

# Digital Photography

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**Introduction.** The advancement of digital photography is an important development for scientific research. Research institutes throughout the world have switched to digital photography due to improved image quality, falling costs of equipment, development of easy to use cameras and the amount of time saved when using a digital camera. Although digital photography is one of the newest forms of scientific documentation there are many principles and techniques that are unexplored. Simple methods for improving the ability to purchase affordable equipment, using a digital camera's manual override setting, suitable backdrops and use of reflectors for photography, and practical steps for using a digital camera on a microscope are discussed.

**A Practical tip for using a digital camera on a microscope**

Digital cameras have become an essential tool for scientific research in nearly every laboratory world wide. Using a digital camera on a microscope is a practical way to document microscopic subjects and instantly email or print images (Fig. 4a). It is necessary to use the proper size microscope adapter for your digital camera and the AC power supply for extended battery life of the digital camera (Fig. 4b). The video out port on digital cameras (Fig. 4c) can allow a user to connect to a television (Fig. 4d) using the supplied cable (refer to digital camera manual) and increase the preview size of the subject. Previewing a microscopic subject on a larger screen (Fig. 4a) can aid in the clarity of the image and serves as a method to inexpensively display the subject in real time during group discussions and presentations.

**Optics.** The lens is one of the most important components of a digital camera. Consumer class digital cameras offer fixed lenses that cannot be removed from the body of the camera. Fixed lenses have specifications that are set by the manufacture (Fig1a). They determine the amount of optical and digital zoom and lens quality. Optical and Digital zoom are common features for fixed lens digital cameras. Optical zoom is a real multi-focal length lens but digital zoom is a digital magnification of the center 50% of an image and produces lower quality images. Prosumer digital cameras are available in fixed and interchangeable lens models (Fig 1b).



Fig 1a. Example of a fixed lens on the Canon digital camera



Fig 1b. Example of an interchangeable lens on the Canon Rebel SLR digital camera.

**Suitable backdrops and use of reflectors for clearer photographs**

A backdrop can isolate a subject and improve the light quality of an image. The backdrop can be constructed from a canvas frame with tightly stretched material stapled to the frame (Fig. 2a) or a mat or poster board can be sufficient. Backdrop colors should be in the neutral color range for botanical subjects (charcoal, olive green, brown, dull blue, black). Using a backdrop in a daylight situation can even out the light in the background of your subject (Fig. 2b) and provide an overall improved balance to the image (Fig. 2c).

A light reflector can provide additional light to the shadow areas of a subject to be photographed (Fig. 3a). In daylight and indoor situations shadows can create dark areas with little or no detail (Fig.3b). A reflector can bounce light onto parts of the subject and reveal more detail and increase overall image quality (Fig. 3c). Reflectors can be purchased at camera stores or made from aluminum foil and cardboard.

