Digitization of the Valdosta State University Herbarium

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Richard Carter
Herbarium (VSC)
Biology Department
Valdosta State University
Valdosta, GA 31698

Background

- Valdosta State began as teacher's college, accepting its first class in 1913
  - South Georgia State Normal College (1913, 2-year curric.)
  - Georgia State Woman's College (1922, 4-year curric.)
  - Valdosta State College (1950, co-ed)
  - Valdosta State University (1993, regional university)
- Enrollment
  - 1984: ca. 6,000
  - 2014: >12,000
- VSU predominately undergraduate, with demanding teaching load
  - 1980s – 1997: 15-22 hrs per quarter
  - Since 1998: 12 hrs per semester

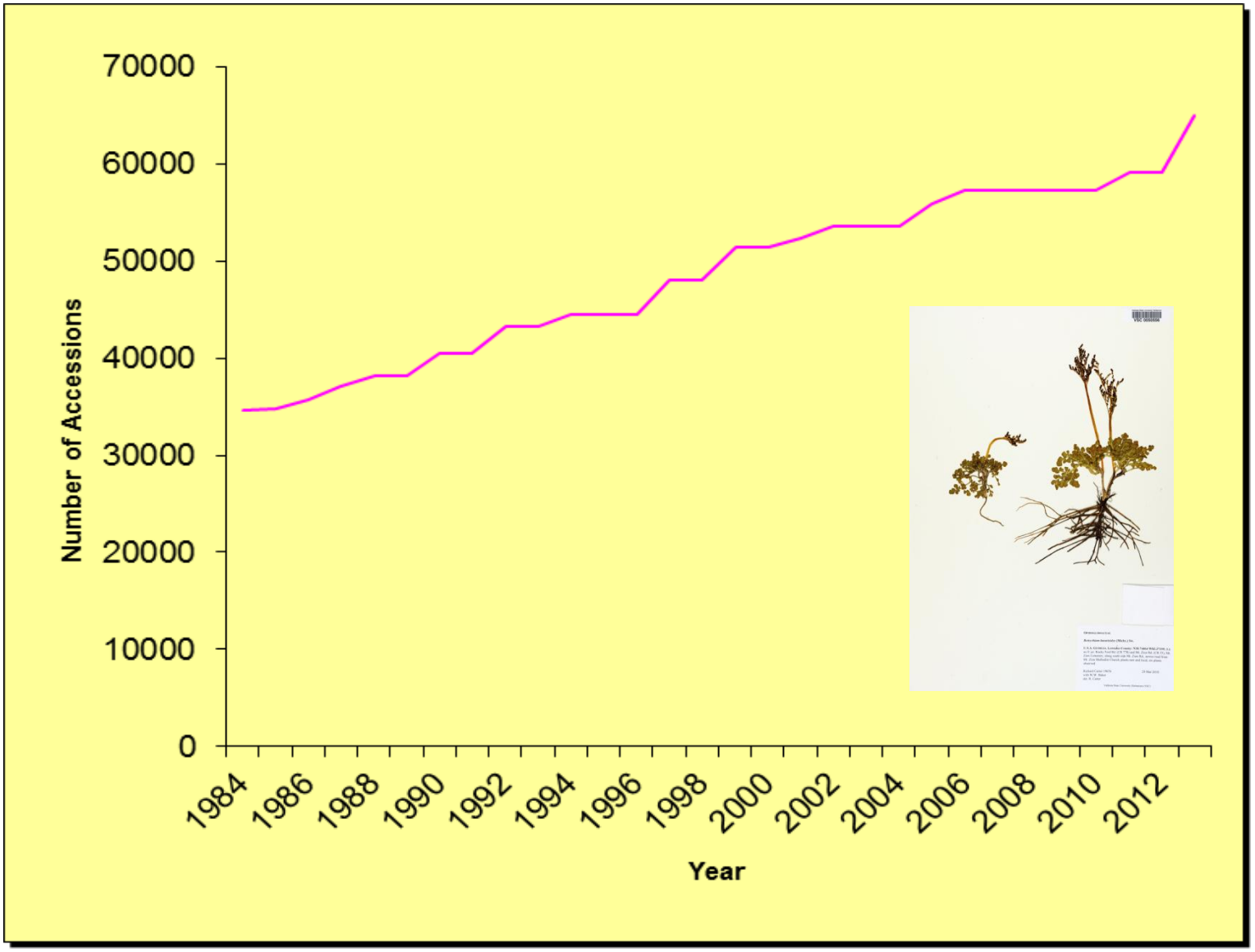

HISTORIC
SAPELO ISLAND
LIGHT STATION
BUILT 1820

History of VSC

- Pre-1960, Dr. Beatrice Nevins accumulated a teaching collection of about 400 specimens.
- In 1961, Dr. Wayne Faircloth began to build a research collection.
  - IH listing (1968): VSC
  - Faircloth became department head (1984): >30,000 specimens
- Before 2001 herbarium housed in one small room with inadequate ventilation and space
- In January 2001 herbarium moved into new building providing
  - Greatly improved ventilation and air quality
  - More than double the space

Size and scope of collection

- Regional collection of >65,000 accessioned specimens
  - Particularly rich in plants of Georgia coastal plain
  - Extensive collections of graminoids, ferns, bryophytes
- Significant collections
  - W. R. Faircloth
  - R. K. Lampton (bryophytes, lichens)
  - R. Carter
  - R. Kral
  - C. T. Bryson
  - S. T. McDaniel
  - R. K. Godfrey



Growth of VSC since 1984

Current facilities

Herbarium suite 1456 ft^2

with climate control

- Constant climate: temp 68F, relative humidity ca. 50%
- Air exchange: 9x per hour
- Herbarium proper isolated from specimen prep area and office to minimize risk of pest introduction

