Tube video)

<http://www.youtube.com/watch?v=FbfFIT0Rs6Q>

Using Your Digital Camera - A Guide to Great Photographs

<http://www.shortcourses.com/use/>

Close-up Photography Tutorial

<http://www.jimdoty.com/learn/Tips/Closeup/closeup.html>