



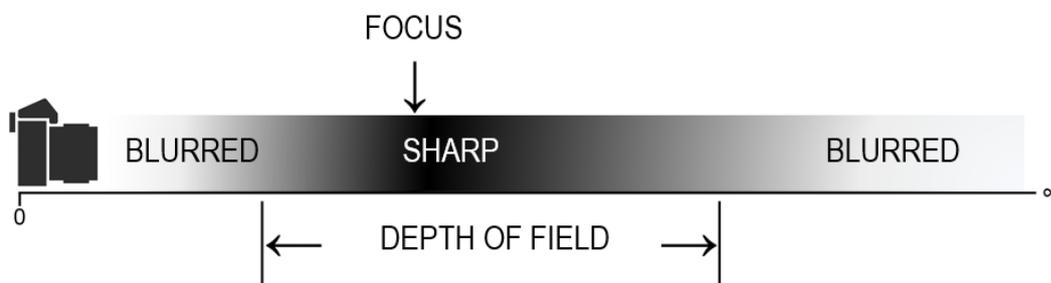
MACRO PHOTOGRAPHY
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1- Introduction

The term "Macro" means photography of small subjects. It can be insects, electronic components, or small parts of larger elements. Usually we talk about macro from a magnification ratio of at least 1:1.

Depth of field:

It is the amount of distance between the nearest and farthest objects that appear in acceptably sharp focus in a photograph.



What is ratio 1: 1

Concretely, a subject which measures 1 mm in reality also measure 1 mm on the sensor, or 24x36 film. Therefore a subject of 3.6 cm length occupies the entire length of the picture.

This is valid for "full frame" sensors.

But with digital sensors APS-H (coefficient 1.3) and APC (Coeff 1.6), the reasoning becomes more complex as the object of 3.6cm far beyond the scope of the picture.



At focal length (105mm here) and equivalent distance, here is the practical impact of the different dimensions of digital photo sensors.

Larger is the sensor: smaller depth of field, noise reduction at high ISO, increasing of the dynamic range (ability to preserve details in shadows and highlight).

Today, we usually name macro any photo that shows something small, a detail or a close up.

It is a misnomer that are responsible hardware manufacturers themselves, who often describe their lens as "macro" while those will not achieve this 1:1 ratio.

It is more close-up picture and the term is rather dedicated proxy-photography (photos of flowers or dragonflies...).

It is then usually found at ratios of 1: 2 or 1: 4.