Herbarium suite

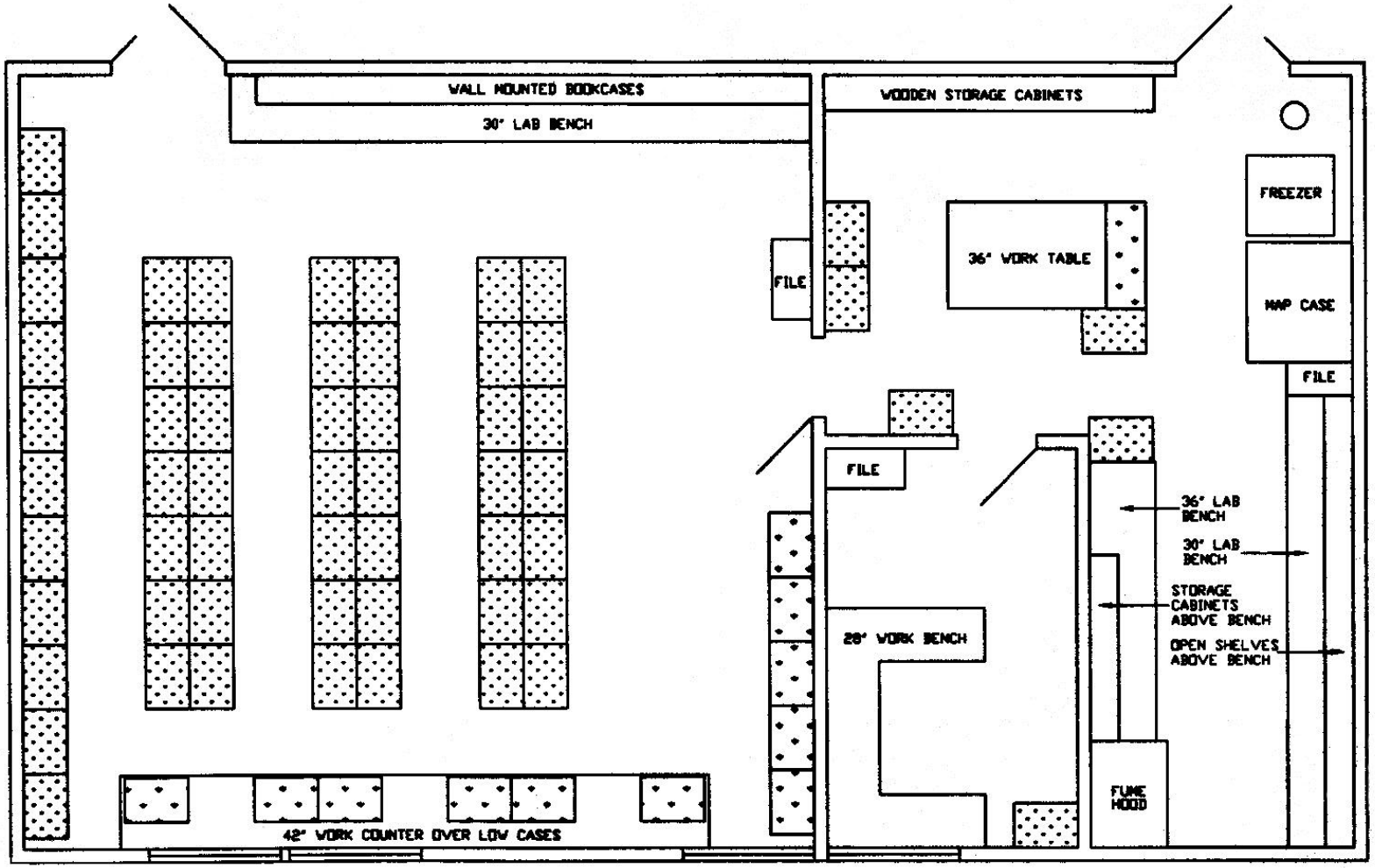
- Herbarium proper: 760 ft^2
- Herbarium prep with lab benches, fume hood, chemical storage: 420 ft^2
- Curator's office: 140 ft^2
- Drying & storage closets (nearby): 136 ft^2

Additional space

- Faculty office (across hall): 142 ft^2

Valdosta State University Herbarium (VSC)

VALDOSTA STATE UNIVERSITY



VALDOSTA STATE UNIVERSITY HERBARIUM [VSC]

SCALE: 1/4" = 1'-00"

- HERBARIUM CASE
- SAFETY SHOWER
- HALF SIZE HERBARIUM CASE

Current facilities

Specimen storage

- 81 steel herbarium cases (84 1/8" H X 29 5/32" W X 18 25/32" D)
- 13 steel herbarium cases (40" H X 29 5/32" W X 18 25/32" D)

Ultra-cold freezer

- 1 So-Low U40-22 freezer (-40C) for pest control

Optics

- 1 Olympus SZ 6045 stereo-dissecting microscope with phototube and Infinity 2 digital camera and fiber optic illuminator
- 1 Olympus SZ51 stereo-dissecting microscope with fiber optic illuminator
- 1 Nikon SMZ-1 0.7-30x zoom stereo-dissecting microscope with ring illuminator

Current facilities

Computer resources

- 1 HP d530 CMT Compaq computer with Pentium 4 HT processor
- 1 Dell Optiplex 755 computer with Core 2 processor
- 1 3TB external hard drive
- 1 HP 2420 Laserjet printer
- 1 HP 2055dn Laserjet printer

Staffing

- One part-time curator/director
- Occasional student assistant

Funding

- No budgetary line for herbarium
- Unpredictable and limited support through the Biology Department
- Grants and contracts secured by curator used to support field program – mostly rare plant surveys
  - Department of Defense (DoD)
  - Georgia Botanical Society
  - Georgia Department of Natural Resources (Georgia DNR)
  - Louisiana Department of Wildlife & Fisheries
  - National Science Foundation (NSF)
  - Nature Conservancy
  - US Department of Agriculture (USDA)
  - US Fish & Wildlife Service (USFWS)
  - University of Georgia Foundation
  - US Army Medical Research Acquisition Activity (USAMRAA)
- In 2011 VSU administration began returning a generous portion of overhead on grants and contracts to the PI.

