Photomacrography

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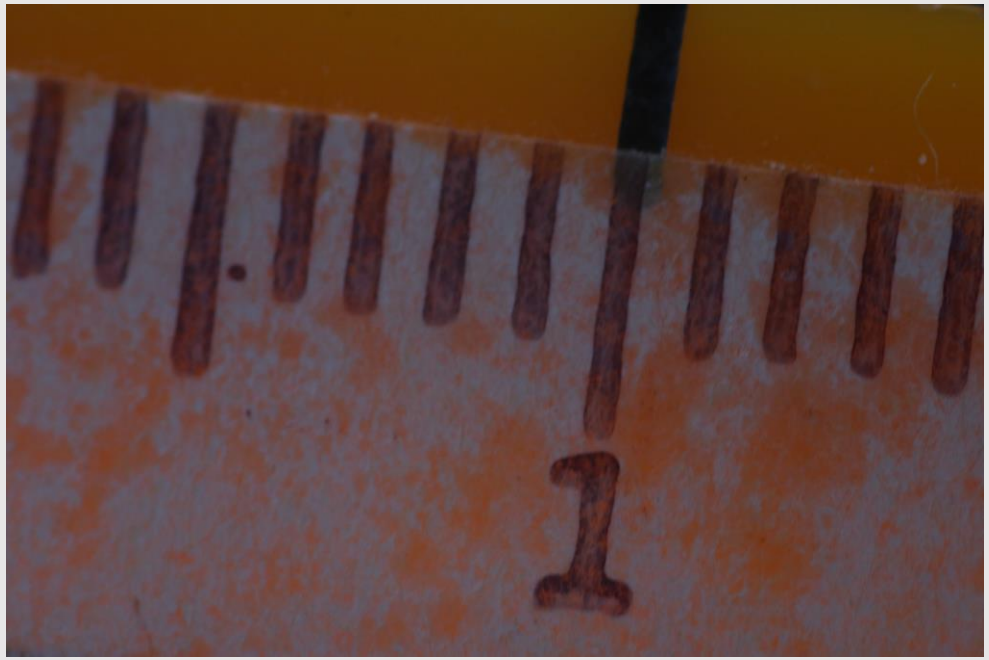
- On the field

Macrophotography

- > life size
- The ratio of the subject size on the film plane (or sensor plane) to the actual subject size is known as the **reproduction ratio**. Likewise, a **macro lens** is classically a lens capable of reproduction ratios of at least 1:1, although it often refers to any lens with a large reproduction ratio, despite rarely exceeding 1:1.
- Up to 10X size
- Reproduction ratios much greater than 10:1 are considered to be photomicrography, often achieved with digital microscope.