2- Particularities in macro

2.1 Depth of field very low

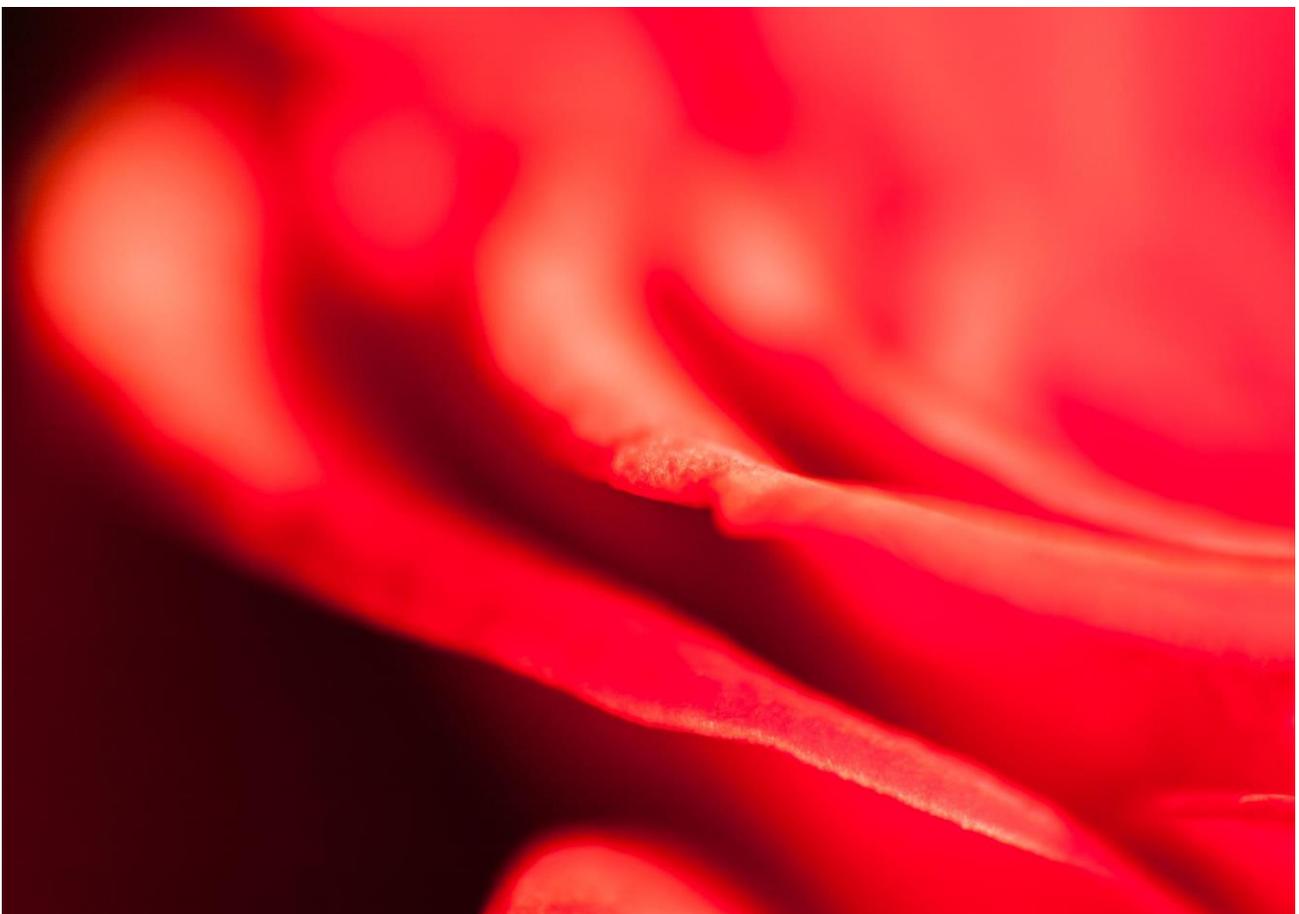
Such a strong magnification ratio means being extremely close to the subject.

The film / sensor plane is located about 30cm from your subject, and the front lens is actually only a few centimeters from the subject.

You know the depth of field decreases with distance from the subject.

Well macro too, but worse !!

For example, 100 mm (lens I use), f / 2.8, and the magnification ratio 1: 1 (that is to say, the minimum focusing distance of) the depth of field is less than 2 mm!



Canon 300D f/9 1.6s ISO100



Canon 300D f/4 1/100s ISO100

This seems to be high compared to the size of an insect, but technically, the slightest movement of the lens, or the subject (eg wind) back and forth, destroys your chances of getting a clear picture where you want. The focus ring will not serve you ... to make focus, but to choose your magnification ratio, the focus is then done by standing at the proper distance from the subject.

To increase the depth of field and have at least the eye of an insect net, your only option will be to use a smaller aperture.

f/ 8, f/ 11 or f/ 16 are openings commonly used in macro.

As a beginner, you do not have to seek the highest possible magnification ratio.

Insects can be very interesting, photographed as a whole, not a detail. So you get a little more perspective, and flexibility (depth of field) more comfortable. Also insects more tolerate a greater distance.

2.2 Speed reduction and blur

You must control your depth of field. You have two possibilities:

- Aperture priority

In this case, your case will adjust the shutter speed to obtain a mean exposure (unless you shift this exhibition). for example in the woods, this rate can drop drastically.

- [Manual mode](#)

You choose your diaphragm (f /), then your speed, to get adequate exposure.

Again you may be facing a fairly low speed, in connection with a very small aperture (f / 16, for example).

Freehand, it is very difficult to remain stable, the tripod will be a great help but this is cumbersome but necessary in many contexts (I prefer the monopod is much less bulky).

Ideally, a tripod and a remote control coupled to your camera limit unwanted vibrations.

If you don't have tripod, bean bag (useful for photo on the ground), or a monopod can be beneficial.



Bean Bag Jama.fr 28 €

Modern bodies allow you to compensate for the downfall of shutter speed by turning the sensitivity (the ISO).

Do not hesitate, if your body allows him to work in 5000 or 6000 ISO.

The limit in ISO is where the noise affects the picture.

[2.3 Light](#)

Light is one of the essential ingredients for a good photo.

Macro, you close a lot, and it takes longer to available light to reach your sensor.