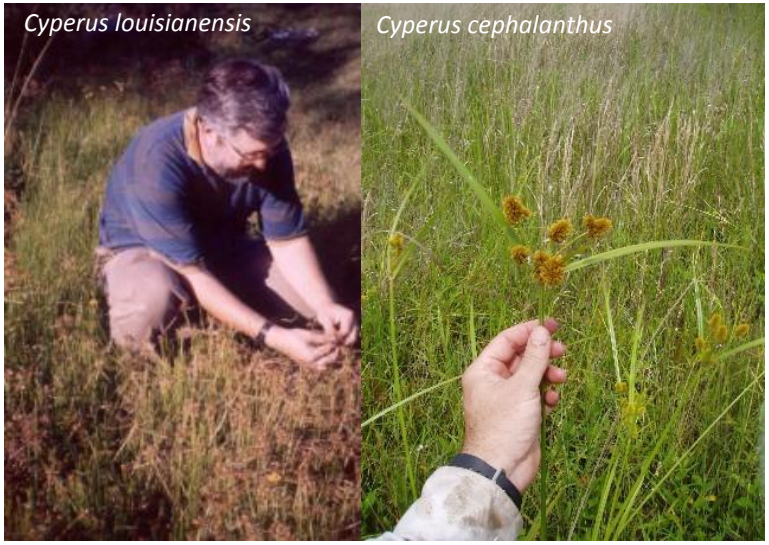
Rare plant surveys

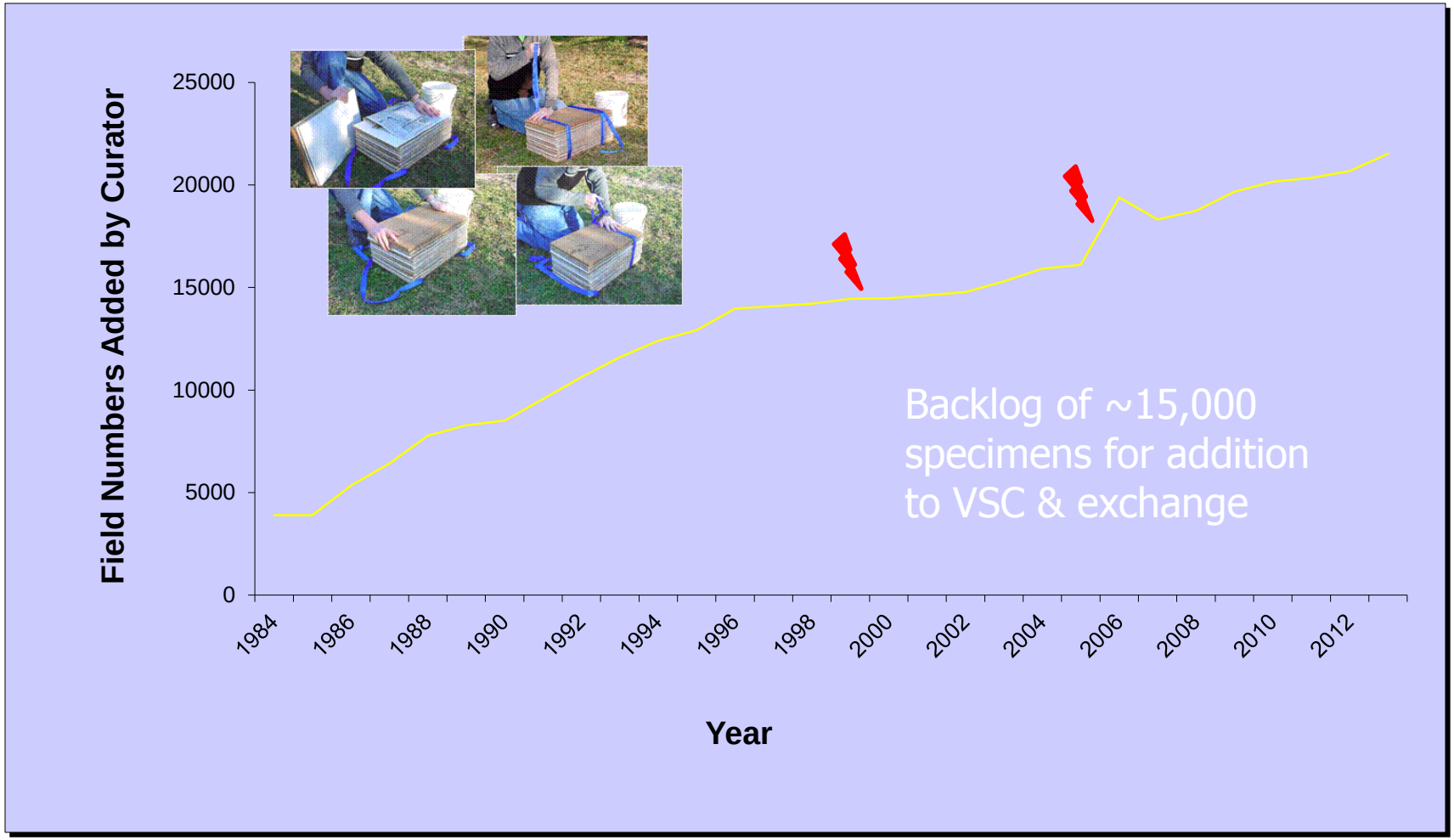
Targeting areas

Fort Stewart Military Reservation (1992)
Moody Air Force Base (1993-1994)
Kings Bay Submarine Base (1996-1997)

Targeting species

Cyperus cephalanthus (1992-1993)
Cyperus louisianensis (1993)
Lilium iridollae (1994)
Schwalbea americana (2007-2008, 2013-2014)
Lindera melissifolia & *Litsea aestivalis* (2008-2009)





Specimen collection since 1984

Crisis – ca. 2005

- Acute need for resources to store and process specimen backlog
- In exploring options for external support for the herbarium, it immediately became obvious that *digitization* would be a necessary component of a successful NSF proposal

Digitization: Getting Started

- 2005: *Deep South eFlora Workshop* hosted by Austin Mast, Florida State University
- 2006: *Herbarium Cyberinfrastructure Workshop* in Chico, California, sponsored by Yale University
- 2008*: Opportunities and Challenges of Small Collections Workshop* hosted by Alan Prather, Research Coordination Network, Michigan State University
- 2009: *Specify "How to" Workshop* hosted by Herrick Brown at University of South Carolina, sponsored by SERNEC, Zack Murrell, Appalachian State University

Collaborative Research: The GA-VSC Herbaria Collaborative: Phase I of a Statewide Consortium

