

# Beautiful Bugs *A Collection of Tiny Portraits* by Frank Phillips

## How to Do Macro Insect Photography

by Frank H. Phillips, ©2004, All Rights Reserved, see © notice at bottom

### WHY PHOTOGRAPH BUGS?



Despite their reputation as pests, the trillions of insects, bugs, and spiders that inhabit the Earth can make some of the most fascinating and dramatic close-up photography subjects. Insects and their tiny environments offer the macro photographer an unlimited amount of color, texture, and physical architecture to explore. They are as unique as we are, and they are obviously much more plentiful. As an added bonus, you won't even have to get a "model release" after you've photographed them! During most months of the year, bugs can be found just about everywhere, and most make very willing subjects...

if you just learn how to find, approach, and compose them.

### WHAT DOES "LIFESIZE" MEAN?

What is meant by "true macro" is the ability to produce an image that is as big (or bigger) on the film plane (or digital sensor) as it is in real life...this is where we get the term "lifesize" or "1:1 magnification" as it is used in macro lingo. The term "magnification" is important because true macro photography does not involve "zooming" or getting closer to a subject; instead, we are relying on the lens itself to magnify the image that will be projected onto the film plane. In other words, just because your Sony F717 has a minimum focusing distance of 2 cm doesn't mean that it can produce "lifesize" images by merit of its ultra-close minimum focusing distance. Zooming and how close you are to the subject really have nothing to do with macro; it's mostly in the magnification properties of the lens. Still, just because you don't have a true macro rig doesn't mean you can't get great insect close-ups.

### EQUIPMENT CHECK

If you want to go beyond typical close-up insect photography with your SLR, you'll be entering the world of true macro photography (called "photomacrography"), and dedicated macro equipment will be necessary. If, however, you want to stick with your digital point-and-shoot (which is a great tool for close-up work), you'll have to work on getting "closer" close-ups instead of doing true macro photography.

The equipment options for an SLR shooter (film or digital SLRs) are wider than for the point-and-shoot camera owner. The equipment that an SLR user might employ includes true macro lenses (be careful: just because a lens says "macro" doesn't mean it's true 1:1 macro), extension tubes, close-up filters, bellows, and "reversed" lenses. The latter two methods,



although effective, are more troublesome than the first three, so we'll stick to discussing those.

**True Macro Lens:** This is a dedicated 1:1 macro lens that does not require any special attachment to achieve true macro magnification, although you could “kick it up a notch” with accessories like extension tubes and/or close-up filters. These lenses are “prime” lenses, meaning that they are of a fixed focal length, usually in 50mm, 100mm, or 180mm. Just about every 35mm lens manufacturer, including Canon, Nikon, Minolta, Sigma, and Tamron, among others, produces true macro lenses.

**Extension Tubes:** These are hollow tubes that are placed between a lens and the camera body, and they simply move the lens elements farther away from the film plane, thus increasing magnification. Because there is no glass in the tube (just air), image quality will not be degraded by optics that are of lesser quality than the lens you're using. As a general rule, the magnification you can achieve using extension tubes is relative to the focal length of the lens you use them with, and the “formula” is:



$$\text{tube length} \div \text{focal length} = \text{added magnification}$$

For example, if you use two 25mm extension tubes on a 50mm macro (1:1) lens, then your magnification will be 2:1 (2x lifesize) because your lens was already 1:1 (by virtue of being a true macro lens) and then you added another 50mm (2 x 25mm) of extension tubes which is the same as the focal length of your lens, adding another 1x.

**Close-up Filters:** Besides a true macro lens, close-up filters are the easiest to use, but afford the least magnification. They are diopters that screw onto the threads on the front of your lens (macro or non-macro) that magnify what's in front of them, kind of like reading glasses for your lens. These filters come in a variety of “powers” and are produced by many different manufacturers. Of special note are the Canon 250D and 500D close-up filters; they come in different thread sizes to fit a wide variety of lenses. You should not confuse these with “teleconverters” that multiply the focal length of your lens; these filters do not change focal length, they serve only to help magnify what's in front of the lens, not “zoom” the lens.



If you are a digital point-and-shoot camera owner, your reasonable options are limited to close-up filters. But don't get discouraged, because you can still get some outstanding results using these filters. For example, on the internet you can find a tremendous amount of excellent close-up insect photography being done by [photographers](#) using cameras such as the Canon G3/G5 with reversed lenses, or Sony F717/F828 equipped with close-up filters.