The addition of light (one or more flashes), or diversion of light (reflector) is often very useful, first to obtain satisfactory speeds, on the other hand, to contribute to ambiance.

[3- Various technical approaches](#)

You have to adapt your practice depending on the subject and the context in which it is approached.

The subject is immobile: in this case, you can use a foot and accept a low shutter speed.



Flowers are an excellent stationary subject and apprehend a relatively low magnification of 1: 2 or 1: 4. They are an excellent subject of training.

The insect takes afraid if we approach?

Insects are an extremely difficult subject to play with.

In the day, they are very mobile.

They need heat to move, the best time to photograph them is early morning under a beautiful light, before the sun warms them up.



Canon 7D MKII f/7.1 1/125s ISO320

The 100 mm or 150 mm and 180 are excellent for these subjects so difficult to approach.

Below this is very short. For proxy, Canon have a 300mm f / 4, the minimum focusing distance is very short (1.5 m). A good option.

Like Wildlife photography, a good knowledge of species is essential. This will let you search for invertebrates on the right plant (hosts), in the right environments (ponds, limestone plains ...) at the right period.

You will increase your chances to capture interesting behavior such as couplings, or the emergence of dragonflies.



Graphosoma Italicum - Canon 7D 1/125s f/8 ISO 100 - Sigma 105 EX

Do you need or want a large depth of field?

Short depth of field is sometimes essential to blur unwanted items from neighbors about (twigs, etc.). But we sometimes have the opportunity and the desire to show an insect in its entirety.



Megachile Maritima - 1/125s f/16 ISO 400 - Canon 7D + Canon 65 MPE
In this picture the depth of field can show almost the entire head of the bee

At which ratio do you photograph?

A fly for example can be understood in its environment, in full, or conversely, very closely.

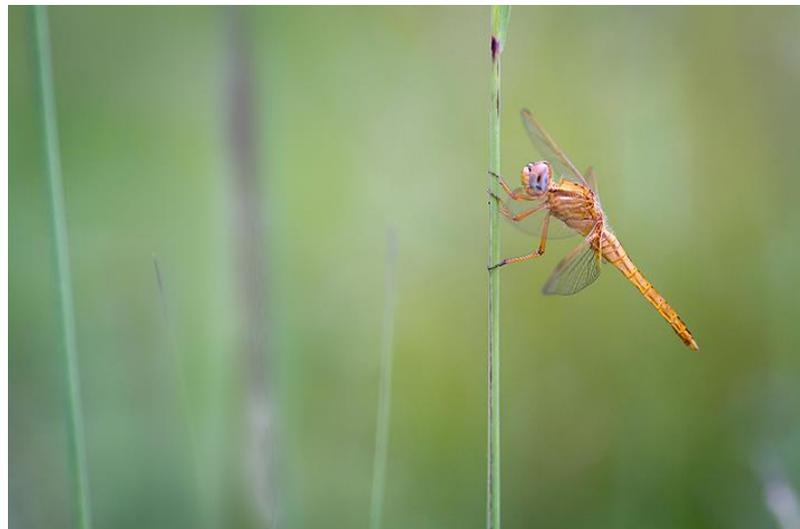


Diptères - 1/160s f/16 ISO 400 - Canon 7D + Canon 65 MPE

Here this dragonfly, framing and ratio tell two different stories



Orthetrum Cancellatum
1/100s f/16 ISO 400
Canon 7D + Canon 65 MPE



Orthetrum Cancellatum
1/160s f/5 ISO 320
Canon 7D + Sigma 105 EX

Weather conditions are they good for Macro?

Very cloudy, give you a box to natural light, much more interesting than a large midday sun.

If there is wind: stay home !! You may go home without pictures ... and somewhat nervous.

If it's cold, the chance is small to see lots of insect. You must use these periods to find new places.



*Argus - 1/200s f/5 ISO 200 - Canon 7D + Sigma 105 EX
Dew is nice and photogenic.*

4- The hardware

4.1 Optical Equipment

Choosing the flexibility is a macro lens with 1:1 ratio.

But many other options available to you, from the most affordable to the most advanced.

4.1.1 Macro Lens

There are different types of macro lenses, so you have to think ahead to your needs: the focal range of these objectives is from 50 to 200 mm.

Short focal length of the lenses (50 or 60 mm) are light and easy to handle but the subject distance / lens will be very short, which can scare the wild insects such as moths.

4.1.2 Extension rings

The extension rings are simple tubes (no optical elements inside) which is installed between the body and the lens.