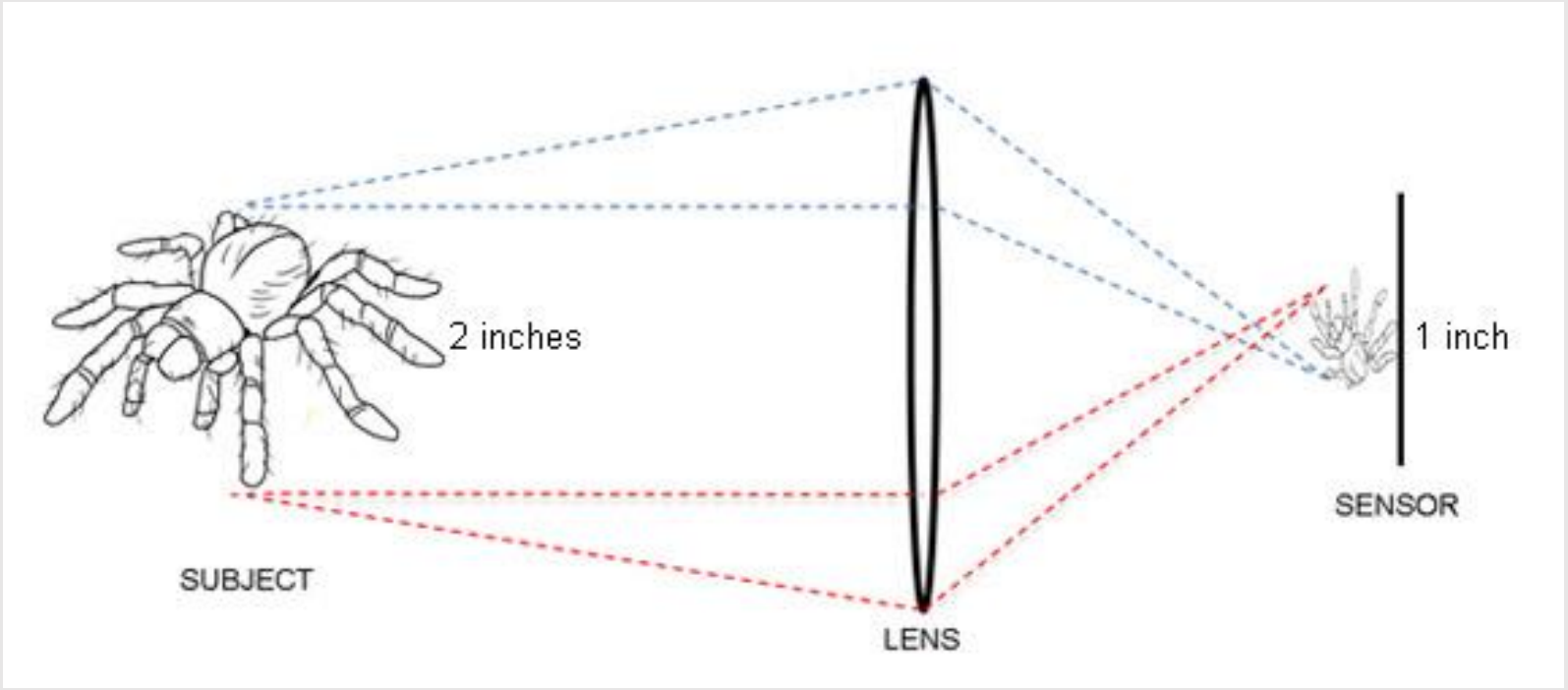
Magnification

- Use this formula X= i/o
- Use a millimetric ruler
- Canon Rebel T6 APS-C **dimensions** of 22.3 x 14.9mm.
- X= 20mm/10mm = 2X