## UNDERSTANDING MACRO'S LIMITATIONS

As the saying goes, “You can't have it all”, so the increased magnification you get with macro comes at the expense of depth-of-field (DOF). Depth-of-field is “how much” of the picture is in sharp focus. There is an inverse relationship between magnification and DOF...the more magnification you get, the less DOF you get.



Of special note is the DOF difference between point-and-shoot digital cameras and SLR cameras with macro lenses. The physics behind this are

quite complex, but because the lens on a P&S digital is so close to the digital sensor, the lens must have an extremely wide focal length in order to project the image onto the sensor. Wide lenses by nature provide greater DOF than longer lenses (all other things being equal), so P&S digital cameras are capable of providing a significant amount of DOF relative to their weak magnification ratios.

Another limitation to higher magnification is the “camera shake” factor that increases with magnification (and with the weight of all that equipment...my full rig weighs over 6 pounds). If you’ve ever looked through a non-stabilized 300mm telephoto lens, you know that even as you breathe, your field of view will wobble as you find it hard to hold the lens steady at that long focal length. The same is true of high magnification; although it’s not “zoomed in” on the subject (it’s magnified), the effect is the same...it’s very difficult to hold still when highly magnified.

Another technical difficulty in shooting macro, especially “extreme” macro, is getting the focus point at the optimal plane. Focusing at the right point becomes critical because of the very limited DOF, so you need to identify the part of the bug that will yield the most drama, and this can depend on exactly what you’re trying to show. On many bugs the eyes (and even bug “pupils”) lend a dramatic connection between them and us, so that is what you might want to have the sharpest focus. On the other hand, many bugs’ wings have similar structure to a stained-glass window, and you might want to draw attention to those patterns. Whatever it is that captures your eye should also capture the eye of your audience, and that is what you should focus on.

## BEND THE LIGHT

There are two good ways to tip the scale in your favor when shooting macro. The first is to make good use of external electronic flash. Although there are some drawbacks to using flash in macro, such as the possibility of glare, reflections, or a stark background, these risks are outweighed by the benefits of maximized depth-of-field because flash will let you stop down and increase shutter speed. When you control the light, you control the shot.

Electronic flashes have come a very long way, in terms of macro photography. Many camera manufacturers offer complete macro systems that make it easier than ever to control macro lighting. Of special note is Canon’s excellent MT-24EX flash, which mounts on the front of your macro lens and provides two separate flash heads that can be angled and rotated in a multitude of lighting combinations. Another way that macro photographers are using flash is to employ special brackets and diffusers that put a single flash on an adjustable arm so that the arm can be “bent” and thus point light directly at the subject. Still other photographers are using brackets that provide shoes for two separate flash units that can be positioned independently. Obviously, there are many ways to employ flash in macro photography, and doing so will improve your success rate dramatically.

Another way to get the upper hand is with increased megapixels (if you shoot digital). There is a huge difference between shooting 3 megapixels vs. 5 or 6 (or even 8) megapixels because when you capture more pixels you can crop (an “after the fact” zoom) many of them away and still end up with enough pixels for a good print. Note, though, that megapixels have nothing to do with magnification.



## LET'S TALK LENSES

The easiest and most efficient way to get true macro photos is to use a true macro lens. Most manufacturers make 1:1 macro lenses in several focal lengths ranging from 50mm to 200mm, and



they are always fixed focal lengths. These are low-maintenance lenses that you put on the camera and operate just like any other lens.

Macro lenses typically have very short minimum focus distance ratings; minimum focus distance is the “closest” distance you can be to the subject before the lens loses its ability to focus. Short focal length macro lenses have lower minimum focus distance than longer focal length macro lenses. What this means to the macro photographer is “working distance”; working distance is the measure of length between the end of your lens and your subject when at a 1:1 magnification ratio. A longer lens will give you more working distance while maintaining 1:1 true lifesize magnification.

For example, Sigma makes three very good macro lenses in the three focal lengths 50mm, 105mm, and 180mm. The working distances are as follows:

Macro Lens:	50mm	105mm	180mm
Working Distance :	1.6 inches	4.7 inches	9.1 inches

This means that if you use the 50mm lens, you will have to be about 1½ inches away to get a lifesize shot, and if you use the 105mm lens, you’ll have to be just under 5 inches away. But if you use the 180mm lens, you can be up to 9 inches away from the subject and still get a full 1:1 lifesize macro shot. Obviously, this is important with either dangerous or highly skittish insects like butterflies...more working distance allows you to get 1:1 without getting too close.