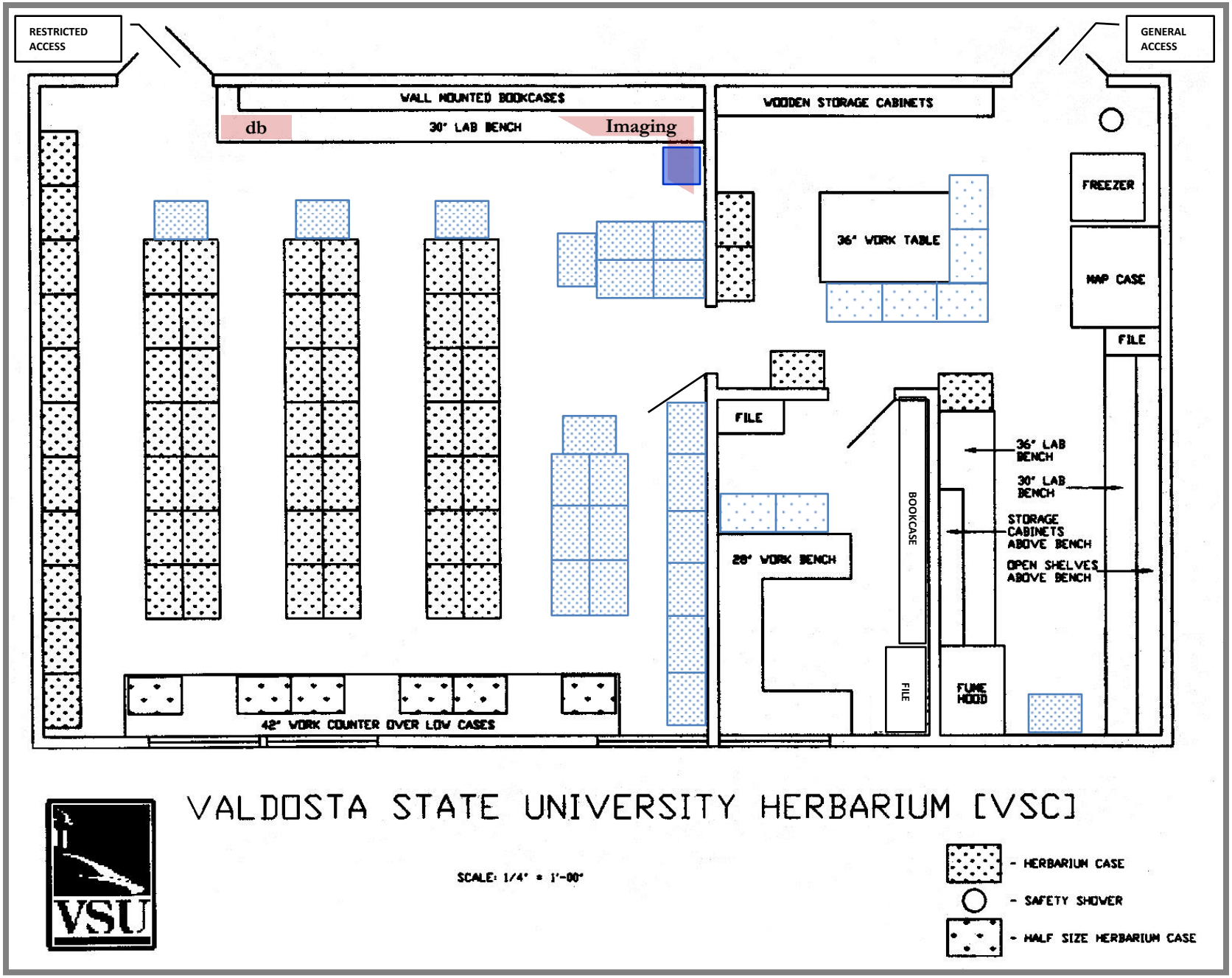
- April 2011 the Valdosta State University Herbarium (VSC) received funding from the National Science Foundation (NSF DBI-1054366, J.R. Carter, PI).
- In collaboration with University of Georgia Herbarium (NSF DBI-DBI 1054329, W.B. Zomlefer, PI, and D.E. Giannasi, coPI).
- Major outcomes for VSC
  - Digitization of the collection
  - General enhancement of the collection

Specific outcomes

- General enhancement
  - 10 new herbarium cabinets
  - Replacement of worn door seals in old cabinets
  - Replacement of old genus folders with geographically color-coded archival folders
  - Processing of specimen backlog
- Digitization
  - Prepare high-resolution images of herbarium specimens
  - Build an associated database from specimen label data
  - Contribute VSC images and data to produce on-line atlas of the state's flora, in collaboration with University of Georgia Herbarium (GA)

Results – general enhancement

- 20 new herbarium cabinets have enabled the secure storage of backlog specimens and provided space for growth.
  - 10 purchased with NSF funds
  - 10 purchased with internal funds


RESTRICTED ACCESS
GENERAL ACCESS
WALL MOUNTED BOOKCASES
WOODEN STORAGE CABINETS
db
30" LAB BENCH
Imaging
FREEZER
36" WORK TABLE
MAP CASE
FILE
FILE
36" LAB BENCH
30" LAB BENCH
STORAGE CABINETS ABOVE BENCH
OPEN SHELVES ABOVE BENCH
BOOKCASE
28" WORK BENCH
FILE
FUME HOOD
42" WORK COUNTER OVER LOW CASES
VALDOSTA STATE UNIVERSITY HERBARIUM [VSC]
SCALE: 1/4" = 1'-00"
- HERBARIUM CASE
- SAFETY SHOWER
- HALF SIZE HERBARIUM CASE

Results – general enhancement

- Worn out herbarium cabinet gaskets were replaced with rubber foam weather-seal.

Results – general enhancement

- Old genus folders were replaced with geographically color-coded archival folders.

Specific outcomes

- General enhancement
  - 10 new herbarium cabinets
  - Replacement of worn door seals in old cabinets
  - Replacement of old genus folders with geographically color-coded archival folders
  - Processing of specimen backlog
- Digitization
  - Prepare high-resolution images of herbarium specimens
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Digitization equipment

Imaging station

- Nikon D3x digital camera
- Kaiser RSX copy stand
- Dedicated HP 8200CM i7 4GB 250GB HDD computer
- Barcode reader (Symbol Technologies, Inc., P/N: LS9208-SR10001NSWW, MFD: Oct 5, 2005 / Code 39)
- 2 Seagate Black Armor 12 TB NAS 111309-CDW storage devices for data storage and backup

Data entry station

- Dedicated HP 8200CM i7 4GB 250GB HDD computer
- Barcode reader (Symbol Technologies, Inc., P/N: LS9208-SR10001NSWW, MFD: Oct 5, 2005 / Code 39)
- Server supported and backed up through IT, and accessible via local area network

Digitization configuration

Mobile chair

Databasing station

Mobile chair

Imaging station

Data entry workflow

1. Open Specify data entry form
2. Retrieve specimen folder from cabinet
3. Scan barcode label into db
4. Enter county and assoc. geographical data
5. Enter collector name
6. Enter collection number
7. Enter collection date
8. [Repeat]
9. Return specimen folder to cabinet

Imaging workflow

1. Turn camera and lights on, check camera settings
2. Open Nikon Camera Control Pro and FN Intercept
3. Retrieve specimen folder from cabinet
4. Place specimen sheet on copy-stand
5. Take photograph
6. Scan barcode and check file (re)name
7. [Repeat]
8. Return specimen folder to cabinet

