Getting Started: Digitizing Multiple Collections at UCSB

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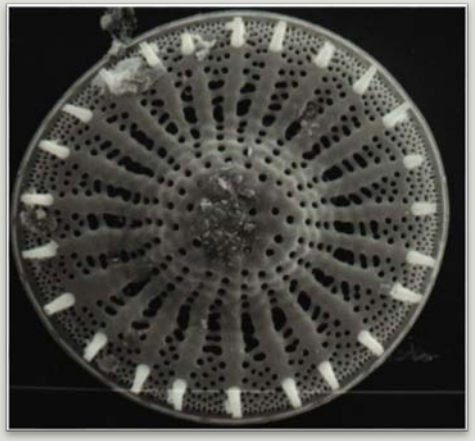
SPNHC Meeting, May 21, 2015

CCBER
CHEADLE CENTER FOR BIODIVERSITY & ECOLOGICAL RESTORATION

A Sample of CCBER Collections



700 Diatoms

Insects

Core samples and microfossils

Herbarium sheets

Photographs

Field notes

7,500 Algae

64,000 Plant Anatomical Slides and Images

32,000 Vertebrates

Digitization Projects Initiated at CCBER

- **The Katherine Esau Digital Archive Project** -- Library Services and Technology Act (LSTA) (2008-2009)
- **Cheadle Plant Anatomy Collection** (internally funded) (2009-2010)
- **Compact Storage and Curation of Higher Plant and Algae Specimens** -- NSF BRC grant 2010-2012.
- **Vertebrate Collections Management Project** --IMLS MFA (2011-2013)
- **Digitization of the UCSB Vascular Plant Collection--**IMLS MFA (2013-2014)

Katherine Esau Digital Archive

Electron and light microscope slides; photographic images, papers

Challenges

- No previous experience with large scale digitization
- No collection manager
- No equipment or funding to get started
- How to serve digital objects to wide audience?

Katherine Esau Digital Archive

Strategies and Results

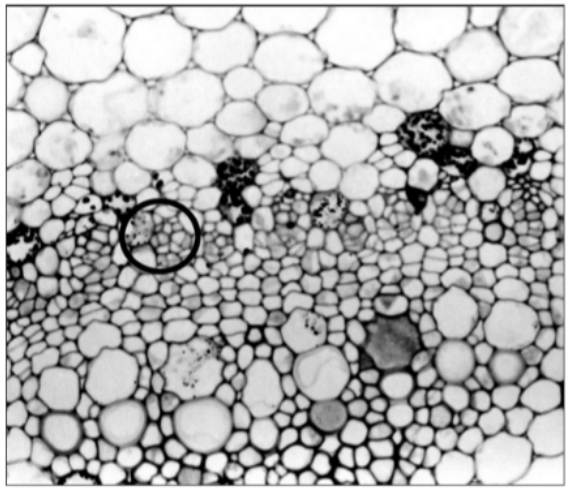
- Fit project to funding source (LSTA)
- Created pilot digitization project
- Grant paid for scanning in-house vs. outsourcing
- Only photos digitized
- Targeted widest audience for collection (K-12, academic)

Katherine Esau Digital Archive project 2008-2009

- Digitized ~ 375 images
- Images served by Calif. Digital Library and DPLA
- Web pages with biographical info. and plant anatomy materials
- K-8 curriculum

What Are the Differences Between a TEM and a Light Microscope?

Although TEMs and light microscopes operate on the same basic principles, there are several differences between the two. The main difference is that TEMs use electrons rather than light in order to magnify images. The power of the light microscope is limited by the wavelength of light and can magnify something up to 2,000 times. Electron microscopes, on the other hand, can produce much more highly magnified images because the beam of electrons has a smaller wavelength which creates images of higher resolution. (Resolution is the degree of sharpness of an image.) Figure 2 compares the magnification of a light microscope to that of a TEM.