One effective way to squeeze even more working distance out of some lenses is to use teleconverters (TCs), which go between the lens and the body (like extension tubes do); TCs contain glass elements that effectively change the focal length of the lens. Continuing with my example above, if you put a 2x TC onto the Sigma 180mm macro lens, you will effectively double the focal length of that lens to 360mm and it will still maintain its true macro 1:1 magnification. But the real benefit of doing this is that it will also double the working distance of that lens to over 18 inches. As an added bonus, you could even gain some extra magnification this way because if you use this combination at the “normal” working distance of 9 inches, you are actually shooting at 2x lifesize (2:1)! I should mention here that there is a price for just about everything, and the price of using TCs is loss of light reaching the film plane by the



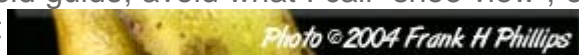
number of stops equal to the magnifying property of the TC. For example, a 2x TC cuts out two full stops of light, and thus will “slow down” your lens by 2 stops. This really doesn’t matter in macro, as you have already learned, because you will be stopping down anyway in order to maximize depth-of-field.

There are some other highly-specialized macro lenses available from Canon and Minolta that allow for “extreme” magnification without any extra attachments such as tubes or teleconverters. The Minolta lens allows magnifications up to 3x lifesize (a 3:1 reproduction ratio) and the one I use, Canon’s outstanding MP-E lens (read my review of this lens here), allows magnifications of up to 5x

lifesize (5:1). These lenses are expensive, difficult to master, and hard to handle, but if you practice with them and become proficient in their use, you will reap the benefits of some utterly stunning extreme close-up shots.

## THE "ART" OF THE SHOT

Before you fire the shutter for the first time, you should prepare yourself mentally. The first thing to think about is putting yourself in a frame of mind to compose the image in a non-clinical way; I prefer to approach each shot as if I am doing a “portrait” of the insect. Try to avoid an aerial perspective like you might see in a field guide; avoid what I call “shoe view”, or showing the bug as the bottom of your shoe might



see it, as demonstrated by the ladybug at right.

Remember, the science of the shot may be your advanced equipment, but the art of the shot is capturing the subject in a unique and dynamic pose. Think about what makes this bug so interesting, and then try to highlight that feature. For example, butterflies have a built-in “straw” called a proboscis, and they use this straw to draw nectar out of blossoms. If you can get an “action shot” of a butterfly dipping its straw, you’ve got an interesting and dynamic photo.

One of the first things you’ll notice is that some insects are extremely skittish (butterflies, damselflies, and dragonflies) while others aren’t bothered by your presence (ladybugs, many grasshoppers). You’ll see that some insects are constantly moving about (ants, bees) while others prefer to sit still for extended periods (many spiders and assassin bugs). And others, like leafhoppers and plant hoppers, don’t seem to mind being photographed, but will shyly turn their back on you, forcing you to change position constantly. The point is that you should invest some time getting to know the common behavior of your tiny subjects before firing the first frame.

## PATIENCE AND TIMING

If you’re like me, only a very small percentage of your shots end up being “keepers”. You can help to tip the odds in your favor if you practice patience and plan the timing of your outings strategically.

As you already know, most bugs are seasonal creatures and are most plentiful during Spring and Summer, so if you begin looking in late Autumn or the dead of Winter, maybe you should



hold off until Springtime. The time of day you choose to go out hunting for bugs can have a dramatic effect on both the number of bugs you encounter and the quality of their demeanor when you shoot them. As with most daylight outdoor photography, the best times to go are early morning and late afternoon or evening. The light is at its softest then, making for less harsh light and shadows, and in the early morning you’ll have the benefit of “groggy” bugs that have not yet warmed up enough to start moving around frantically. This is not to say that you will not find bugs in the middle of the day; you will find plenty of them, but at mid-day you’ll be wrestling with faster-moving bugs and

harsh light.