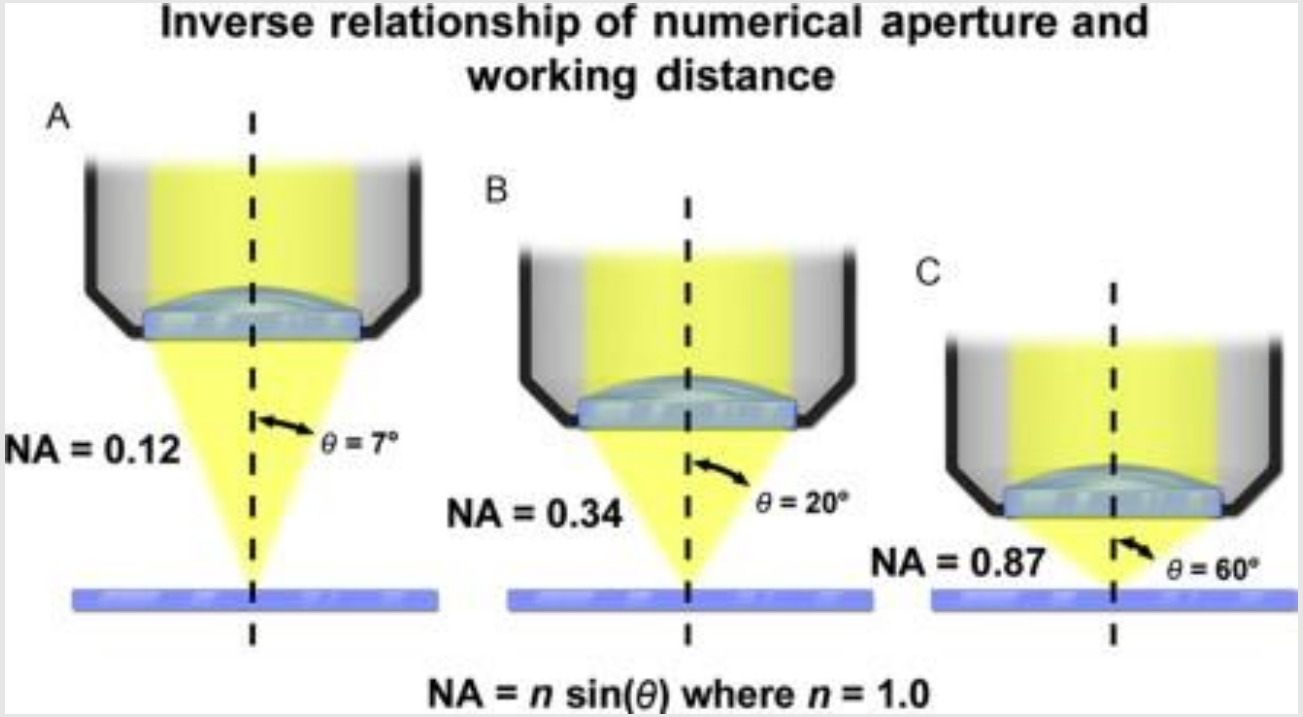


Magnification

X= i/o
X= 1m”/2”= 0.5X



On microscopes follow the NA rules

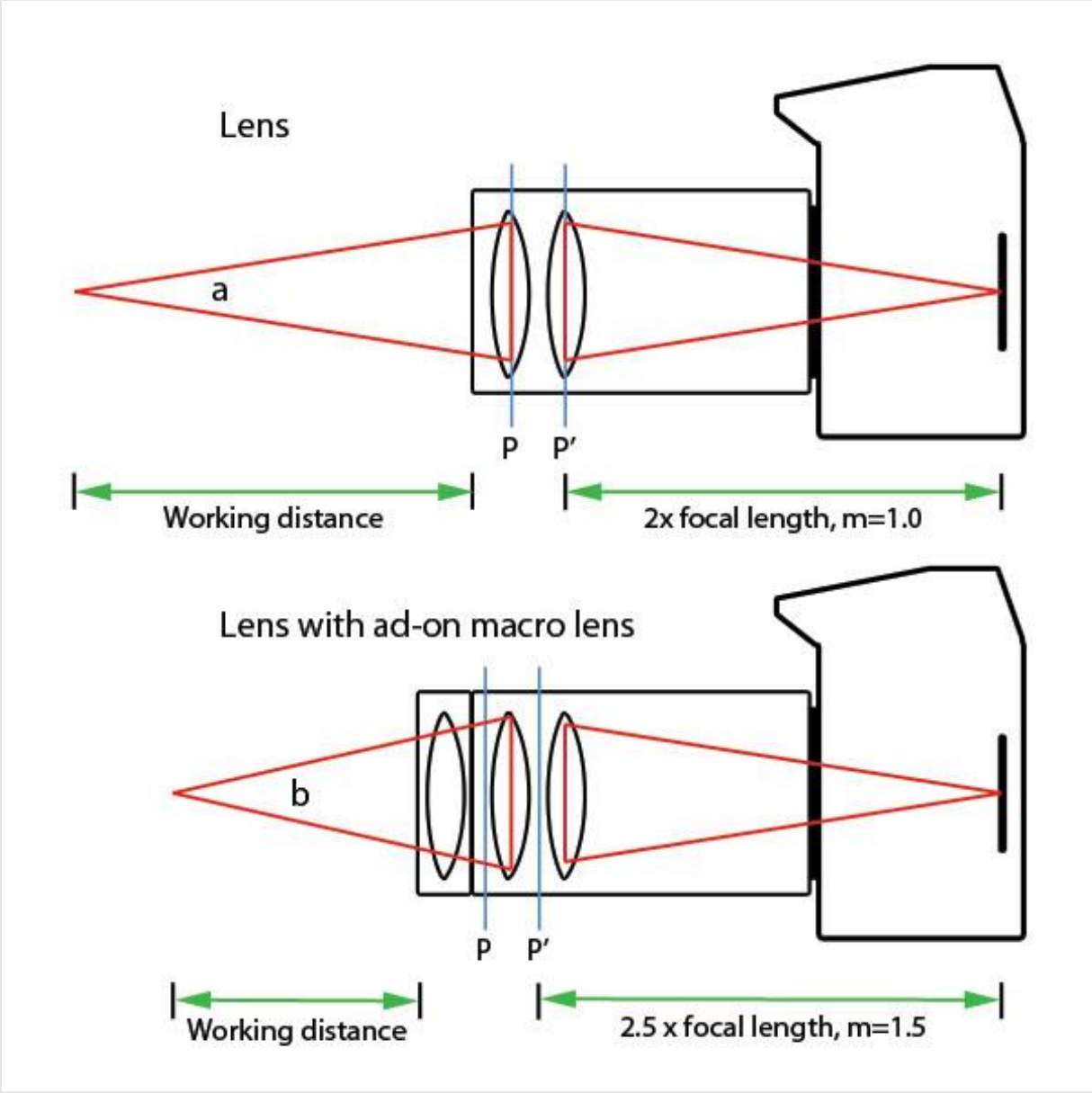


On microscopes follow the NA rules

- The bigger a cone of light that can be brought into the lens, the higher its **numerical aperture** is. Therefore the higher the **numerical aperture** of a lens, the better the **resolution** of a specimen will be which can be obtained with that lens. ... All high dry lenses work in air which has a refractive index of 1.0.

