

## The Use of Digital Imaging in General Botany Laboratories at The University of Wisconsin - Madison

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For the last three years, General Botany laboratories here have been taught with the use of laboratory imaging systems. Output from these systems is from two ceiling-mounted 32" color monitors placed so as to be clearly visible to students working in their seats. Input comes from either of two color cameras, one on a stereo-zoom dissecting microscope, the other on a compound scope; or from a VCR; or from a teaching computer. Image capture and retrieval is accomplished by means of either tape using a VCR or digitally to a hard drive using a computer.

Experience has shown that TAs are too busy to routinely use the instructional microscopes during laboratory time. A library of images tightly related to the curriculum is necessary for the effective use of the General Botany imaging systems. In the lab, images from a set are presented in the background without announcement and referenced in response to questions, allowing students to work independently without interruption, and providing TAs with helpful images when needed. While dynamic images best demonstrate the relationship between structure and function, video tape is limited because segments cannot be randomly accessed. Two ways around this problem have been developed: by producing long tapes showing the same dynamic phenomenon (such as cyclosis), or by converting video clips into digital movies that can be randomly accessed. For lab use, digital images are also converted into hard copies to produce instructions to guide students through preparations. The output from an inexpensive ink jet printer (Hewlett Packard 550C) has been satisfactory for this purpose.

The image sets developed are also useful outside of lab time. Access by students is accomplished through tutorial computers and through the network. One particular use of this resource outside of instructional times may be of interest. Digital images have been embedded in computer-based dichotomous keys. These keys use images to clearly illustrate the difference between alternate choices in each dichotomy allowing students to use a taxonomic key effectively without first memorizing a set of glossary terms. With use, the student usually learns these terms anyway in a context that makes them meaningful. Dichotomous templates have been written in Macromedia's *Authorware*, and the conversion from a text-based key to a computer key, embellished with color graphics, is simple and easy.

Other educators are invited to use Botany's image sets. Currently five curriculum sets containing over 7,000 JPEG-formatted images are networked. These images may be accessed at the web address, <gopher://gopher.adp.wisc.edu:70/11/.data/.bot>, and may be used for any non-copyrighted instructional use.