

# MOVING PICTURES

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First and foremost, I am a photographer. But I did study TV Camera Techniques and have done some work in documentary cinematography. So far, I have worked on 4 or 5 documentaries. While photography can provide a lot of information, videos are moving pictures, which mean that it can add the moving activities of living things, which can add a whole new range of information.

Most modern DSLR or Mirrorless cameras have the option of taking stills or video images. Some of the films I have worked on were done in 4K with my Mirrorless Olympus cameras. The results were excellent. It's important to be familiar with the video settings of your camera. Do not leave it on automatic, as a standard bright field would result in images that are too dark. Refer to your manual to understand how video works and then do some practice videos of every day subjects. Only once familiar with the settings should one try to mount the camera on a microscope for some serious work...

Filming microscopic subjects comes with its own set of difficulties. For starter, one of my favorite techniques for photography, focus stacking, cannot be used in video. So depth of field will be limited and can only be controlled, to a point, by playing with the condenser diaphragm.

But closing down the diaphragm also comes with a price: less light reaches the camera. And that brings us to the next challenge in video. One cannot decide to reduce shutter speed, which is dictated by the video image per second aspect. Video can be filmed at standards 24 or 30 images a second. To do that, the camera must be set at 1/50 or 1/60 to get acceptable results; slower shutter speed results in jittery or blurry images. To get those shutter speed one needs a lot of light. Fortunately for me, my main microscope has received a new light, a LED that is more powerful than the original tungsten light found on most microscopes.

Next on the list of difficulties is the need to increase the ISO in order to get enough light. Some older cameras cannot produce decent images beyond a certain ISO level, however, most can be pushed to 6400 or even 10 000 ISO and still provide acceptable results.

If were are doing moving pictures, it means that the subject will be moving, but not always the way we want them to... Nothing can be more frustrating than trying to keep up with a very mobile ciliate that keep moving out of the frame. Trying to keep up can be a challenge and does require a certain amount of practice to move the microscope controls in the right direction...

Finally, the editing. Many software exist to cut and adjust color balance and brightness. However, an element of editing that I use quite extensively in photos cannot be used in video: I cannot remove spots and various junk that may have been on the slide while filming.

Following are a few examples of things that I was able to film through the microscope. Click on each video still below which opens a new tab to view each clip on vimeo.com.

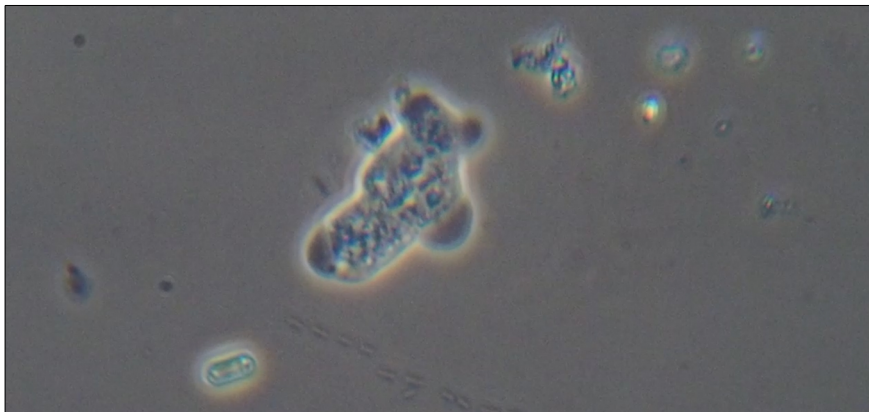
Rotifers are good subjects for video: they are more or less anchored and their feeding motions are just fascinating. At first, you can start with lower magnifications, which makes it easier to keep them in the frame.



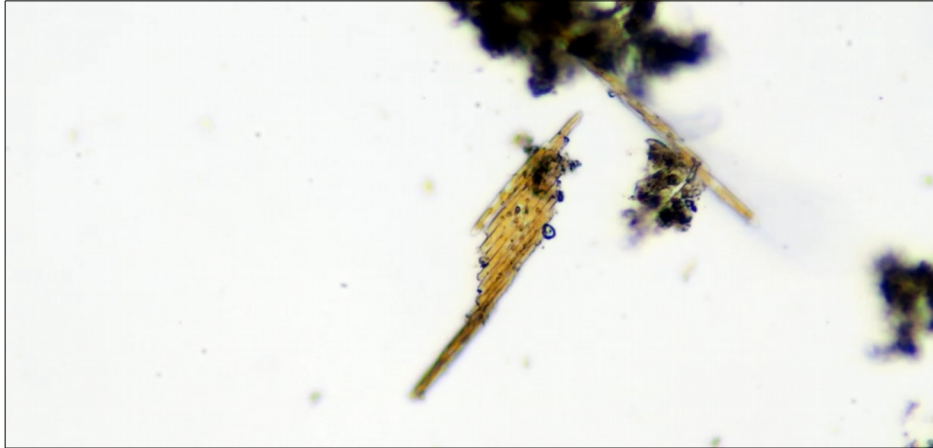
Getting closer can provide a better view of the moving jaws inside the body.



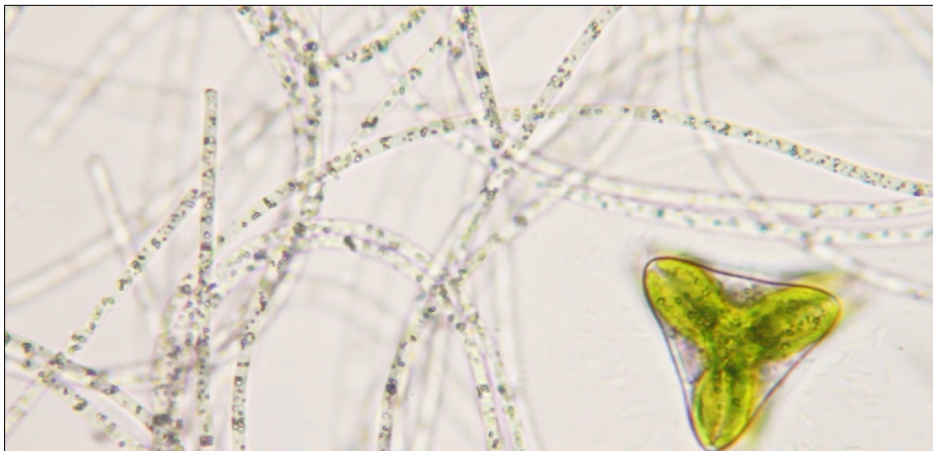
Amoebas are a classic example of microscope subjects for video. This one was shot in phase contrast; that microscope doesn't have as strong a light as my Zeiss Standard.



But if you want to see how difficult it can be to follow moving subjects, take a look at these funny diatoms, *Bacillaria paxillifer*, as they stretch and shrink and move about...



These water mold and algae were part of a previous article, but the video really shows how these molds are constantly moving.



Finally, playing with the focus may be a way to add some interest to an otherwise static video (*Staurastrum*).



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