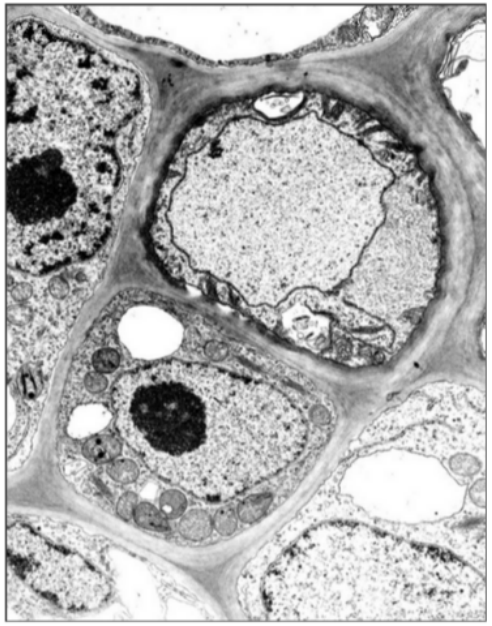
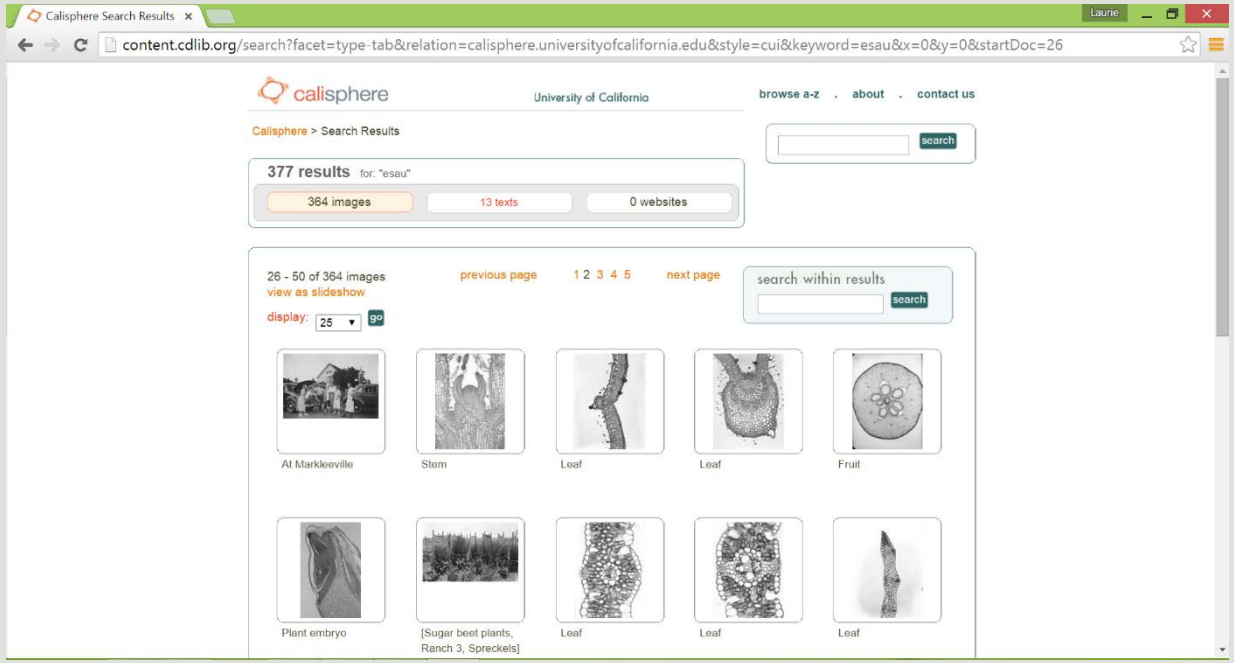