Optics

Focal length	60mm	Blades numbers	10PCS	Closest focus	26cm
Frame Type	APS-C	Optical structure	7 groups, 8 elements	Lens anti-shake	Without anti-shake
lens material	metal	Angle of view	25°	Focusing method	Manual focusing
weight	550g	Maximum aperture	F2.8	Filter size	39mm
Aperture ring	De-Clicked	Minimum aperture	F16		


Lens
a
P
P′
Working distance
2x focal length, m=1.0
Lens with ad-on macro lens
b
P
P′
Working distance
2.5 x focal length, m=1.5

Reversing the lens

Sigma


$160
INSTANT
SAVINGS
17-70mm F2.8-4 DC Macro (OS)* HSM | C
PRICE:$499.00
NEW PRICE: $339.00
COMPARE
18-200mm F3.5-6.3 DC Macro OS HSM | C
PRICE: $399.00
COMPARE
$180
INSTANT
SAVINGS
18-300mm F3.5-6.3 DC MACRO OS HSM | C
PRICE:$579.00
NEW PRICE: $399.00
COMPARE
$500
INSTANT
SAVINGS
105mm F2.8 EX DG OS HSM Macro
AVAILABLE FOR MIRRORLESS
$100
INSTANT
SAVINGS
70mm F2.8 DG MACRO | A
PRICE:$569.00
NEW PRICE: $469.00
18-250mm F3.5-6.3 DC (OS)* MACRO HSM

Working Distance and focus

- The working distance of a macro lens, not to be confused with minimum focus distance, is the distance between the front of your lens and the subject.
- This is different from the minimum focus distance which instead means the distance to the subject as measured from the focal plane mark on the camera body, not from the front of the lens.

Working Distance

- Working distance is a more important figure since it tells how much space you have between the front of your lens and your subject.
- Working distance generally increases with longer focal length lenses, shorter lenses usually have shorter working distances.
- Set by optic and bellows
- Focus auto or manual. In manual you move to find the focal point.

Subject size

- Control by lens focal length or
- By moving-in the camera closer to the subject