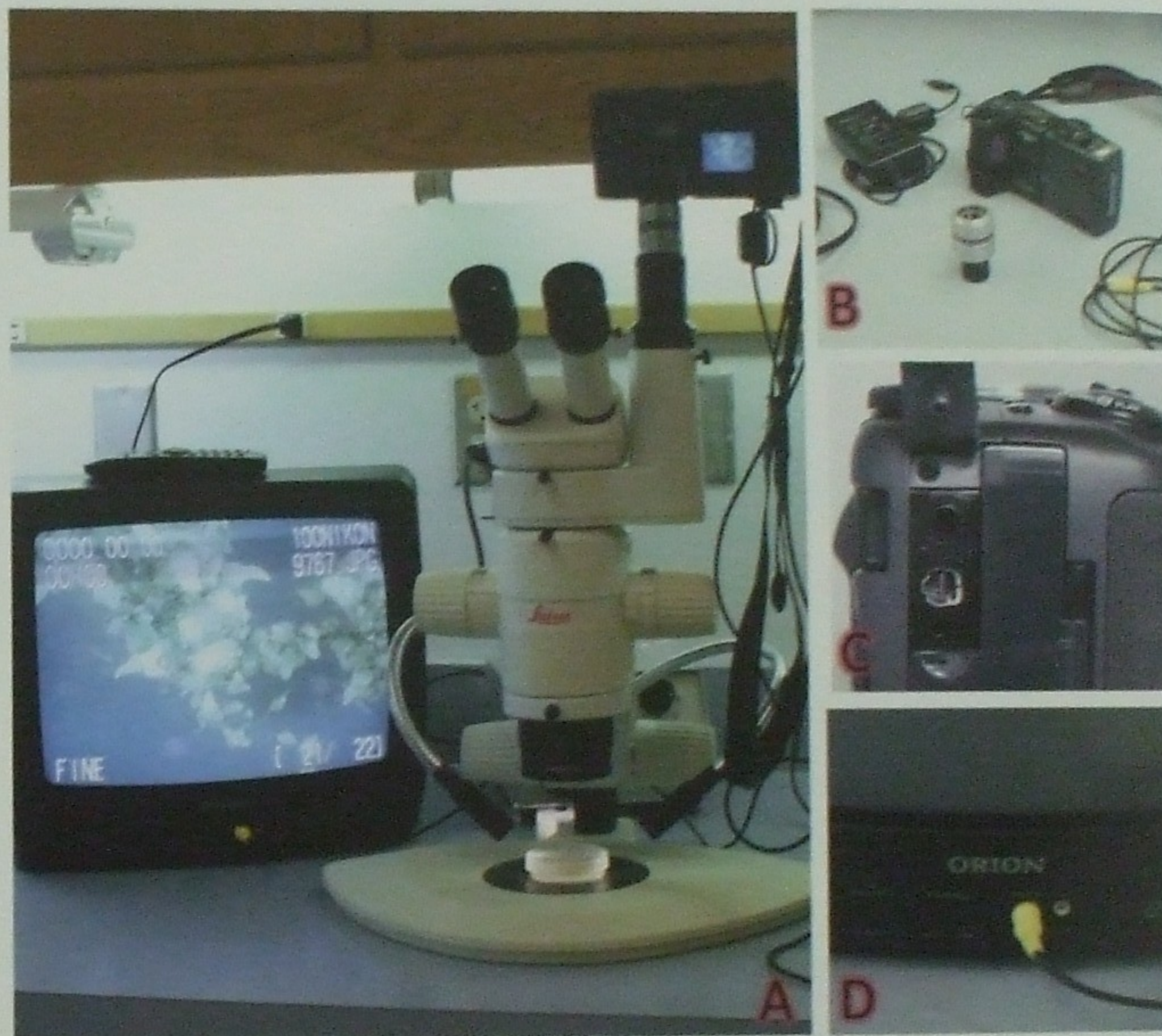


Fig. 4a Lecia MZ 12<sub>5</sub> stereoscope with Nikon Cool Pix 990 digital camera connected to 13" Orion television via camera video out and television video in. Fig. 4b Nikon Cool Pix 990 digital camera with stereoscope adapter, AC power supply, video out cable. Fig. 4c Detail of video out port on the Nikon Cool Pix 990 digital camera. Fig. 4d Detail of video in port on the 13" Orion television.



Fig 5a. Correct white balance



Fig 5b. Incorrect white balance

The proper white balance will give an image the correct color balance and white subjects within the image will appear white.



Fig 2a. A backdrop assembled from a large canvas frame with stretched black material



Fig 2b. Photographed without a backdrop (Sugar Apple, *Annona squamosa* Linn.)



Fig 2c. Photographed with a backdrop (Sugar Apple, *Annona squamosa* Linn.)



Fig 3a. A light reflector can add light to the shadow area of a subject.

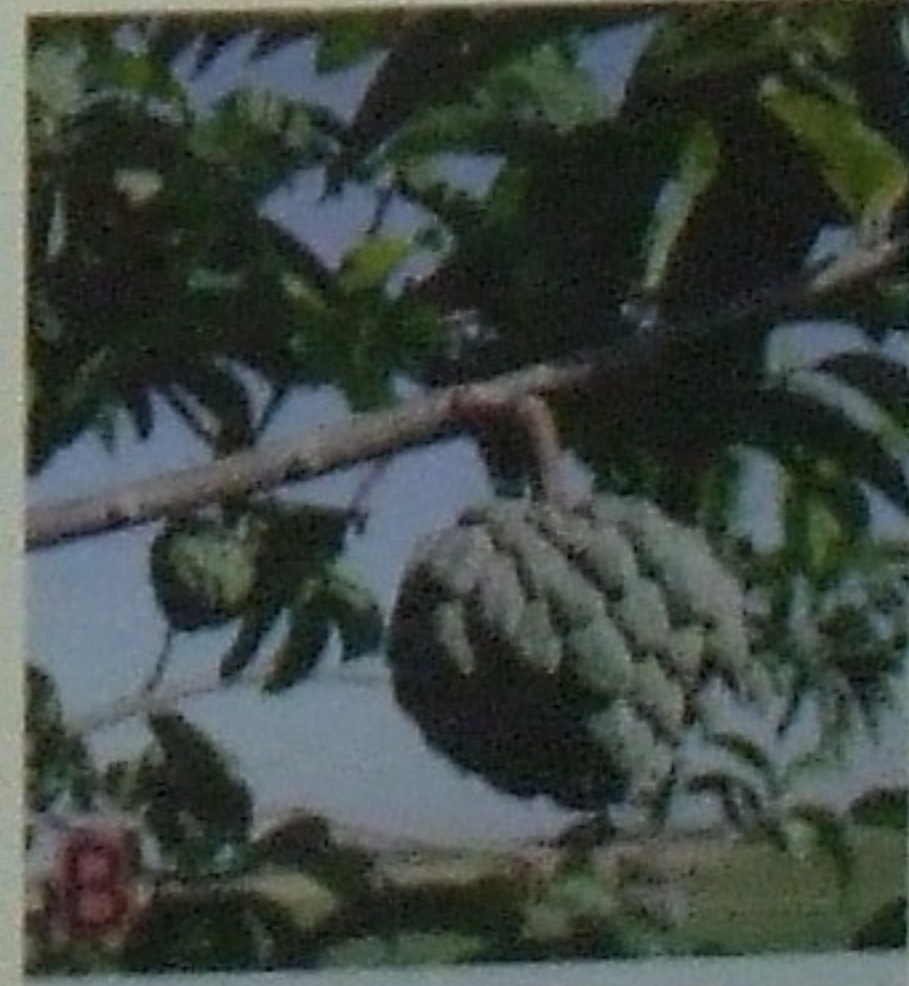


Fig 3b. Photographed without a reflector (Sugar Apple, *Annona squamosa* Linn.)



Fig 3c. Photographed with a reflector (Sugar Apple, *Annona squamosa* Linn.)