Digital online measurement at the Bailey Hortorium

Kevin Nixon
Curator, L. H. Bailey Herbarium
Cornell University
Ithaca, NY

Two Interfaces

- CUPAC – anatomical slides
- Herbarium images

Basic Design

- MYSQL database of images, specimen data, character data, image objects (measurements, annotations, and structure labels)
- Interface written in PERL and Javascript (HTML5) with some occasional C++
- Not fully public at this time.

BASIC GOALS

- Online measurement of character data from specimen images
- Automated/rapid calibration
- Institutionally defined basic set of descriptors for persistent measurements.
- User definable characters and measurement tools for the public, downloadable in standard formats; persistent server-stored data for authorized users with accounts.

ANATOMICAL SLIDES

- Calibration easy to do based on magnification – tests suggest very high accuracy relative to direct measurement with microscope.
- Relatively flat field and well-defined structures
- Angle of section may affect accuracy of measurements; however, this is a problem whether measuring from an image or directly.
- Areas, circumferences etc. very useful

HERBARIUM SPECIMENS

- Mostly very flat (palms excepted)
- Calibration best done individually, or by image "lot" – set of images done at same working distance.
- Kinds of measurements used in taxonomy are mostly simple length/width.
- High level of accuracy relative to the realistic precision – for most measurements, within a mm is sufficiently precise.
- Accuracy of calibrated specimens is less than 1 mm.

Increasing precision (and therefore accuracy)

- Image measurements stay accurate when the image is "zoomed in" thus increasing precision.
- This helps with the problem of "missing" the desired spot with the mouse.
- Therefore, becomes feasible to measure structures such as twig diameter accurately with a relatively high precision.

- BH specimen images page

FUTURE GOALS

- Complex measurements
- Perimeters and areas
- Improving ease of use
- Automated detection of edges, etc.