Set of extension rings ~100 €

In practice, this is a sort of tube with a male insert ring and a female insert ring.

The installation increases the distance between the Body and the Lens which has the direct consequence of reducing the minimum distance of focus and thus to approach the subject.

Generally speaking, the extension rings are sold in 3 different lengths (the Kenko kit consists of 3 rings of 12 mm, 20 mm and 36 mm), they can then be combined to get a draw (and therefore a magnification) maximum. Two disadvantages: loss of light, and loss of focus at infinity.

The first can be solve by using a flash, the second is not essential in macro pictures.

The extension rings, unlike macro (close up) filter, cause no loss in quality (because without optical) and fit on most lens (macro or not).

Warning: With some rings, motorization of the lens is maintained (provided with electrical contacts), others not. How to calculate the magnification ratio G by the number of rings?

BAGUES ALLONGE / épaisseur					
N° 1	N° 2	N° 3	N° 4		
5 mm	13 mm	21 mm	36 mm		
rapport de repro	0,4	0,5	0,8	-1	-1,5
tirage pour un objectif de 50mm	5 mm	25 mm	38 mm	50 mm	75 mm
combinaison des bagues allonge	n°1	1+3	4	2+4	1+2+3+4

The use of extension rings can transform a cheap lens as the Canon 50mm f / 1.8 (~ 100 €) or the 18-55 EFS from beginner kit in a macro lens.

4.1.3 The macro (close up) filter

A close up filter is a macro lens that mounts to the front of the lens. The minimum distance of focusing the lens is reduced ...

To simplify, it helps with approaching closer to the subject and thus to obtain a larger image on the sensor. Depending on the power (expressed in diopters) of the close up lens, you can approach more or less closer to your subject and therefore more or less enlarge the image.

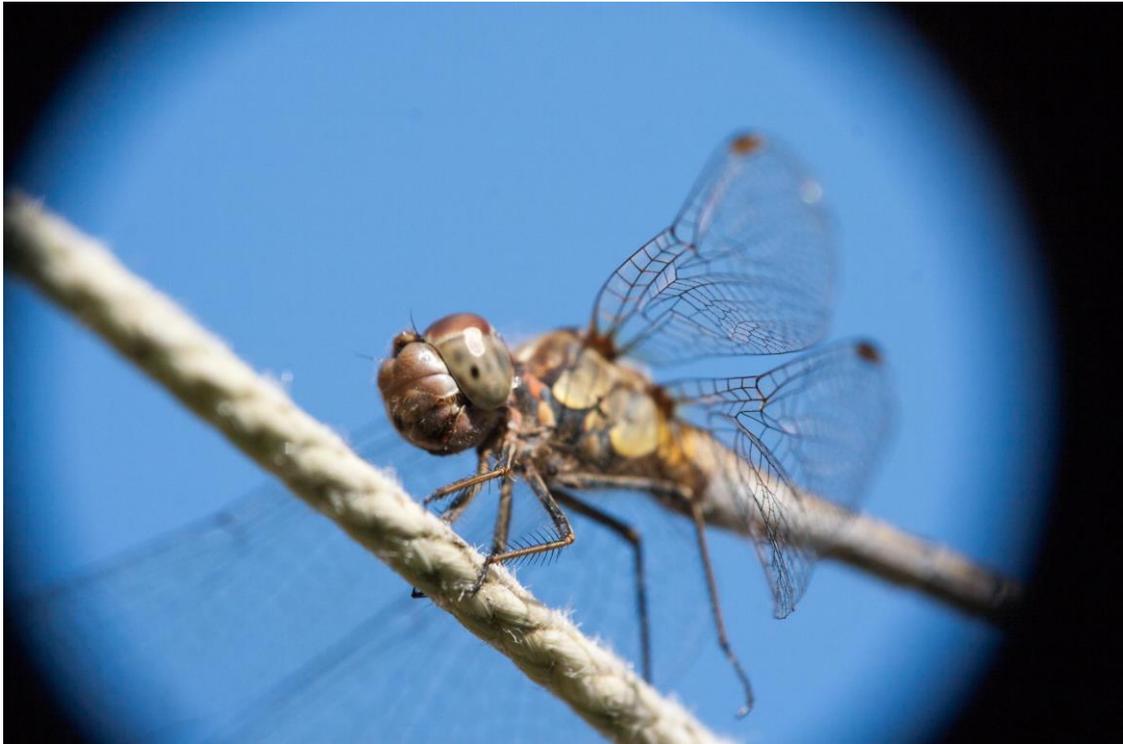
Close up lens can be used on any type of lens: fixed, zoom, wide-angle or a long lens ...