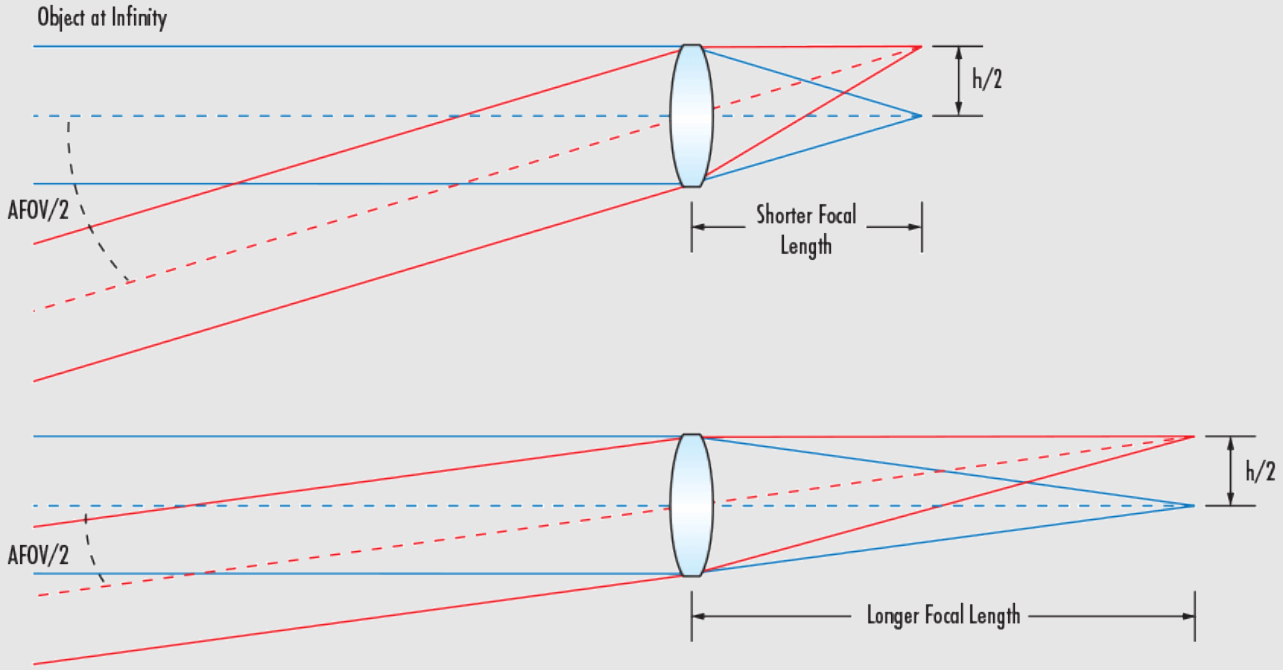
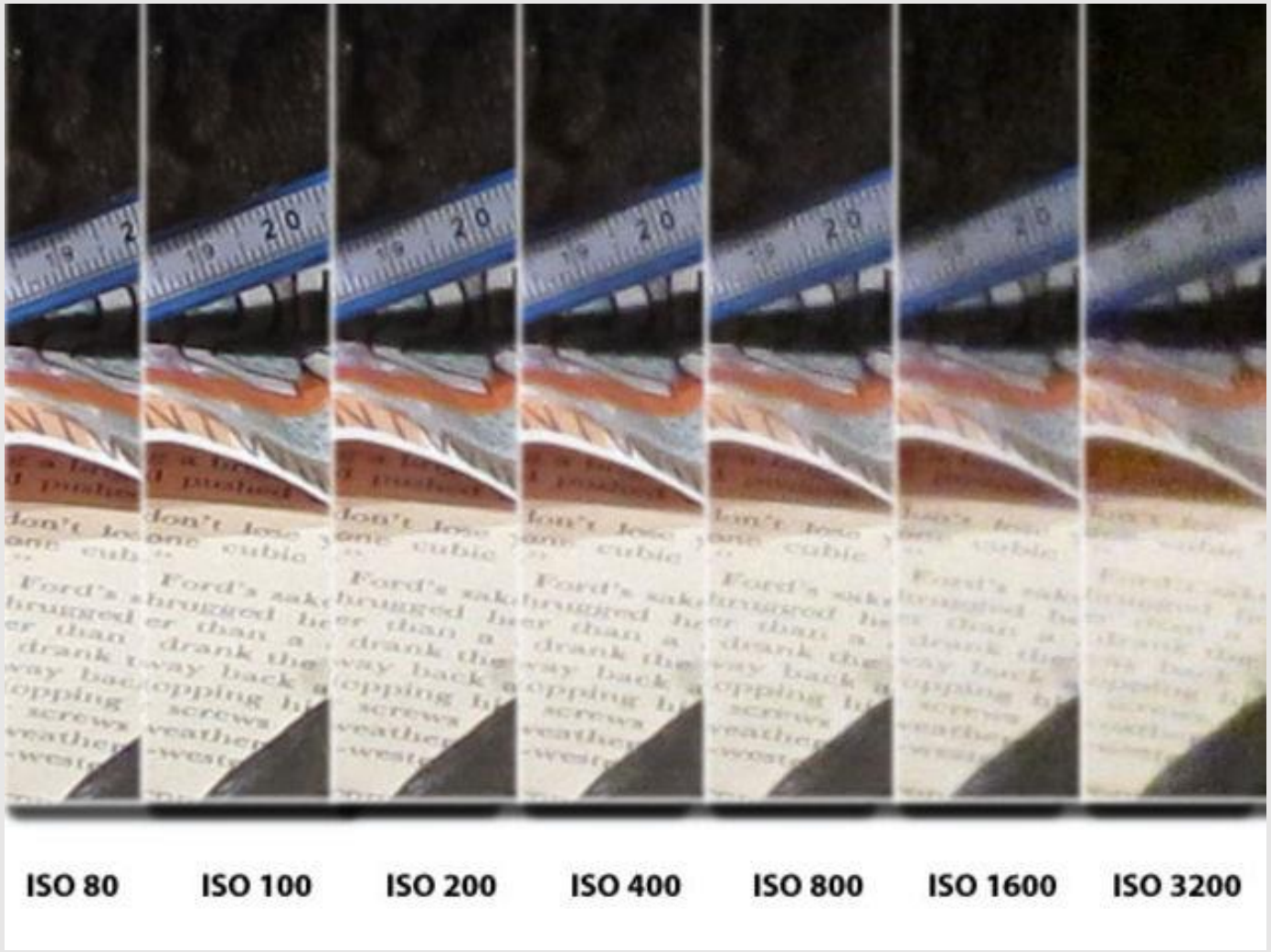