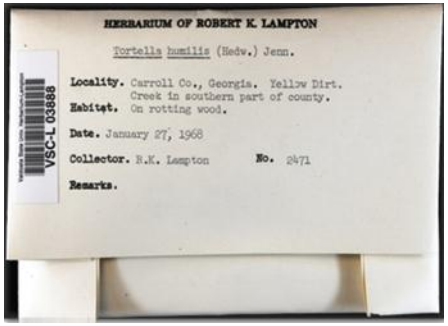
Post-processing

1. For each imaging session open Nikon Capture NX
2. Review images (QC) and move any defective into reshoot folder
3. Rotate, crop, adjust light quality for batch-processing
4. Overnight: run post-processing of batch
5. Next morning: QC processed jpeg images, move NEF images to NEF Archive folder and move jpeg images to jpeg Archive folder on Black Armor storage device
6. Weekly: confirm automatic backup of image data on remote duplicate Black Armor storage device

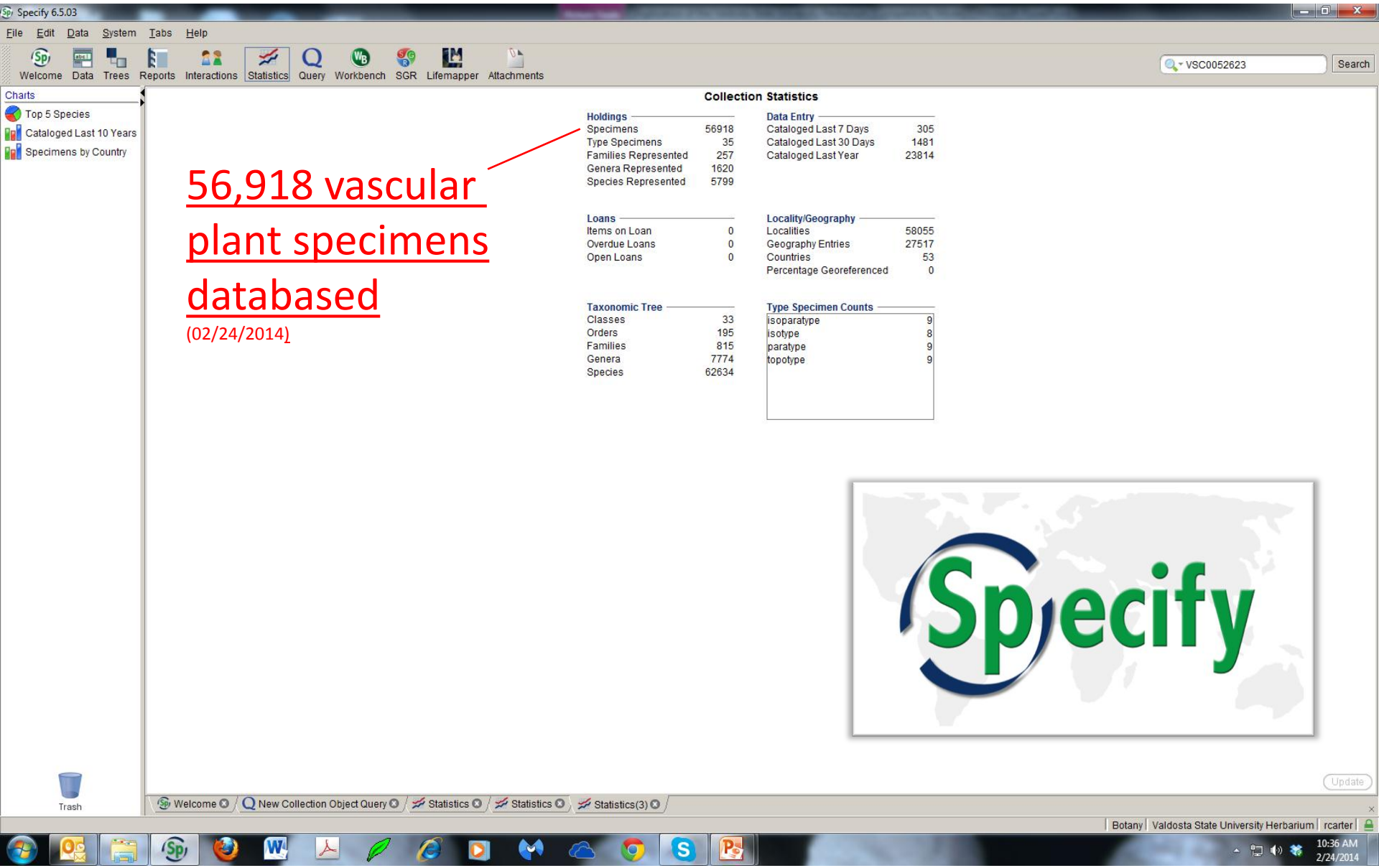
Results – digitization

>61,000 vascular plant specimens imaged

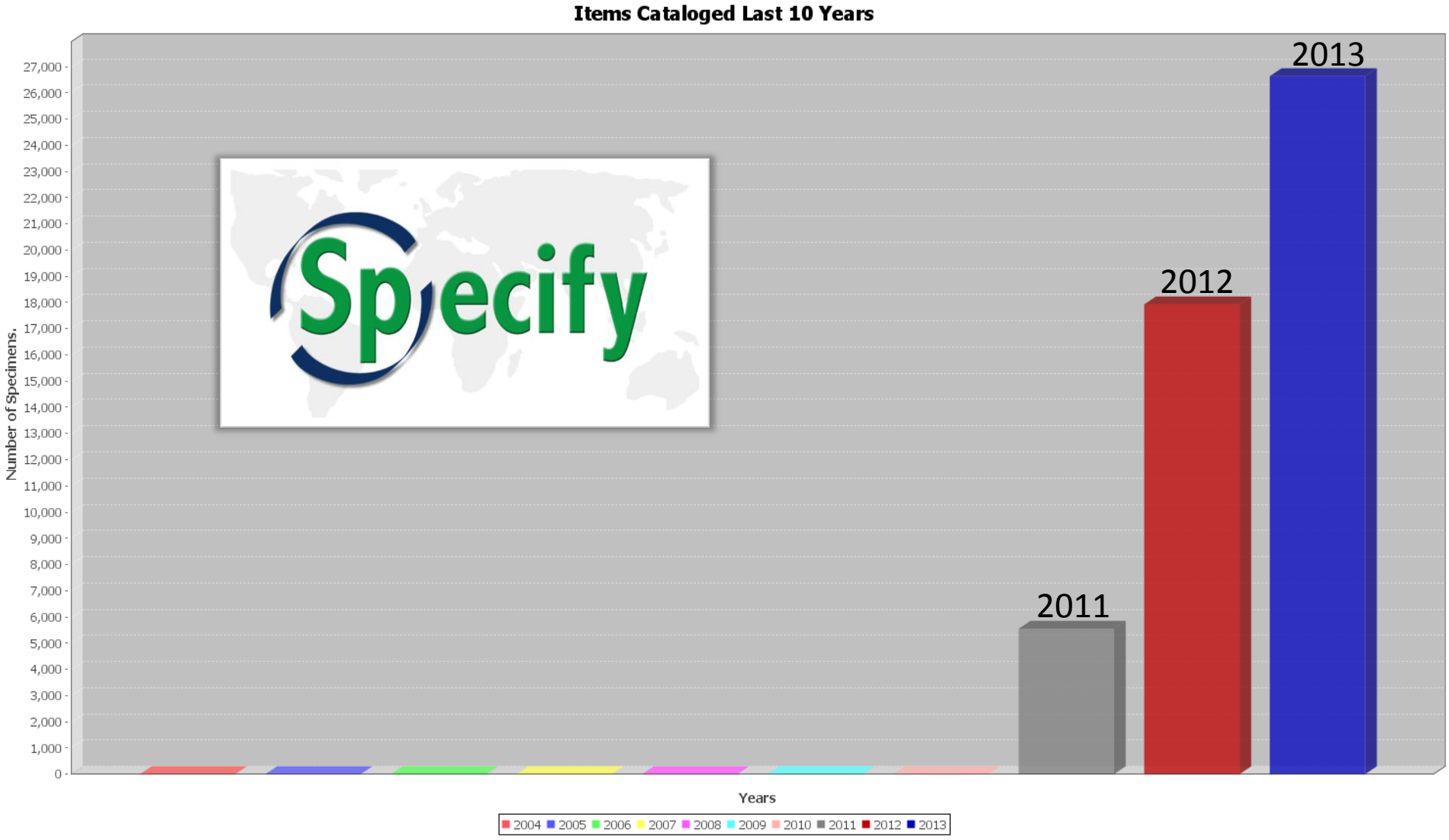
>4,000 non-vascular specimen packets imaged