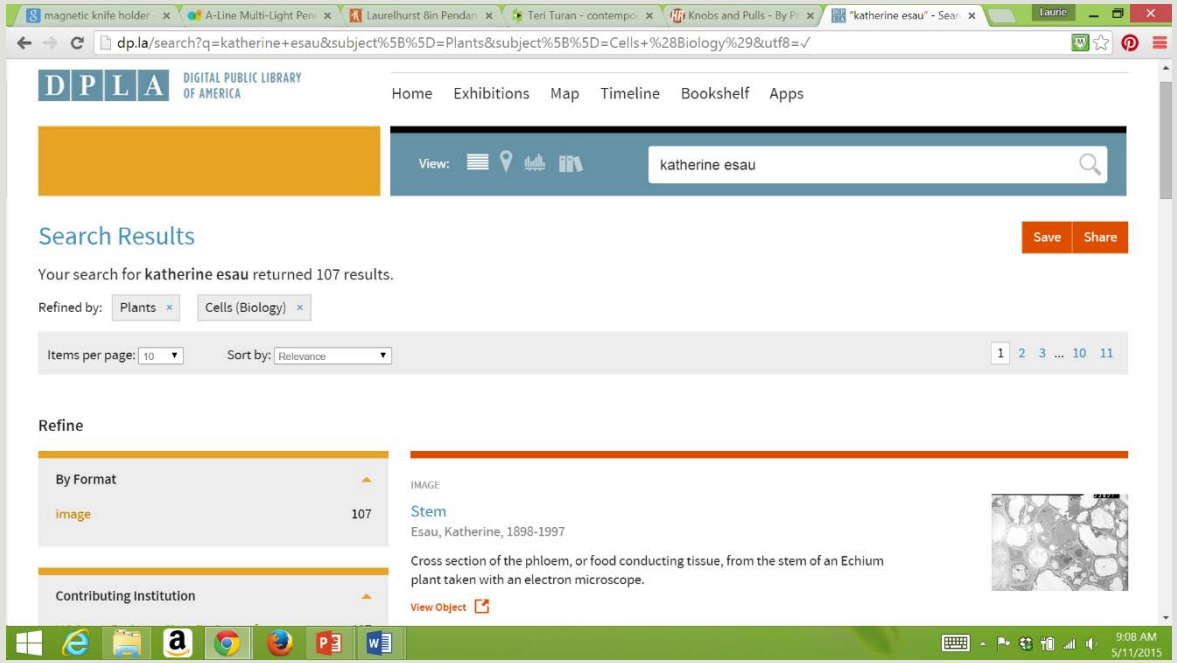