Image Quality

- Large image Size
- High image quality
- Low ISO, high ISO settings are the biggest contributors to photographic noise
- Avoid lens flare
- Master your focus technique

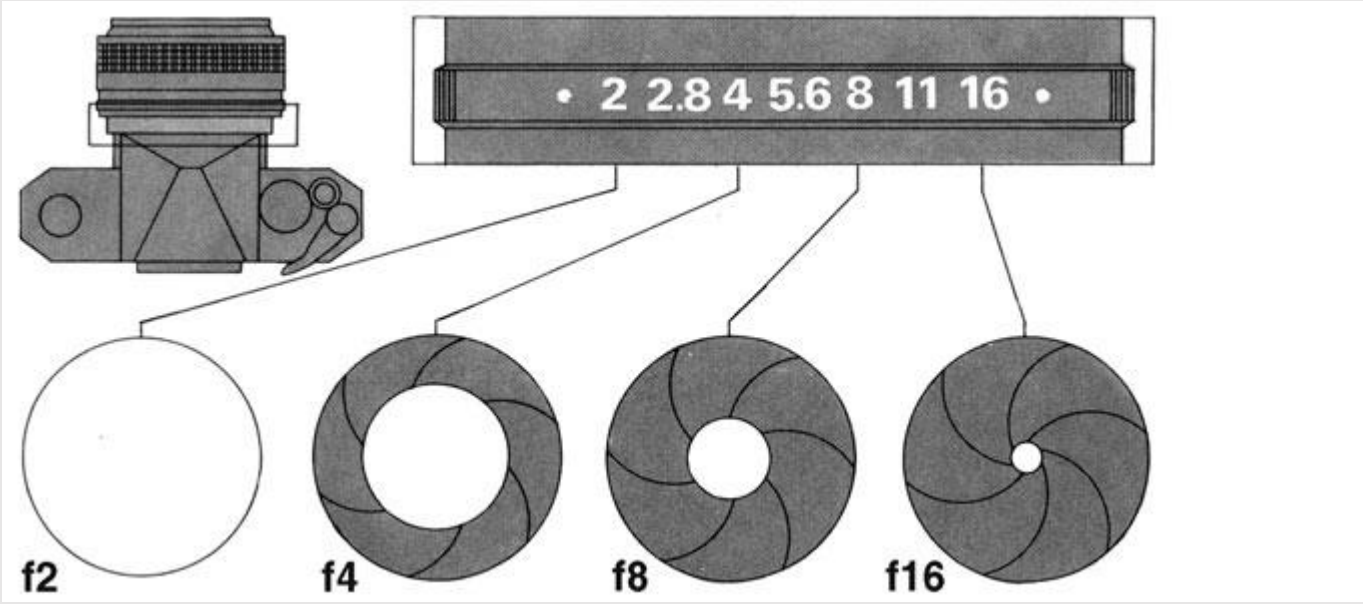


The Right Exposure

- For the proper exposure you need the correct combination of shutter speed, ISO film speed and aperture.
- Use tripod when possible
- In the field test your shutter.
- I shoot at 1/250 as a minimum in low light conditions.
- Use SPOT metering
- BRACKET! use the AEB to ½ stops
- Balance flash with available light

Aperture

- Depending on your shot
- Test each lens for the optimal resolution
- Avoid optical aberrations



Lens rings and Focus

- **Zoom ring —** Usually the larger of the lens rings, turning the zoom ring zooms the lens in or out.
- **Focus ring —** The smaller of the lens rings, rotating this ring allows you to adjust focus — but only when autofocus is turned off. Lenses oriented toward professionals will often have larger focus rings owing to the fact that experienced users are more likely to use manual focus than beginners.