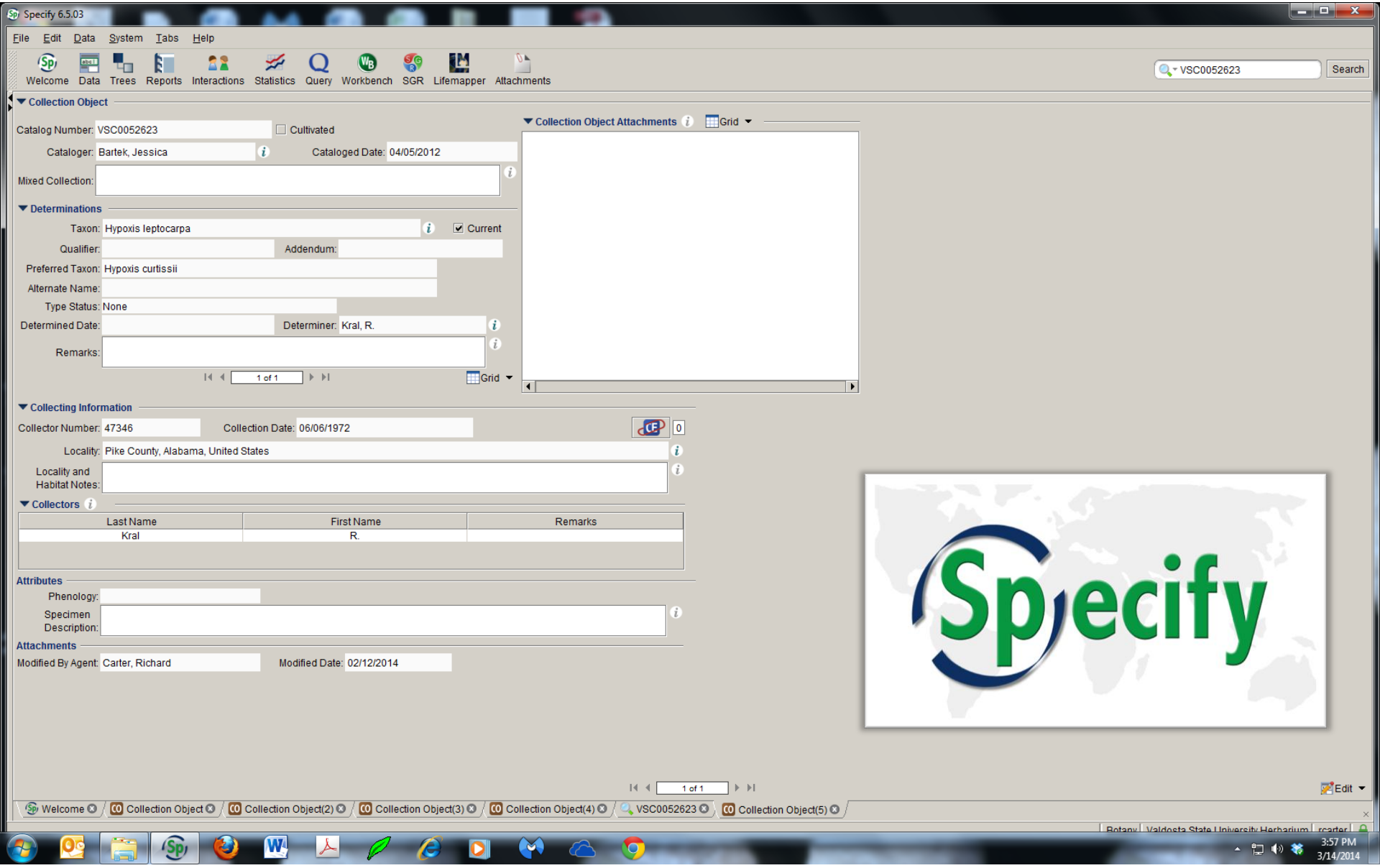
Results – digitization



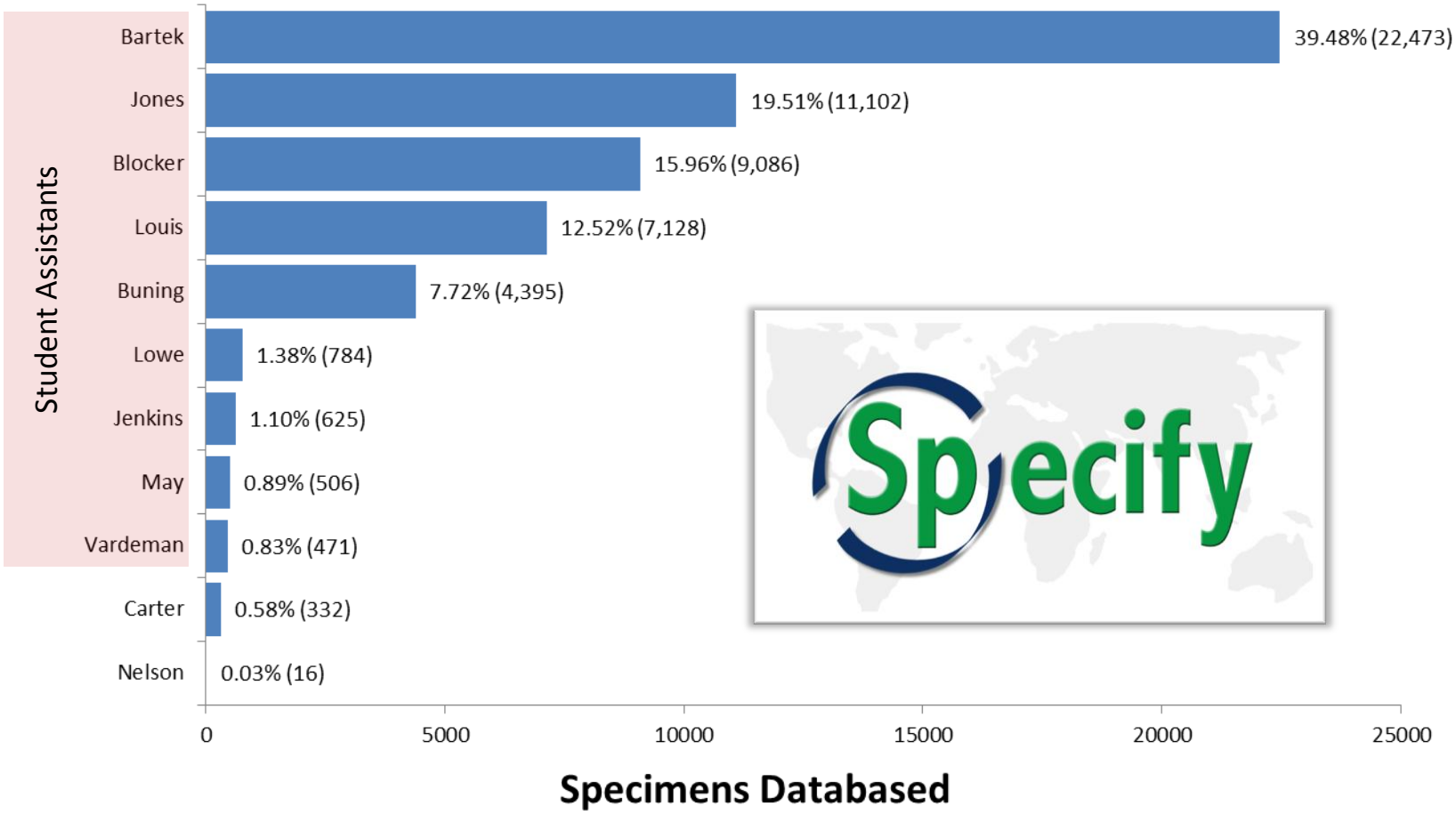
Results – digitization



Results – digitization



Results – digitization



Results – digitization

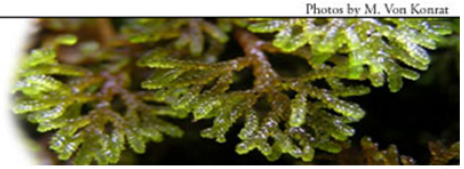
http://bryophyteportal.org/portal/index.php

Consortium of North American Bryophyte Herbaria Valdosta State University Collection Profiles - Windows Internet Explorer

http://bryophyteportal.org/portal/collections/misc/collprofiles.php?collid=13

Consortium of North American Bryophyte Herba...

Photos by M. Von Konrat



Consortium of
NORTH AMERICAN BRYOPHYTE HERBARIA

Home >> Collection Search Page >> **Valdosta State University Details**

Main Menu

- Search Collections
- Image Library
- About CNABH
- Data Usage Policy

Flora Projects

- North Carolina
- Dynamic Checklist

Other Resources

- Links
- Frullania Portal (CNABH)
- Lichen Portal (CNALH)
- Symbiota Help Page

- Log In
- New Account
- Sitemap

Valdosta State University (VSC)

The Valdosta State University Herbarium (VSC) provides a repository for the preservation of voucher specimens that document the flora of the Coastal Plain region of Georgia and specimens from a broader geographical area that might be useful in the study of the flora of this region and that enable specialized research on particular groups of plants carried out by faculty and