Fig. 2 [left] Cotton stem; area in the circle is the phloem tissue. Light microscope x250. Photo by K. Esau. [right] Enlarged image of cotton phloem tissue showing a sieve element (top cell) and a companion cell (bottom cell), TEM x8,000. Photo by J. Thorsch.

Images and Metadata Served Through Calisphere and Digital Public Library of America





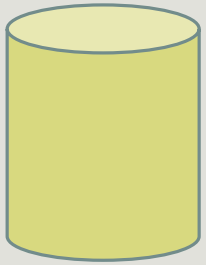
Cheadle Plant Anatomy Collection

Fluid preserved specimens, herbarium sheets, slides and photographs

Challenges

- Complex data schema/structure
- How best to represent multiple relationships in Specify
- Data entry only; still have slides to image and derivative images
- Link to Vascular Plant Collection

Fluid Plant Specimen



Herbarium Sheet

Original specimen

Catalog Number: 102242
Collector number: M32
Prep Types: slides and sheets

Slide Preparations

X-sect. Root

100123-100130

Maceration Roots

100131-100135

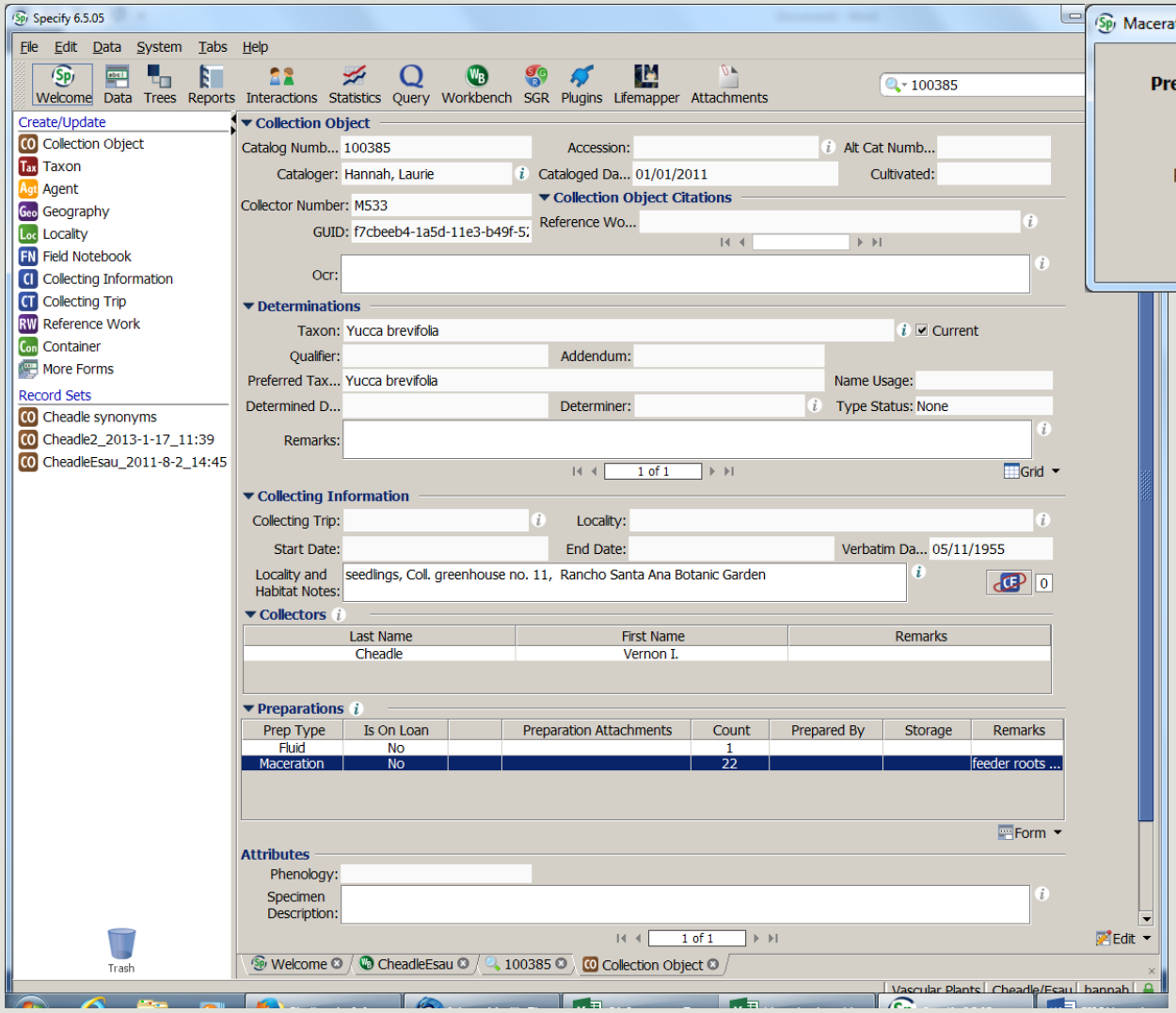
Plant Anatomy Collection in Specify

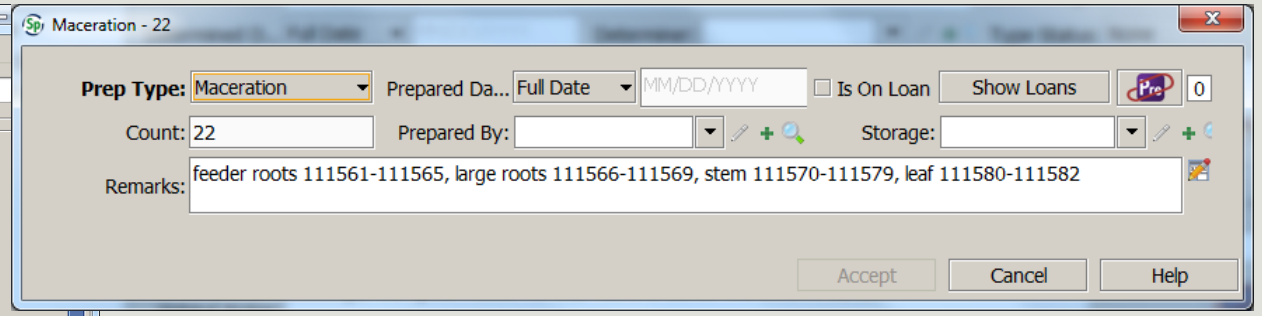
23578

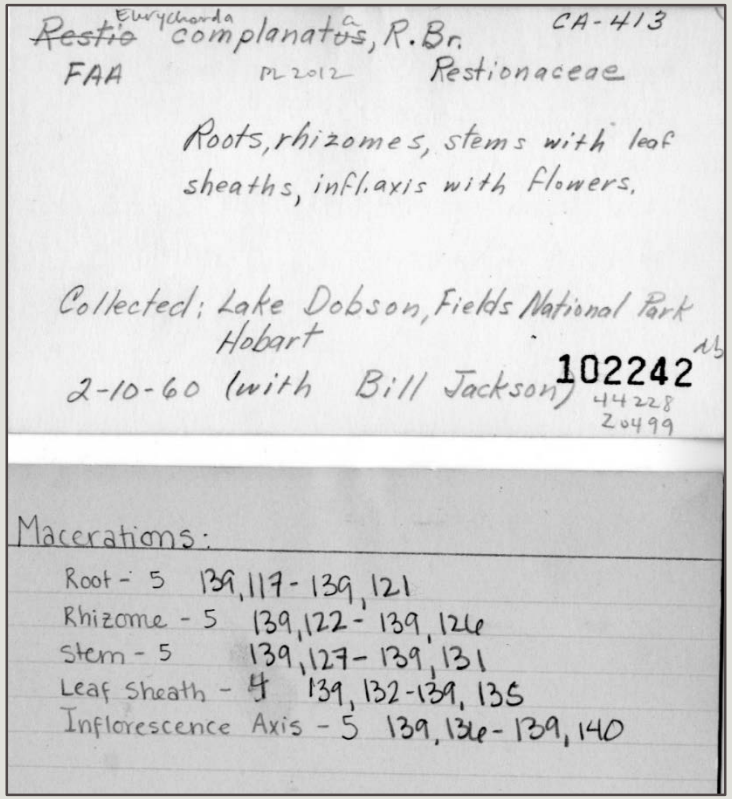
Catalog number: 23578
Collector Number: M32
Prep type: Sheet

Vascular Plant Collection in Specify

Sample Specify Record







Cheadle Plant Anatomy Collection

Strategies and Results

- Used available endowment funds
- Leveraged staff with collections experience
- Specify = free, open source
- Bottles 66% completely databased with 25,415 associated microscope slides
- Project can continue using current imaging workflow for vascular plants

Vertebrate Collections Management Project

Challenges

- No collections manager
- Data missing or incomplete, not normalized, from multiple sources
- Curation of collection needed
- Infestations

Williams. S. et al. 1996. APPLYING MCGINLEY'S MODEL FOR COLLECTION ASSESSMENT TO COLLECTIONS OF RECENT VERTEBRATES. Collection Forum. 12(1):21-35

What level of processing are the specimens at?

Level 1—Acquisition and Accession
At this stage, the potential exists for loss of specimens, specimen parts, and/or associated data.

A) Do specimens have associated data and a collector number?
B) Are specimens at risk for mechanical, chemical, and/or biological damage?
C) Does UCSB have legal ownership of the accession as a whole? Are copies of permits available?

Level 2—Stabilization
At this stage, specimens are stabilized for preservation and protection, and associated records are compiled and organized

D) Have specimens been either prepared or frozen?
E) Do unprepared specimens have a pre-prep number?
F) Is associated data correct and complete?
G) Do we need to eliminate or replace inappropriate materials? (e.g. packing or improper fluids)

Level 3—Cataloging
At this stage, specimens are catalogued and provisionally available for use.

