

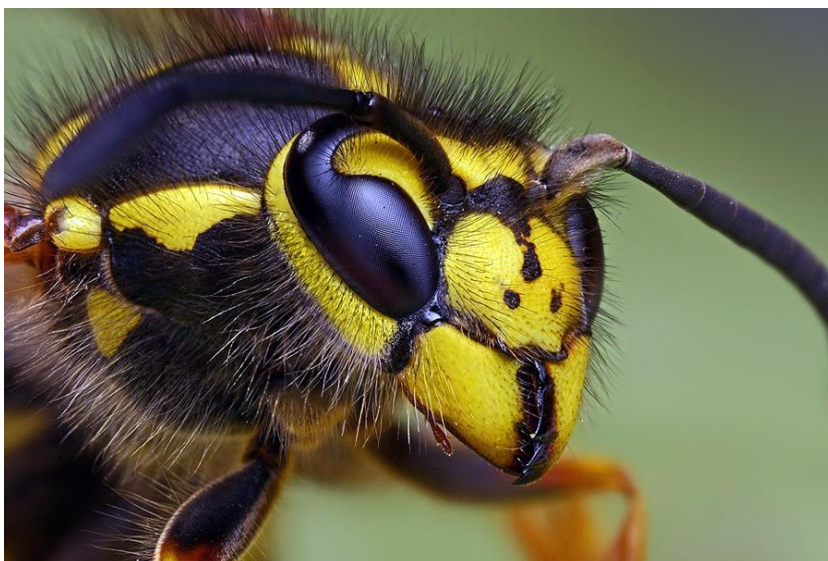
MACRO AND CLOSE UP PHOTOGRAPHY

WHAT IS MACRO AND CLOSE UP?

The technical definition of macro is that the subject must be life size “on the sensor”, thus producing an image many times life size when displayed. Thus, macro kit is described as a ratio compared to life size on the sensor. 1:1 would be life size, 2:1 double etc, and, of course, 1:2 is half life size on the sensor. That would fall into the category of closeup, rather than macro.

Beware of lenses making false claims!

These images are macro images:-





Maybe this one is technically a closeup

WHAT KIT DO I NEED?

Macro photography (I'm just going to call it macro from now on) requires getting the camera as close to the subject as possible and providing magnification with the lens. The minimum focusing distance of most lenses prevents this type of photography. You simply can't get close enough. So macro kit primarily reduces the minimum focusing distance and gets you closer.

Your options are (in cost order):

Lens reversing adapter (£5-£10 for the basic option)



There are two types of reversing adapter. The type that will not allow communication with the lens (left pic) and the type that does (right pic). Communication with the lens gives control over aperture, so if using the cheaper type, a modern lens may not work, or may be stuck at max aperture. You will also need to use manual mode as the camera's automatic systems may be disabled.

Don't dismiss this method. One of the pics at the Wildlife Photographer of the Year exhibition that we went to on our last outing was taken using this method.



7:39

NATURAL HISTORY MUSEUM WILDLIFE PHOTOGRAPHER OF THE YEAR

WPY 2019

© Ripan Biswas

Winner 2019
Animal Portraits
Ripan Biswas, India

Face of Deception

Ripan was photographing a red weaver ant colony when he spotted this slightly strange individual. It may have the face of an ant but its eight legs give it away – on closer inspection Ripan discovered that it was an ant-mimicking crab spider. By reverse mounting his lens, Ripan converted it to a macro capable of taking extreme close-ups.

Many spider species imitate ants in appearance and behaviour. Infiltrating an ant colony can help them prey on unsuspecting ants or avoid being eaten by predators that dislike ants. This particular spider, says Ripan, seemed to be roaming around the colony, looking for a solitary ant that it could grab for a meal.

Technical specification

Nikon D500 + 18–55mm lens (reverse mounted); 1/160 sec; ISO 200; Godox V860II flash

TAKE CARE, YOUR LENS' REAR ELEMENT WILL BE EXPOSED TO THE WORLD.