The result will depend on the lens focal length and power of the Close up.

The bonnets are a good starting point for the world of macro, they do not require a big investment, they are compact and allow to keep the autofocus of the lens.



*The diameter of the Bonette must match the diameter of the lens
Prices range from 50 to 100 €*

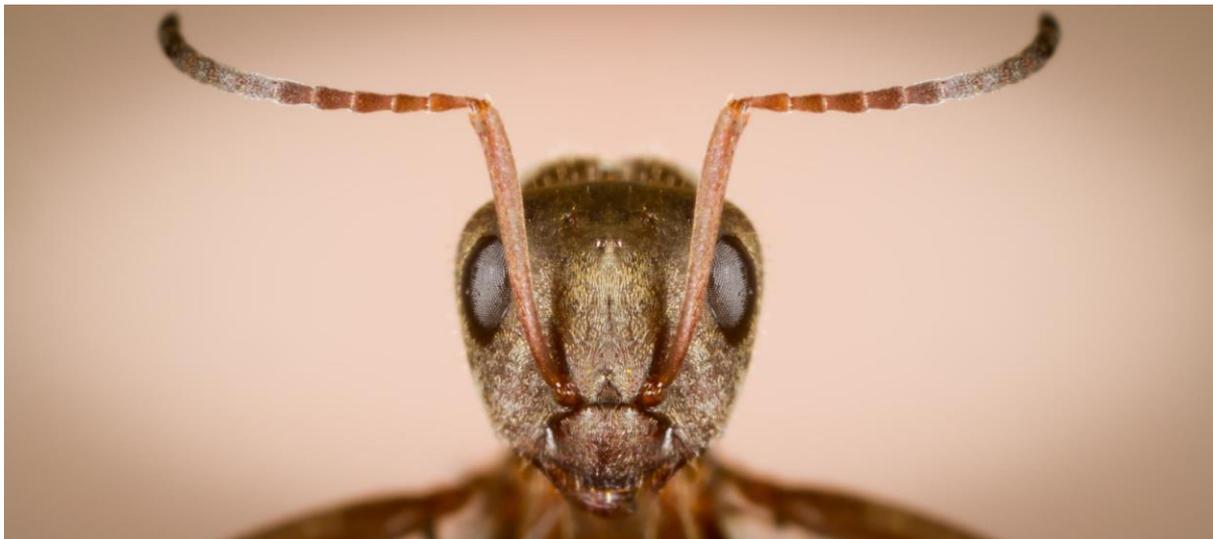


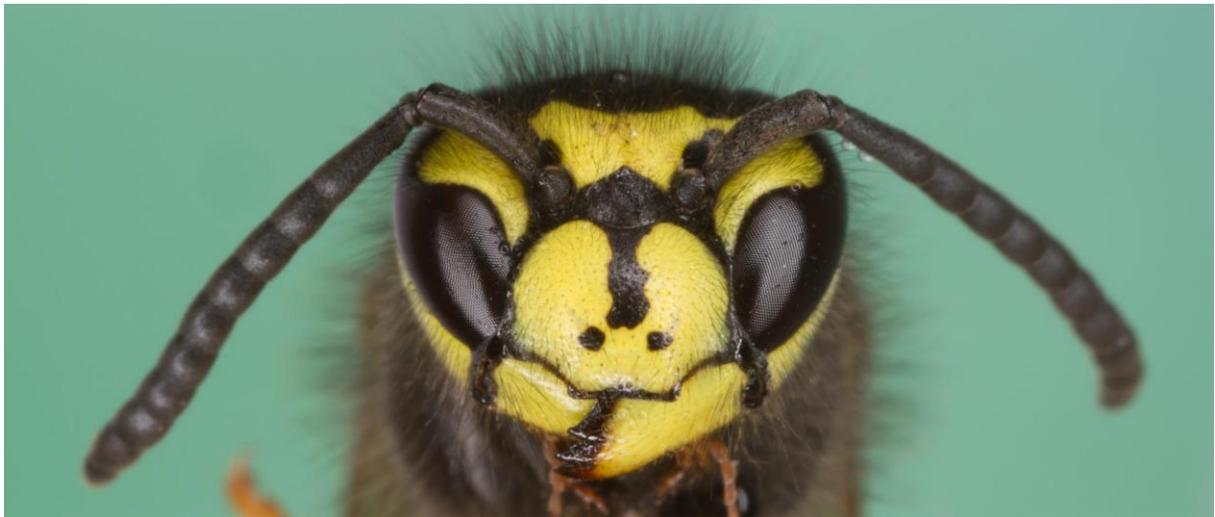
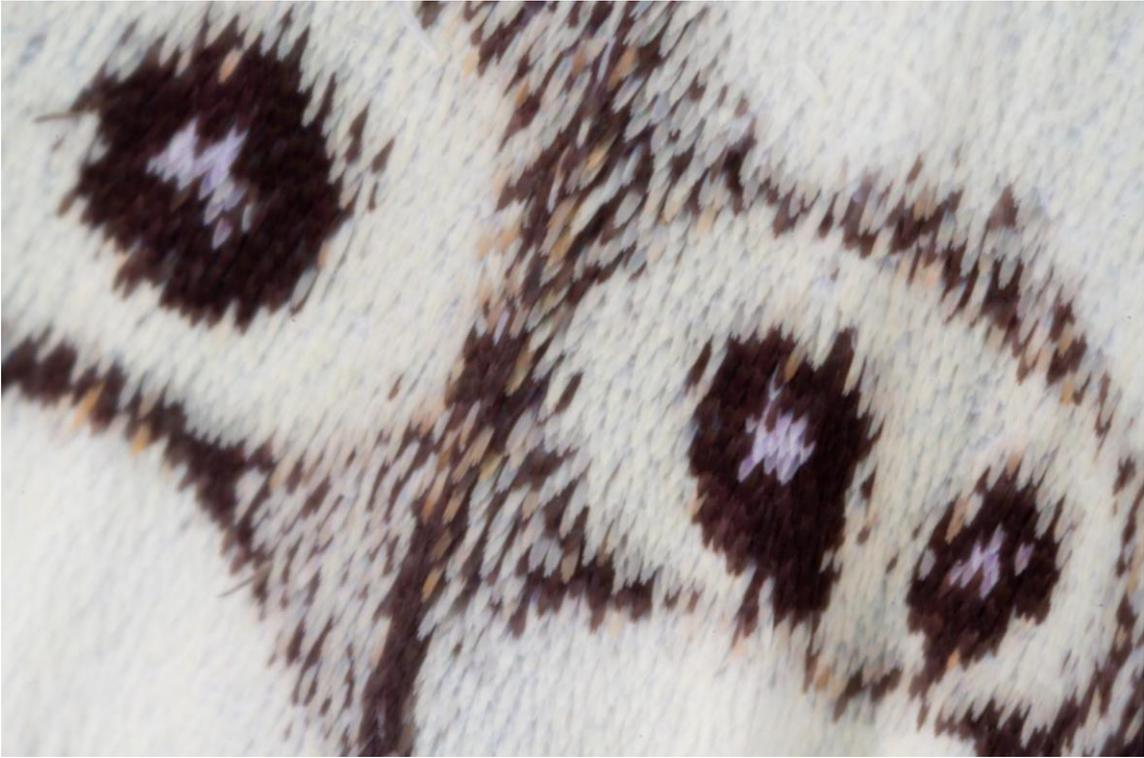
4.1.4 The UFO

Canon offers a remarkable lens able to reach 1:1 to 5:1 ratio, the MP-E 65.



Mass 710gr - Price 900 €





4.2 Lighting

4.2.1 The flash

You read above, it is frequently necessary to compensate for the lack of light in macro, and the best way to compensate for this loss is the flash.

The built-in flash: Most digital cameras have a built-in flash, why not use it? Unfortunately, it is usually low power and the emitted light is parallel to the axis of shooting which gives a fairly flat image.



Prices ~ few euros - you can do it yourself



Price 5€

There are devices for diffusing the light emitted by the integrated flash.

The flash cobra : the light, like the internal flash, is parallel to the shooting direction, but it is much more powerful and offers high-speed sync, which allows using flash beyond standard sync speeds. Pay attention to shadows created by the lens.



the advantage is that all the same thanks to its height you can easily create a diffuser with a piece of paper.



Furthermore, there are on the net very great variety of offers for kits broadcasters within 100€.