H) Do specimens have a UCSB catalog number?
I) Are associated parts of specimens marked with the catalog number?
J) Have all extraneous materials been removed? (e.g. string, debris, staples, etc.)
K) Has a catalog record been created (card or online)?

Level 4—Labeling and Housing
At this stage, specimens are properly housed and labeled.

L) Are specimen parts correctly and completely labeled? (e.g. attachment of tags on specimens, bones labeled with catalog number. This applies to multiple lots in one container.)
M) Are specimen parts associated with the rest of their collection? (i.e. cross referenced)
N) Are specimens stored in appropriate containers? (e.g. standardized boxes or vials)
O) Are containers properly labeled?

A	B	W	X	Y	Z	AC	AD	AE	AF	AG	AH	AI
Herp collection												
		U	V	W	X	Comments						
Unit 1	Ambystomatidae, Dicamptodontidae, Amphiumidae, Chryptobr					Ants inside door of room; all shelves on south wall need vacuuming; hazardous materials throughou						
c		1	1	1	1	F-#27842 lacks data; L lots need data tags; O-R Need UCSB # and fluid yr. on LL						
d		0	1	1	0	F-L 1 lot #6107 inc. data; O-R UCSB # on LL; U bolt loose on shelf; X need new fluid						
e	Plethodontidae	1	1	1	0	L mult. Ser. In 1 jar; O-R UCSB and fluid yr. on LL; Q need county reorg.; S jars overstuffed; X new fluid						
Unit 2						Move additional canisters out of the way of the shelf						
b	Plethodontidae	1	1	1	0	F 2 jars missing data; L mult ser. In 1 jar; O-R UCSB and fluid yr. on LL; S jars overstuffed; X new fluid						
c	Rhyacotritonidae	1	1	1	0	F some missing data; L mult ser.; O-R UCSB # and fluid yr on LL; S 1 jar overstuffed; X new fluid						
d	Ascaphidae, Bombina	1	1	1	0	J remove paper; L missing SL in lots; O-R UCSB # and fluid yr.; Q work table blocking retrieval; S overst						
e	Pelobatidae	1	1	1	0	L mult ser in 1 jar; O-R UCSB and fluid yr. on LL and shelf not labeled ; Q ethanol cans blocking retriev						
Unit 3												
b	Bufonidae	1	1	1	0	L mult ser Bufo boreas (SB); O-R UCSB# and fluid yr; S overcrowding in jars; X new fluid						
c		1	1	1	0	O-R LL lot#s, UCSB#; S Bufo boreas (Vent.) overstuffed; X fluid						
d	Bufonidae, Leptodact	1	1	1	0	O-R LL lot#s, UCSB#; Q cans blocking; S overstuffed; X 8 bad lids, fluid; Y needs review						
e	Hylidae, Microhylidae	1	1	1	0	L mult ser Pseudacris regilla; O-R UCSB# and fluid yr.; Q hard to reach; S overstuffed						

Vertebrate Collection Management Project 2011-2013

- 1.5 years
- 17 students participated
- 31,000 herpetological, ornithological, and mammalian specimens databased
- 522 gallons ethanol replaced

Vertebrate Collections Management Project

Strategies and Results

- Summer collection assessment -> IMLS grant narrative
- Solidified and firmly established curatorial internship
- Increased student recruitment—17 students participated
- Convinced donor to fund 3-yr full time collections manager position

Lessons Learned and Key Strategies

- Design manageable projects that can be finished on time.
  - PROs: Less stress, build on accomplishments; CONs: Digitizing entire collection may take years.
- Be creative with funding.
  - Piggyback on a TCN
  - Digitize more than one type of material
  - Look for funders beyond science

Council on Library and Information Resources

National Endowment for the Humanities

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2) the folks at **iDigBio** who have worked with the collections community to create an outstanding array of models, workflows, training opportunities, and communication platforms to support all of us in our digitization efforts.