I recommend buying a vintage lens, say a 50mm f1.8. It will have an aperture ring giving aperture control, and they are cheap to buy (so few worries about the rear element).

Focal lengths of 50mm or less are best, with wider focal lengths giving more magnification.

Focusing involves moving the lens in and out relative to the subject.

Macro filters (£10-£20)



These are, perhaps, the simplest way so start in the world of macro. They simply screw into the front of your lens (using the filter threads) and off you go! They come in various magnifications as you can see. You will need to know your lens' filter thread diameter, and you will only be able to use them on lenses with that particular filter diameter. A lens of approx. 50mm will suit best.

Focusing relies on moving the lens in and out relative to the subject.

Extension tubes (£25-£150)



These are effectively spacers, moving the lens away from the camera body. They come in two types, those with electrical connectors allowing communication with the lens, and those without, giving no communication with the lens.

There is a very small range of distances within which these will work. You will need to get the camera within that range (different for each size of tube). The tubes with no communication are best used with lenses with an aperture ring.

Bellows (£25-200)

Another form of spacer is a set of bellows. A little more complicated to use than extension tubes the bellows have the option of varying the magnification on the fly by changing the separation of camera and lens.

**Camera
Macro Bellows
and Lens**



WITH ALL OF THE OPTIONS ABOVE RESULTS CAN BE EXCELLENT. HOWEVER, CREATIVE CONTROL IS LIMITED AS YOU ARE RESTRICTED IN THE DISTANCE TO SUBJECT.

Probe lenses (£1500 ish)



For those hard to reach places, or subjects you'd rather not get close to, or a look that says you were part of the scene, a wide-angle probe lens may do the job. Beware, though, they're expensive.

Macro lenses (£400-£2000)



This is by far the best and most expensive option. Macro lenses are wondrous beasts that produce results that will have you proudly showing your friends! And you will have total creative control! It works like a normal lens, just with a much smaller minimum focusing distance.

Focal lengths range from 40mm to 180mm, giving increasingly greater distance to subject, and in some cases magnifications.

The focusing ring has a much bigger “throw” (rotation), to enable precision focusing, but this means focusing can be slower than a normal lens. Therefore, macro lenses often have focus limiters, a switch on the lens that allows you to choose the range of focusing distance and speeding it up.

Do you need an image stabiliser? Political correctness in magazines would have you believe that image stabilisers are entirely unnecessary on macro lenses. However, ask yourself how you will be taking your shots. If the answer is handheld in the field, then trust me you want an image stabiliser. After all, you can always switch it off when using a tripod.

And a quick word on micro four thirds cameras. Depth of field is at a premium in macro shots, so this sensor size, with its increased depth of field, is perfect for macro!

MACRO TECHNIQUES

You will need to know how to manipulate the main controls on your camera. Some of your normal techniques, such as focus and recompose, will not work so you will need to be able to change some of the perhaps lesser used settings too.

THE CONUNDRUM

The camera will be extremely close to the subject. That will give us a couple of challenges. Distance to subject has a huge effect on depth of field, and being this close means that dof will be tiny compared to what we might normally expect for any given aperture and focal length. It may be measured in single millimetres at wide apertures.

Also, the closeness to subject means camera shake is exaggerated, leading to a need for faster shutter speeds. Add these two to the desire for maximum image quality and therefore low ISO, and we have a problem.

Fast shutter speeds and narrow apertures let in less light, and low ISOs have lower sensitivity to what light there is. So, we will need to either compromise on depth of field (using low dof as a creative device), light the subject or use a tripod to allow longer shutter speeds.

HANDHELD

ISO

Even on bright sunny days you will need to increase the ISO in order to achieve the shutter and aperture settings you desire. Only occasionally will you be below 400 ISO (without extra lighting), but more frequently you will be at 800.

Aperture

The camera will be very close to the subject. Distance to subject is NOT measured from the end of your lens, but rather from the focal plane symbol on your camera body.