Focus

- Stationary subject, MF
- Living subjects AF
- Test your camera focus point

Canon EOS Rebel T6s 1/250sec @f4

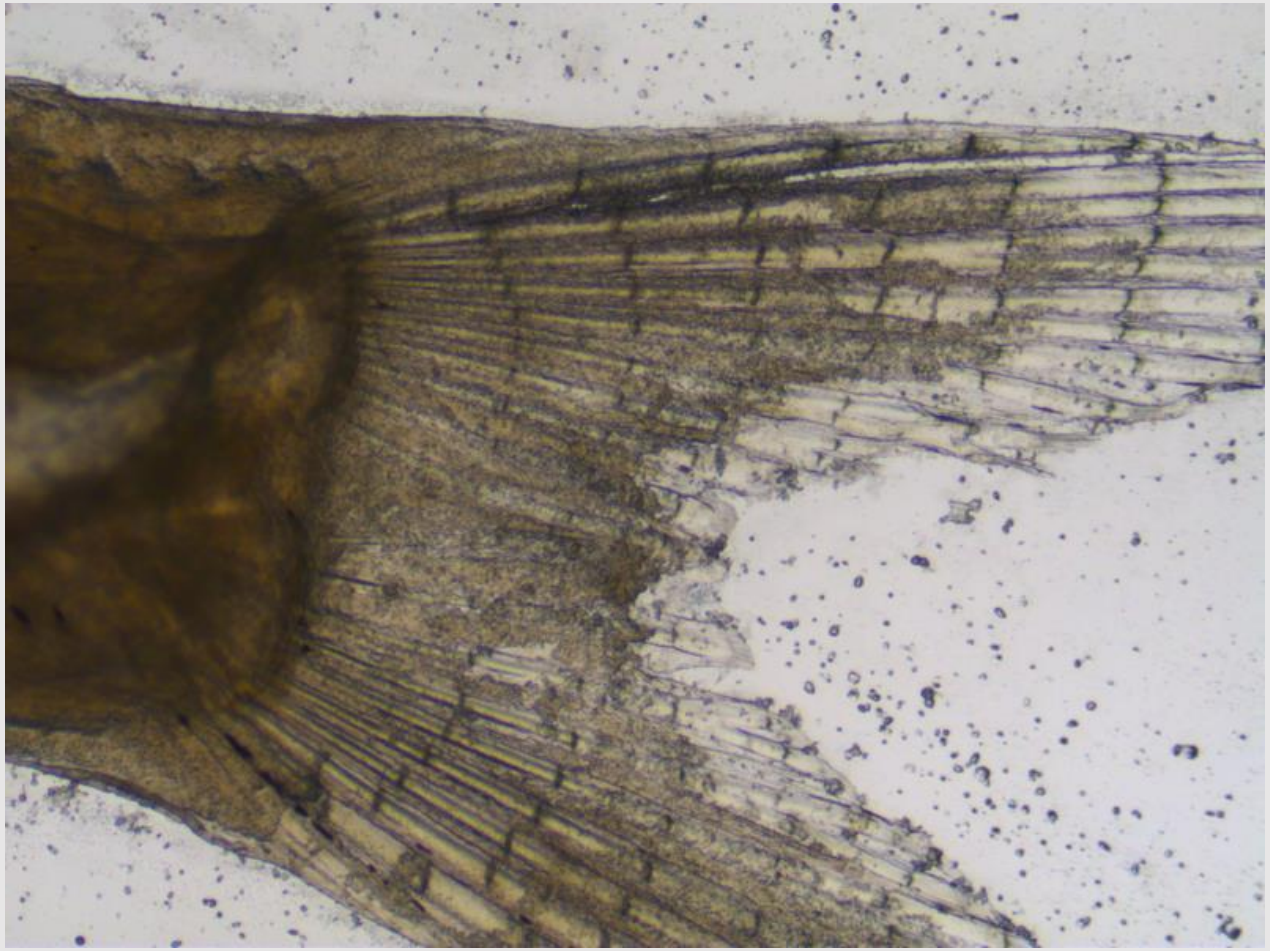
Lighting

- Equipment
  - reflectors, absorbers, lighting accessories, flashlights, flash triggers etc.
- Just when you shoot portraits, use the appropriate light source: size is important, on macro work everything is small (continuous or electronic flash).
- In microsocopy, episcopic illuminators for photomacrography with the Multiphot include vertical on-axis illumination via a half mirror attachment, oblique illumination with flood or spot lamps, and diffused illumination with Lieberkühn mirrors.
- I will demonstrate a daylight balance unit.