The remote flash: generally used in addition to flash "normal" and set aside, it allows for example to illuminate the background. From a practical point of view, he (s) is (are) very bulky (s) and subject (s) to scare the fiercest insects.



price 30 €

The ring flash: The dedicated flash for macro. It is circular and placed at the head of the lens. It consists (for the most recent) of two independent tubes, which allows for interesting light effects. As the topic is found for once surrounded by light, it is well distributed and diffused, and flashes to independent tubes, shadows are still preserved.

His light is sometimes considered flat and characteristics reflections can be seen in insects.



Ring Flash - Price 500€

Beware the compatibility with your lens.

There are also false ring flashes low cost that will lead the light of your classic cobra flash to the front of your lens. (few euros)



4.2.2 The reflector

From an artistic point of view, you can also choose to abandon partially or totally flash light in favor of natural light, possibly reflected.



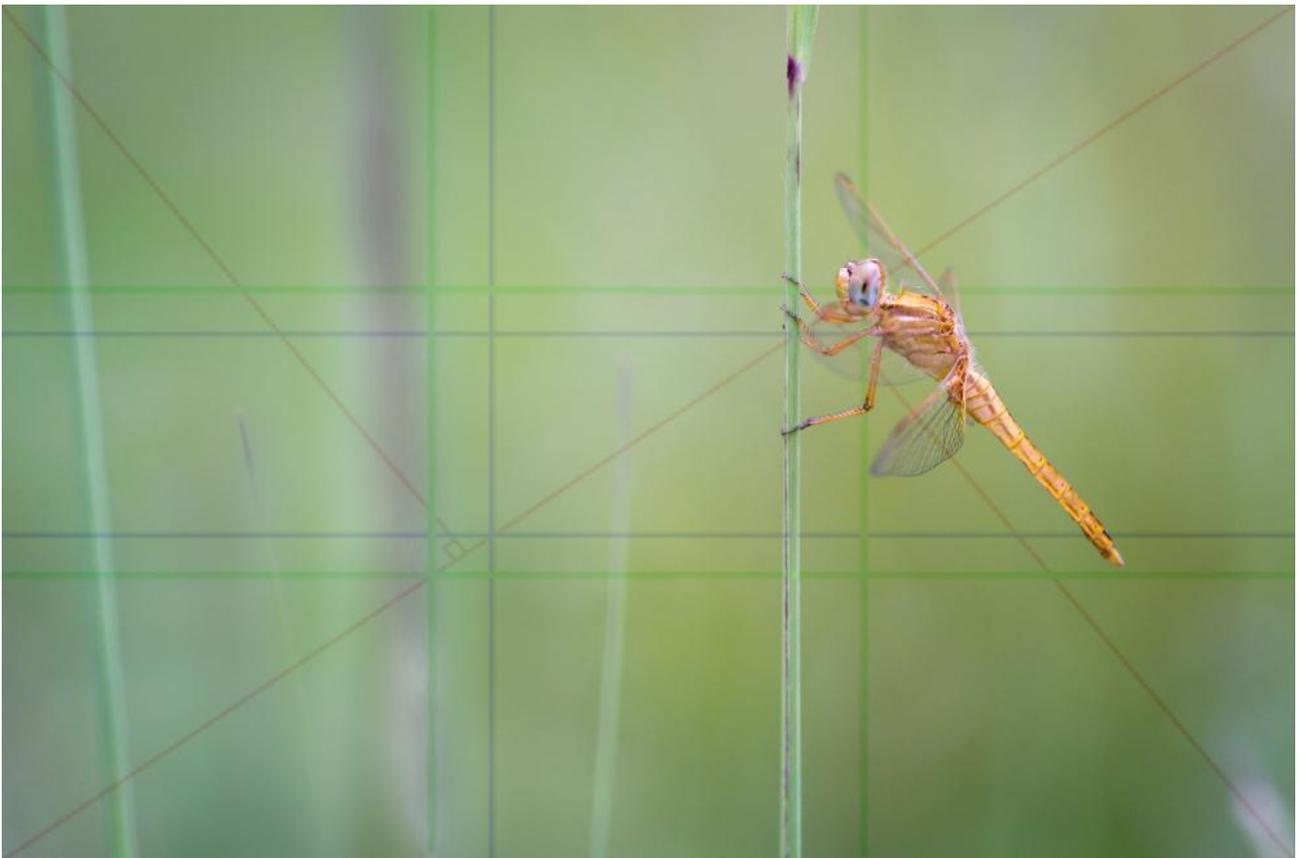
Diameter 60 cm - Prix 15 €

5- A word about the composition

First, in the case of macro "nature" you research the subject: this is the most difficult part when you do not know what one is looking, you can spend a hundred times nearby. Then, before taking the picture, we must carefully consider the image through the lens. The idea is to carefully place the subject in the frame, in order to facilitate reading.