Minimum focusing distances are measured from here. This means that depth of field will be very small. You can use this to your advantage, or combat it using aperture. However, even at 800 ISO it will be difficult to achieve an aperture smaller than f8.

Shutter speed

The proximity to the subject means that any movement of the camera or subject will be greatly magnified. You will, therefore, need a shutter speed that is as fast as possible, but generally no slower than a 250th of a second. This is where an image stabiliser is invaluable giving you the option to sacrifice shutter speed (selecting a slower speed) in favour of a smaller ISO (less noise) or narrower aperture (more in focus).

LIGHTING

There are various forms of portable lighting available for handheld shooters. Lighting the subject has many benefits, including freezing movement (flash), lowering ISOs, allowing greater depths of field and creative options such as backlighting and darkening backgrounds :-

Pop up flash



Use in manual or Av mode. Familiarise yourself with flash exposure compensation to turn the power of the pop up flash up and down.

Speedlight



Again use in Manual for macro (both camera and flash), and turn power of flash up or down on flashgun or using flash exposure compensation. Use a trigger and receiver set to use off camera.

Starting point (my favourite method):-

Manual mode for camera and flash

200 ISO

1/125th of a second

F16

Set the camera settings. Then use test shots to alter the power of the flash until exposure is correct

Use ISO to make minor adjustments to exposure for each shot

Ring Light



Use as flash or constant. Manual is best, but can be Av. Gives very close light, so you can take advantage of the inverse square rule of light to give very dark / black backgrounds.

On camera panel light

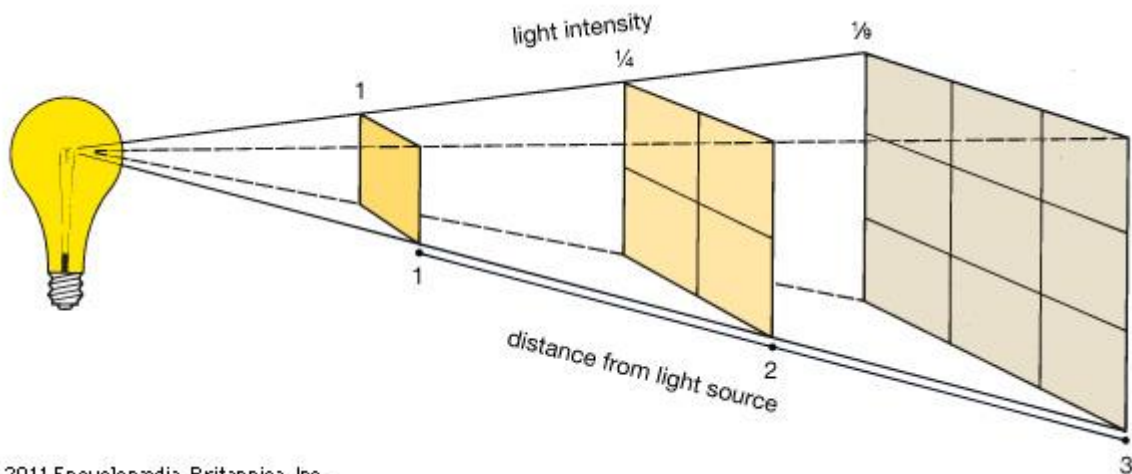


Pretty much speaks for itself. Use manual or aperture priority.

All of these will allow you to reduce shutter speed (flashes), reduce ISO or get smaller apertures. They are useful even on very bright sunny days.

Inverse square rule ($1/(X \text{ squared})$)

Light intensity decreases by the square of the distance away. Thus there comes a point where the background no longer registers on the sensor.



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So if your subject is 1ft from the camera.....

-At 2 ft from the camera (1ft behind subject) flash intensity is $\frac{1}{4}$ that at the subject

-At 3 ft from the camera (2 ft behind subject) flash intensity is $\frac{1}{9^{\text{th}}}$ that at the subject

-And so on

Metering Modes

There are two main metering modes to use. Matrix / evaluative works very well, as does spot metering. If using spot metering, make sure you understand

whether your camera will meter at the focus point or at the centre. Don't assume!