When you are finally in the field, your patience will often be tested. Some days are good, when you will find an abundance of cooperative bugs, while other days you will come up dry, having seen only a few subjects, and ones that were not-so-cooperative as well. When you come upon an interesting subject (or group of subjects), it may take quite a bit of time (and many, many frames) to get what you believe is a good shot, and then when you get home to take a closer look at it, it may not really be as good as you first thought it was. This is where patience really pays off. When you go out for a shoot, plan on blocking out a significant amount of time to make it worth your while.

## THEY'RE EVERYWHERE

One of the most common questions asked of me is, “Where do you find so many bugs?” Insects and spiders are literally everywhere, and in immensely vast numbers. All you have to do is know what type of bug you’re looking for and a little bit about that bug’s behavior, and you’ll know where to start. Buying and studying an insect field guide is a good



place to start because you'll be able to find out which bugs inhabit your area, and you'll learn about where they are most likely to be found. For example, damselflies, dragonflies, and mayflies like water, so if you want to find them, start at a pond or lake. Butterflies and bees like blossoms and blooms, so if you want to find them, go where the flowers are. Grasshoppers like to hang out in fairly tall grass, so the best way to find them is to simply walk through tall grass and watch for them to jump. Because your targets are so small, you have to become fairly "narrow minded" with your vision in order to see them.

## BECOME A STALKER

Once you've placed yourself in an environment that promises to have lots of subjects, and once you've identified a single target, your next objective is to keep from scaring it off. This is when practicing good stalking technique pays off. Most insects have excellent vision (and you would too, if your eyes were made up of 30,000 facets like a dragonfly's eyes) and to them you are a potential predator. Your job is to make yourself non-threatening, so the first thing you want to do is move slowly...very slowly.

Moving slowly also means making deliberate movements. Look before you move...look at where your feet are, look at where your equipment is, and most of all plan where you are going to put the front of your lens. Many potentially good shots have been ruined by the front of a lens bumping a branch or leaf where a bug was resting, causing it to flee.

My most frequently published shot is an extreme close-up of a dragonfly with blue-green eyes sitting on the end of a long leaf. That shot was at 3x lifesize (3:1 magnification) and the front of my lens was between 1 and 2 inches in front of the dragonfly. Needless to say, I had to literally creep up to it extremely slowly to avoid scaring it off. I was crouching down and slowly "waddling"



up ever closer, which was quite uncomfortable, and it caused me to breathe harder and I ended up with shaking and fatigued hands before I fired a frame. You can imagine how hard that can be with equipment that weighs over six pounds! Even to this day I'm still surprised that I was able to get that shot.

Although most bugs do not have ears like ours, many have sensory organs that let them "hear" by sensing vibrations either physically or in the air itself. Any errant movement on your part could cause you to lose a shot, so be sure to tread carefully when stalking your subjects.

## THE TRICKY PART

When you've finally found a great subject in a great position, it really all comes down to one single item: execution. You have to meter properly and you have to focus properly. If these two components are not executed well, all is for naught.

The first rule of metering macro is to maximize depth of field, which means setting your aperture as far down (a high f-stop number) as you can reasonably get it. Most lenses will stop down to f/22, and many macro lenses will stop down to f/32. There is some debate about losing sharpness at those extreme apertures, but suffice it to say that you are much better off at the high-number end of the aperture range, anywhere from f/16 to f/32.



If controlling aperture is so important, it means that you will have to set your camera to either aperture-priority or full manual control. What you want to avoid is setting your camera to “Auto”, “Program” or “Macro”. The latter exposure control setting is usually designated by a tulip symbol, and it just tells the camera to err on the side of a small aperture; it has nothing to do with “converting” your camera or lens to shoot macro, and many camera owners are being fooled by this setting every day.



Be careful when using your camera on aperture-priority mode because the camera will pick a corresponding shutter speed that balances the small aperture (high f/stop) to properly expose, and this often results in shutter speeds too slow to hand-hold (because a small aperture lets in less light). A tripod can eliminate this problem as long as the subject is stationary. Even if you use a flash, though, most aperture-priority systems will still set a balanced shutter speed and use the flash only for fill light, not as the main light for the shot. For these reasons, I do all of my macro shooting in full

manual mode and with a powerful flash.

