

PHOTOGRAPHY THROUGH THE MICROSCOPE

A guide for absolute beginners

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This is an immense subject. All I have done is to summarise, very briefly, some of the basics. The best source of information on photomicrography I have so far discovered is Kodak's *Photography through the Microscope*, which is written with serious attention to detail and is very good. Now that I have found this I am amazed to find that I produce reasonable results about 40% of the time, without its help. It is obtainable from any good photographic store.

1 Take notes!

Keep a notebook and meticulously record every detail of every picture you take. When you get the film back from processing note how successful you were. This is the only way to improve.

2 Simple fact

Photomicrography is a specialised field and help may be difficult to find.

3 Film

100 ISO or slower for best results. Slide film is getting increasingly difficult to obtain in the average shop. I usually use Boots 'own brand' but I also like Fuji because it comes in translucent containers which make good specimen jars. Print films are faster of course but the quality will not be quite as good because of the extra process involved to produce the image. I have tried 200 and 400 ISO print film with reasonable success.

4 Fixed lens camera

Almost any camera can be used to take pictures through the microscope and the simpler lenses of cheap, non-automatic cameras may, in fact, produce clearer results. The camera needs to be placed so that the LENS of the camera is RIGIDLY in the same position that your eye would be in if

you were looking into the microscope. With care, you can use a good tripod or an adapted enlarger stand. Focus the microscope and then move the camera into position for the shot without changing the distance setting on the camera. The camera must be set to focus at infinity and if there is a variable aperture this must be set to its maximum size - that is, the smallest f-number e.g. f2.8. This has no effect on the brightness of the picture but if the aperture is too small, you will clip the corners of your picture.

5 Reflex cameras

Camera shops sell adaptors which will attach to a tube fitting the lens tube of the microscope. The camera lens is removed and the adaptor substituted. You will have to get the microscope end of the adapter from the microscope supplier. My experience of these devices is that the thread is a 42mm 'T-mount' type but this may depend on the microscope. Focussing is done by moving the microscope controls. If you can get a clear-centred ground-glass screen fitted to your camera this will help. It is also possible to obtain an adaptor which fits the front of the camera lens. This may be easier since modern automatic cameras will obtain correct exposure automatically for you. Set the aperture to maximum. You need a camera with a good range of slow shutter speeds - up to 10 seconds or even longer.

6 Subject slide

To produce even focussing the material must be squashed as thin as possible. If you need correct colours (high-power magnification reduces colour almost to black and white), you should use 'daylight' film and the correct lamp. You may get advice in a proper camera shop. These are getting scarce as well. It makes sense to use black-and-white slide

film, which should make selection of exposure time simpler – I haven't tried this myself but it should work.

7 Special gadgets

I was able to get a cheap trinocular attachment for my high-power microscope. This means that I can, if I wish, leave the camera on the microscope all the time and I don't have to fiddle with its lenses. Focussing is tricky because the image in the camera's ground-glass screen is darker and not as sharp as the microscope view.

8 Exposure

The Big Problem. Usually the light used for viewing in a high magnification microscope (>x500) is inadequate, photographically speaking. A cheap fixed lens camera may be unable to provide a long enough exposure to produce an adequate picture. Reflex cameras tend to be better in this respect, but on many SLRs used without the lens the automatic exposure system gives up. My solution is to adjust the lighting for normal viewing and to experiment. With my set-up - a cheap Russian microscope, second-hand Canon A-1 camera - an exposure of 1, 2 or 4 seconds is usually adequate. The long exposure helps eliminate the bounce owing to focal-plane shutter movement.

9 Flash

Using the stereo microscope, you can use additional flash illumination. Obviously you need to experiment, but I have had reasonable pictures holding a cheap flashgun about

two feet from the subject. This is a good way to photograph myxomycetes, for instance.

10 Vibration

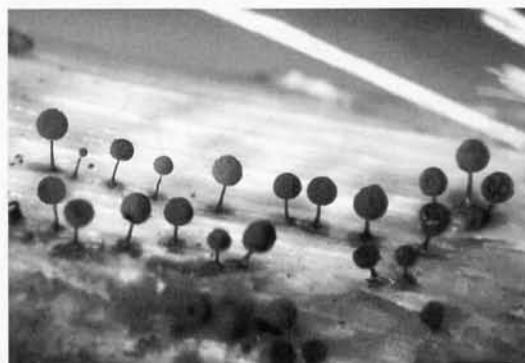
If the camera has a delayed-action shutter, use it all the time. This will eliminate vibration when you press the button. I don't think that a cable release is any better. The Canon A-1 has 2-second and 10-second delays, which is useful.

Reference

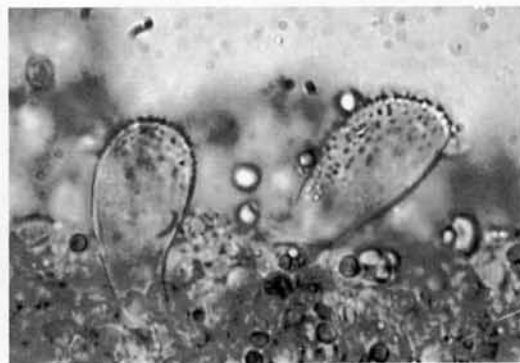
Delly, John Gustav (1988)
Photography through the Microscope. (Ninth edition.) Photographic Products Group, The Eastman Kodak Company, Rochester, New York 14650, USA. ISBN 0-87985-362-X.



Cystidia often benefit from staining with Congo Red. Shown here are the results possible with a simple set-up as described above. Photograph © Alan Braddock.



Comatricha nigra - photograph with simple flash setup under stereo microscope x 20. Photograph © Alan Braddock



Broom cell cystidia on *Mycena capillaris*, x 400 showing the characteristic tubercles. Photograph © Alan Braddock.