Exposure Compensation

Negative compensation is often required, particularly on sunny days and with insects and shiny or white subjects. Some lenses have different transmission factors to others, so you may need to adapt your exposure compensation to suit the lens you are using.

Optimising available depth of field

Subjects that are "in the plane of the sensor" will appear to be more in focus. Those which are perpendicular to the sensor plane will appear less in focus.

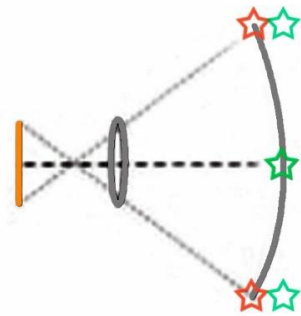


PERPENDICULAR

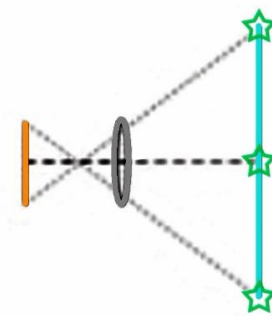


IN SENSOR PLANE

Focusing



Curved Field Lens



Flat Field Lens



Even though macro lenses tend to be flat field lenses, focus and recompose may not work, particularly at wider apertures. In recomposing you risk throwing the subject (or subject's eye) out of focus. So, move the focus point if you have time.

Backgrounds

Backgrounds are nearly as important as the subject – don't neglect them. Position yourself, or the subject or the background to the best effect:-

Mid distance trees and bushes with light coming through them can provide nice bokeh

- Complementing colours are good
- Other flowers etc in background add depth and colour
- The sky can be a white background with positive ev

Go to www.vikspics.com for examples of good use of backgrounds and shallow depths of field.

Here are some pics including nice backgrounds:-





MACRO ON A TRIPOD

For still subjects where a tripod can be used, shutter speed is not an issue. You can control lighting and take your time. Remember to switch off the image stabiliser when using a tripod.

Shutter speed

Who cares? As long as it is under 30 seconds we are fine in all modes.

Aperture

Your choice. F22 is available if you'd like a bigger depth of field (but beware of diffraction reducing sharpness), although you will need a focus stacker for a really big depth of field.

ISO

100 of course!

Focusing

Use live view

Move the focusing frame on the screen over the place you want to focus on.



Zoom in on the screen. Usually a magnifying glass button (see above on lhs)

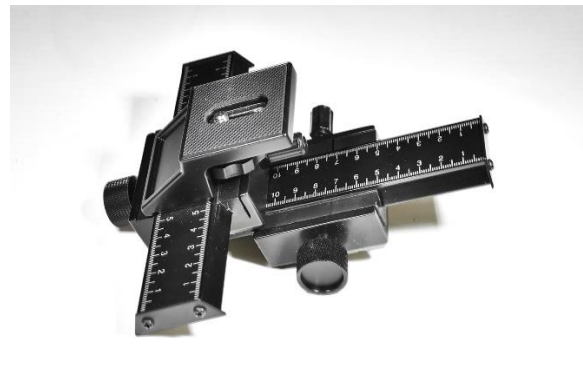
Switch off auto focus. Use manual

Manually focus until the enlarged image is sharp

Shoot!

Use a remote shutter release.

Focus Rail



As a general rule, when the camera is on a tripod you should move the subject to do the first focus, but focus rails allow you to move the camera around without resetting the entire tripod.

It also allows you to make minute movements of the camera (without changing any of the settings or focus point), so you can focus stack later (stitch pics together in software) without any focus breathing by the lens. Famously, Levon Biss uses this technique. Visit <https://levonbiss.com/> to see examples of his work.

Focus Stacking

Follow this link to learn more about focus stacking in Lightroom and Photoshop. You may need to copy and paste into your browser.

<https://muenchworkshops.com/blog/quick-guide-to-focus-stacking-with-lightroom-and-photoshop>

<https://zerensystems.com/cms/stacker>