Assuming that your camera system has a capable flash exposure metering technology, such as Canon's E-TTL and Nikon's D-TTL, the combination of manual exposure settings and a powerful flash system rigged for macro gives you as much control as you will need for most shooting environments. Since you control the light (with your TTL flash or flashes), you can set your camera to whatever aperture and shutter speed you desire, and then just let the flash do its job. Most of my shots are at an aperture of f/16 and a shutter speed of 1/125; this way, I get the value of a smaller aperture (maximizing DOF) and the flexibility of a relatively fast shutter speed that makes handling much easier.

One of the drawbacks to using a flash for all (or most) of your light source is that you often end up with a stark black background, as if the photo was taken in the black of night. This effect is caused by the combination of a very small aperture and a relatively high shutter speed. Some people do not like such a background, but my preference is for this effect because it tends to dramatically separate your subject from anything that might distract from it.



Even with all of the high-tech TTL flash systems available today, nature still finds ways to fool our metering systems. Of particular note are shiny black or dark bugs, whose reflective covering fools most metering systems into underexposing. If your insect is against a very light or white background, it will make the metering system think the environment is brighter than it really is, and you will again get an underexposed shot. Times like this are when the immediate feedback provided by a digital camera system proves to be a real bonus.

So what do you do when you encounter one of those tough metering situations where the camera will be fooled into over- or under-exposing the shot?

Recognizing such a situation is the most important part, but once you know that you need to do something, you generally have two options: exposure compensation and flash exposure compensation (FEC, if your camera has this feature).

Most cameras provide the option of  $\pm 2$  or  $\pm 3$  stops of exposure compensation, so you can use that if you can accept deviations in your aperture setting, which will affect DOF, most likely in an adverse way. My preferred method is to use FEC because doing so allows me to keep my aperture and shutter speed where I want them, and then I just pump more or less light onto the subject with my flash, depending on whether the shot would have been over- or under-exposed.

## THE HARD PART

By far, the most difficult part of macro (and especially extreme macro) is focusing. Modern autofocus (AF) systems are useless at these magnifications because you cannot precisely set the exact plane of focus when using the camera's AF system, but at less-than-lifesize magnification AF will do well. However, if you rely on your camera's AF at high magnifications, you will end up being sorely disappointed and you will finally switch to using manual focus (MF) for these shots, so you might as well start there from the beginning.

The one exception to the "don't use AF" rule is digital point-and-shoot (P&S) models because the LCD screen on that type of camera would have to be used for manual focusing (if the model even has a manual focus feature), and those screens do not have the resolution to accurately show you what is or is not in focus. Another drawback to using a P&S digital for macro, even newer models that show you a "general area" where the camera focused, is that you can never really know exactly where the plane of focus is by looking through a viewfinder or LCD screen. The only way to truly know what is in focus is to be able to see it yourself through the lens.

There are all sorts of elements that will be working against your focusing efforts, depending upon where you are shooting. When shooting outdoors, even a light wind can have a dramatic adverse effect on focus; the camera may be still, but if the wind is blowing your subject around, you can forget about getting an accurate focus. In my experience, I have found that a tripod is not much help because if the subject is in motion on its own (or in motion because the leaf, stem, or branch it's on is moving) the tripod cannot have any effect on that movement. Tripods are good for keeping the camera still, but do not keep anything else still, so they are of very limited use when photographing bugs.



One item that I use every once in a while when it is especially windy is the Wemberly Plamp Clamp. This smart gadget attaches on one end to a stationary object (even a tripod) and the other end has a gentle "grabber" clamp that you can affix to a branch or other object that you want to keep still. For example, if you find a garden spider atop a tall flower, you might clamp the stem of the flower just below the blossom to keep it from blowing in the wind.

Close-up photos are hard, true 1:1 macro is harder, but when you shoot at magnifications of "extreme" macro, all of the difficulties associated with "normal" close-up become magnified themselves. If you find

yourself holding your breath (in an attempt to hold still) when shooting close-up, you will now discover that even the beat of your heart can affect your focusing ability when shooting extreme. Your hands and arms will become fatigued by the weight of your equipment, resulting in physical instability that will add to the difficulty.

Fortunately, there is an excellent focusing technique that many macro photographers use to minimize the effects of breathing and stress. This technique involves setting the lens on manual focus at the highest magnification, and then slowly moving in toward the subject until it is in sharp focus, and then firing the frame. This method can be fine-tuned by first getting "in range" of your subject and then moving slowly toward and away from the subject until you've identified the sharpest plane of focus. If you get the chance to try this, even with simple close-up shots, you'll find that it is very effective.