students in residence at Valdosta State University and by taxonomic specialists at other institutions. VSC also provides specimens for use in teaching, and its staff responds to requests from the general public, natural resource managers, agricultural scientists, and others by providing information about plants and service determinations of unknown plants and, where appropriate, preserving vouchers relating to such.

Contact: J. Richard Carter, Jr. Curator (rcarter<at>valdosta.edu)

Home Page: http://www.valdosta.edu/~rcarter/herbintro.htm

Management: Data snapshot of central database

Last Update:

Global Unique Identifier: 8597eef0-025d-4213-a346-403051ecb406

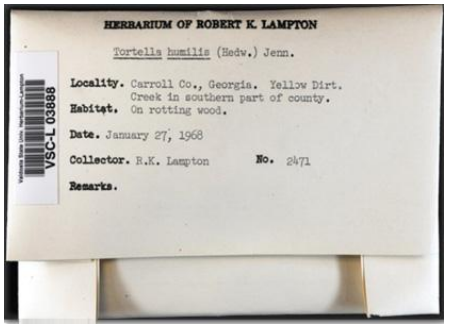
Collection Statistics

- 4069 specimens
- 1% georeferenced
- 100% with images
- 98 families
- 276 genera
- 836 species

Extra Statistics
Show Family Distribution
Show Geographic Distribution

4,069 specimens

100% with images



Symbiota Promoting Bio-Collaboration

Protected Mode: Off

125%

1:25 PM
12/7/2013

Results – general

- Protocols developed
  - Proper handling of herbarium specimens
  - Housekeeping in the herbarium
  - Pest management
  - Preparation of genus folder labels
  - Attachment of bar-code labels
  - Imaging
  - Data entry
  - Mail Merge preparation of specimens labels
  - Mounting specimens

Results – educational outreach, etc.