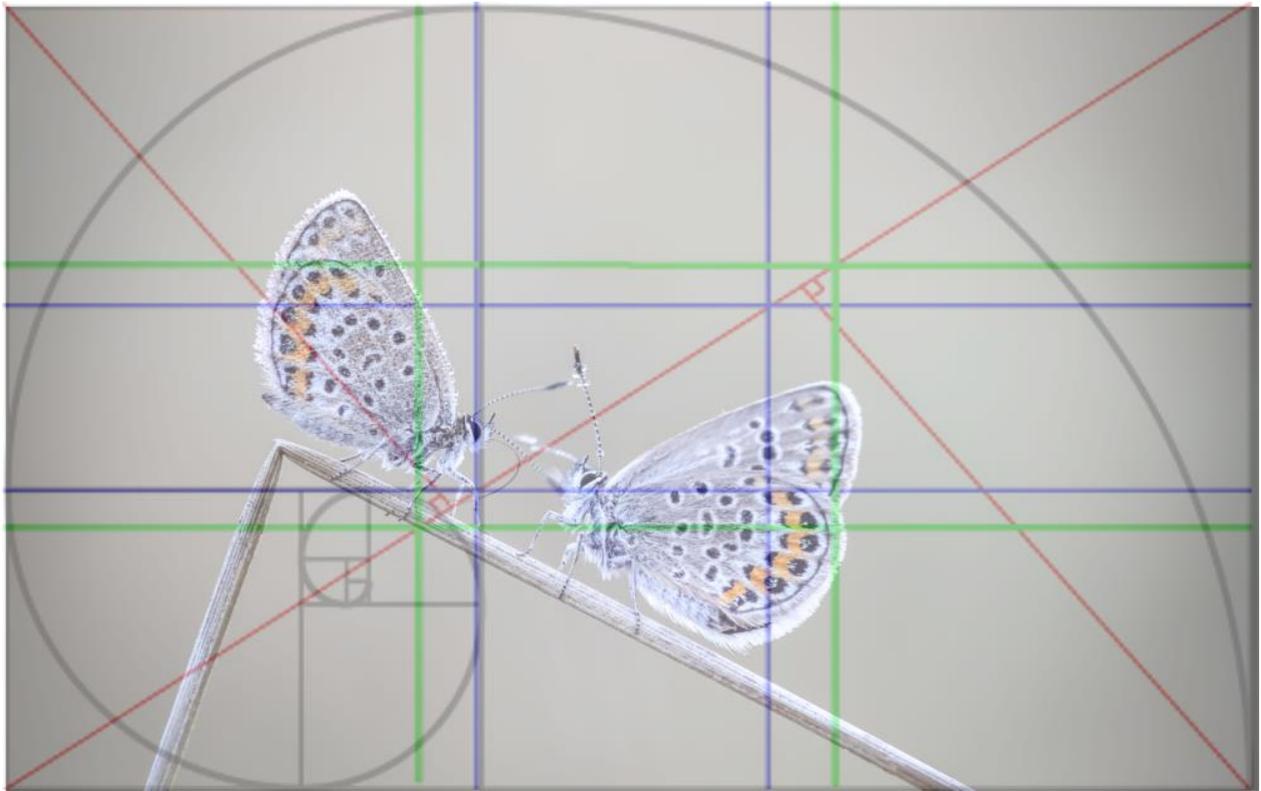
The rule of thirds applies to both horizontal and vertical pictures.

Divide the image into three equal parts, height and width. The intersection of these lines determines the four strong points of the photo.



The composition of a picture based on these elements will be balanced.

We always will try to place the lines of force, the horizon (top or bottom), or eyes of a person (usually the upper third). Similarly, we will place a strong point the main element (the subject) of the image.



Once controlled this rule, it remains only to forget and leave space for creativity. Rules are made to be broken, feel free to compose in a controlled transgression.

6- Conclusion

The macro meets specific codes but is not materially demanding. Do not hesitate to get up early. It's a wonderful world that waits for you. Vary the playgrounds, you will multiply the species encountered.



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