## BRINGING IT HOME

Sometimes you luckily happen upon an interesting bug in your yard, but the bug's immediate environment is either dull (like a bug walking on concrete) or in a position that would make it overly difficult to shoot (like a bug deep inside some thorn branches). Sometimes you're in an environment that is particularly windy or wet. In such cases, it may often be a good idea to gently capture the bug and then shoot it "on stage" in a home macro studio, and then later release it back into the wild.

A home macro studio can be simple or it can be elaborate. Mine is somewhat in-between. I built an eight cubic foot (2'x2'x2') box that is open on top and in the front. It is draped in black velvet, but you could have any color handy, or simply coat it with poster paper, etc. I have clamped onto it two reading lights with GE Reveal bulbs, which are much cooler than regular incandescent bulbs. These lights are not for illuminating the photo itself (my flash does that), but for illuminating the scene so that I can get an accurate focus. Inside of the box I have placed a piece of smooth driftwood bolted onto a piece of slate for stability. On this driftwood I place fresh leaves and greenery, which becomes the bug's temporary home while I'm shooting.



When you capture the bug, it is very important to do so very gently, because you do not want to shoot a five-legged insect (insects have six legs) and you do not want to release a wounded bug back into its habitat, putting it at a disadvantage as both predator and prey. I have found that the best way to capture non-flying insects is to get a container ready, and then gently coax it onto a stick or leaf, where you can then transplant it into the container. In many cases you won't even need a container because you can simply relocate the bug to a more photogenic location and then shoot normally.

But if you decide to take the bug into your home macro studio, don't let it spend too much time in the container because you want to shoot a fresh, lively bug that behaves naturally. Get inside, set up your props and lights, and then start shooting.

## YOUR "NATURAL" RESPONSIBILITY

Being a conservationist (but not an "environmentalist"), I recognize the balance of nature and my responsibility to use natural resources wisely and respectfully. One of the best attributes of nature is its ability to reproduce those resources if we accept the responsibility to maintain the natural order of things and use the resources wisely. Bugs are an important part of this natural order, so it is our responsibility to minimize any potential harm that might come as a result of our activities with them.

I am often asked if I ever use any common "calming" techniques to make bugs cooperate; such techniques include capturing bugs and refrigerating them to the point that they move slowly, if at all. My answer is an unequivocal "No" for two reasons. First, doing such a thing is ethically wrong because it's for a selfish reason. Second, I like the purity of a "clean shot" that is not artificially enhanced...there's something about the thrill of the hunt that makes a great shot even more valuable. Cheating in photography is like cheating on a test: you may get what you want, but it's really not worth much if you had to cheat to get it. Don't compromise your photographic integrity by taking shortcuts that help no one.

Finally, consider the future impact of that single bug that you might kill to get a shot. Don't you want that bug to find a mate and make more little bugs for you to shoot? We're not talking about "the goose that lays golden eggs" in such a case, but you know how that story ended...

Then there's the issue of "baiting", a method used



to attract bugs and keep their attention long enough to shoot them. Although I do not have any moral or ethical problem with doing this, to me it's just not sporting, so I do not do it.

## THE REWARDS OF EXTREME MACRO INSECT PHOTOGRAPHY

Extreme macro photography allows us to explore a world that would be quite difficult to explore with the naked eye. If done well, the results of this type of shooting can be simply breath-taking, but it will come at a price.



You'll be faced with the potentially high cost of a digital SLR camera (if you shoot digital), expensive dedicated macro lenses and macro flash, plus other accessories. The cost of time is high because extreme macro takes time for preparation to go into the field, and a tremendous amount of patience once in the field.

The learning curve is also rather steep, as new shooters will have to learn and practice using new or unfamiliar equipment and techniques, in addition to watching and learning the behaviors of their favorite bug subjects. There will be lots of trial-and-error as a macro photographer's skills become

better.

Despite the expenses of money, time, and a steep learning curve, extreme macro photography could end up being one of your favorite types of photography. If you are interested in getting started, but don't want the risk of a full set of dedicated equipment, get your feet wet with a set of extension tubes and your favorite lens. For P&S digital camera owners, start with the "macro" setting on your camera and see what you come up with; for even better shots, try adding a close-up filter if your camera will take one.

Whichever method you choose, if you want to explore this wonderful world beneath our feet, get started now...you never know what you will find.