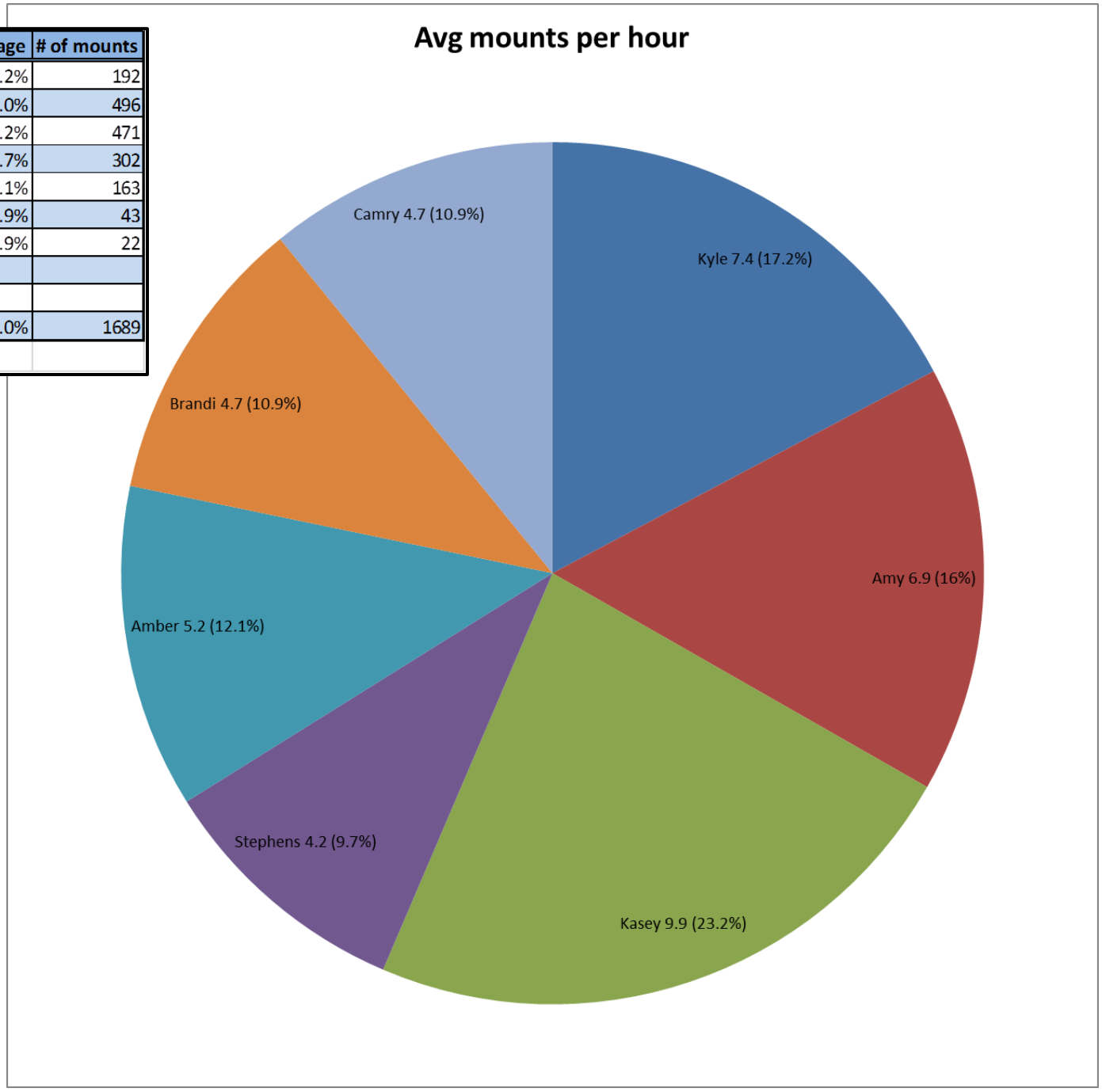
- 15 undergraduate students trained in herbarium curation
- Herbarium tours for local garden clubs, VSU classes, Georgia Governor's Honors Program, Georgia Academy of Science, etc.
- Hosted digitization workshop sponsored by iDigBio September 2012, ca. 30 participants
- Hosted Georgia Herbarium Consortium meeting 2012
- Presentations and demonstrations on VSU project by PI and student assistant Jessica Bartek at December 2013 workshop sponsored by iDigBio at Florida State University
- Installation of digital sign in the atrium of Bailey Science Center to promote the study of plants and the herbarium digitization project

15 undergraduate students trained in herbarium and digitization techniques

Current efforts – specimen backlog

- Eight student assistants have been trained to mount specimens, and most of their effort is toward this.
- Student assistant Phillip Lowe has coded Mail Merge to enable production of customized specimen labels through MSWord from field data in an MSExcel spreadsheet. Subsequently, specimens are mounted and barcode labels are attached and scanned into the spreadsheet, and data uploaded via the Specify Workbench.

Mounters	Avg mounts per hour	Percentage	# of mounts
Kyle	7.39	17.2%	192
Amy	6.87	16.0%	496
Kasey	9.94	23.2%	471
Stephens	4.16	9.7%	302
Amber	5.21	12.1%	163
Brandi	4.66	10.9%	43
Camry	4.67	10.9%	22
Totals	6.676708634	100.0%	1689
StDev	2.07		



Unanticipated outcomes

- VSU Virtual Herbarium
  - Internal funding from the VSU administration
  - Cooperative effort with the VSU Odum Library (Michael Holt)
  - Dedicated server managed by VSU Odum Library
  - Local presence promotes integrity of VSC and enables public on-line access to *all* holdings, not just Georgia
  - Code generously provided by Dr. Austin Mast, Director, FSU Godfrey Herbarium

http://herb.valdosta.edu

Acknowledgments

- VSU Student Assistants
  - Jessica Bartek
  - Amber Blocker
  - Zach Buning
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  - Kyle Conger
  - Brandi Griffin
  - Stephens Griner
  - Terrance Jenkins
  - Jordan Jones
  - Christopher Louis
  - Phillip Lowe
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  - Amy Vardeman
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- Wendy Zomlefer, University of Georgia Herbarium, for productive collaboration and support
- Gil Nelson for invaluable technical advice and assistance throughout
- Michael Holt, VSU Odum Library, for adapting the FSU code for the VSU Virtual Herbarium web interface
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- National Science Foundation (DBI 1054366, J.R. Carter, PI)
- Biology Department, Valdosta State University