Transillumination

- You still will need EPI illumination
- Try an orange, leaf or larvae
  on a transillumination table

Transillumination with a 10X objective X=20X

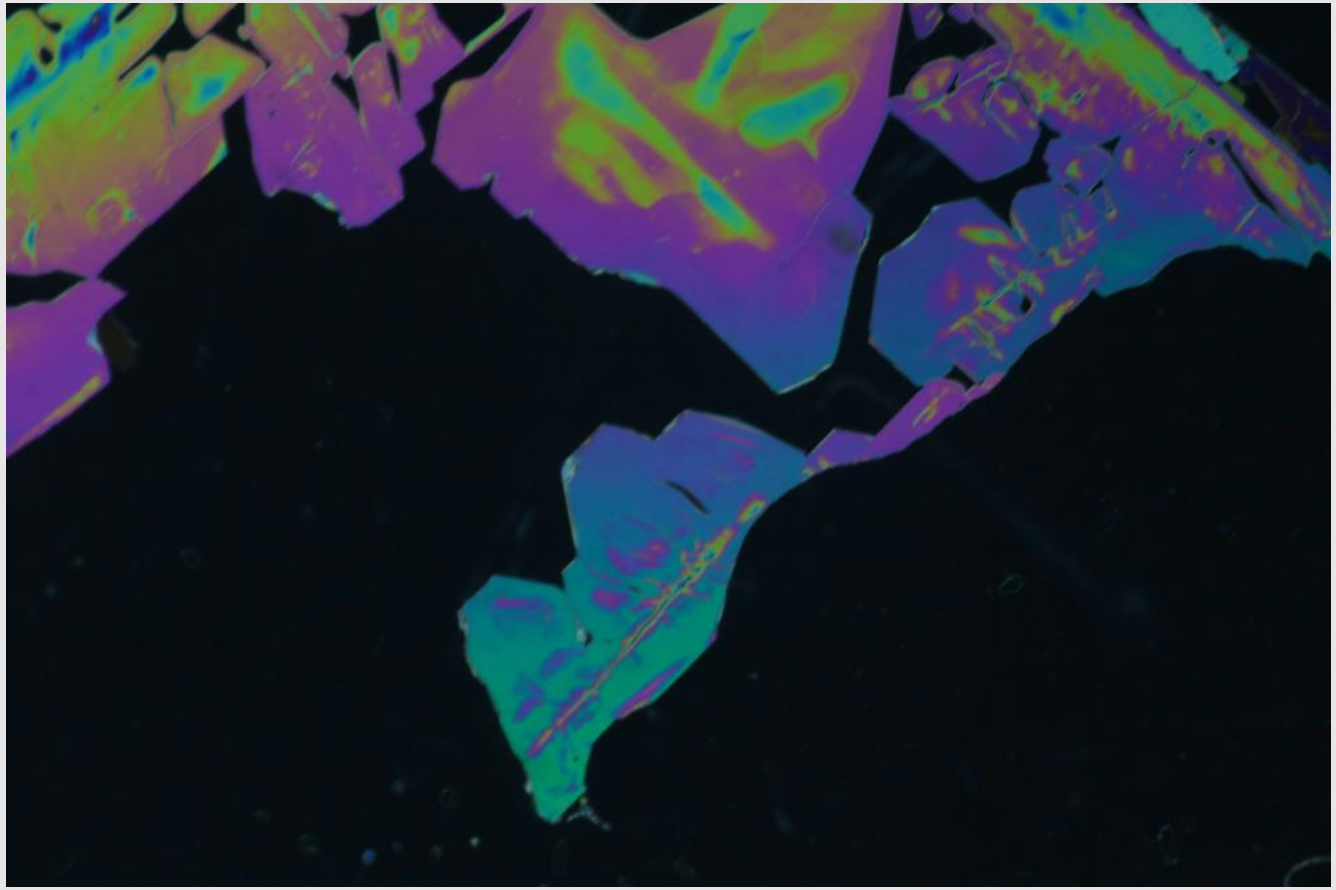


Polarization with birefringent effect

- You need two polarize filters
  - Lens-subject
  - Subject-light source

- Crystals work great,

try menthol or citric acid



Flash on camera

- Use two units (main an fill), depending on the application a good start is a 2:1 ratio
- I have an flexible arm for underwater flash

The real world

- In studio
  - Have stations, lights set and aim for illustration-quality work
- Field
  - Travel with at least two cameras, plenty of spare batteries, SD cards, and food.
  - Be prepared for climate change or any external situation(mosquitos). Cover your gear with waterproof material and by the best camera bag.
  - Travel with someone and in unknow place with a guide.
  - In-location (hospital, research labs)
  - Travel light
- Dress for work!