



PROGRESS AT ARCHBOLD BIOLOGICAL STATION

2015 NSF AWARD CSBR

COLLECTIONS IN SUPPORT OF BIOLOGICAL RESEARCH

- Hilary Swain, Principal Investigator
- Reed Bowman, Co-Principal Investigator
- Mark A Deyrup, Co-Principal Investigator
- Eric S Menges, Co-Principal Investigator
- Betsie B Rothermel, Co-Principal Investigator
- Stephanie Leon Assist. Curator
- Rebecca Waskovich Data Manager

History behind the collections at Archbold Biological Station



Founder: Richard Archbold

- Experience, 1920s-30s Archbold Expeditions to Madagascar and New Guinea with AMNH
- Believed long-term ecological investment in a site required continual survey of local species and their natural history, and management of a reference collection.
- This work began in the late 1940's after he established the Station



Rich biodiversity; many endemics

Hotspot of rare species:

- 44 species plus 9 subspecies globally imperiled
 - 29 federally Endangered and Threatened (+3 more not \geq G3)
- Highlands County - among highest concentration of imperiled species in continental U.S.A.

88

The number
of new species
described by
Archbold scientists.



© S. Telford



© B. Mansell

Archbold's collection facilities –
embedded on-site within a field station environment,
Specimens collected at Archbold are also in
holdings in other collections worldwide



Scientific Goals of the Archbold CSBR award

1. Prioritize digitization of the Archbold arthropod collection.
 - a. **Ant** collection
 - b. **Flower** Visitor
 - c. LWR Rare **Endemics**
 - d. **Dead Wood** Specialists
 - e. Expand the **storage capacity** for the arthropod collection
 - f. Establish and document **methods** for arthropod digitization
2. Build a **complete searchable holdings list (all taxa)** and image specimens.
3. Build on our existing **collaboration with iDigBio**.
4. Add **metrics** and web analytics of the use and impact of Archbold Collection data.
5. In conjunction with iDigBio Archbold to **serve as a model for biological field station collections**.

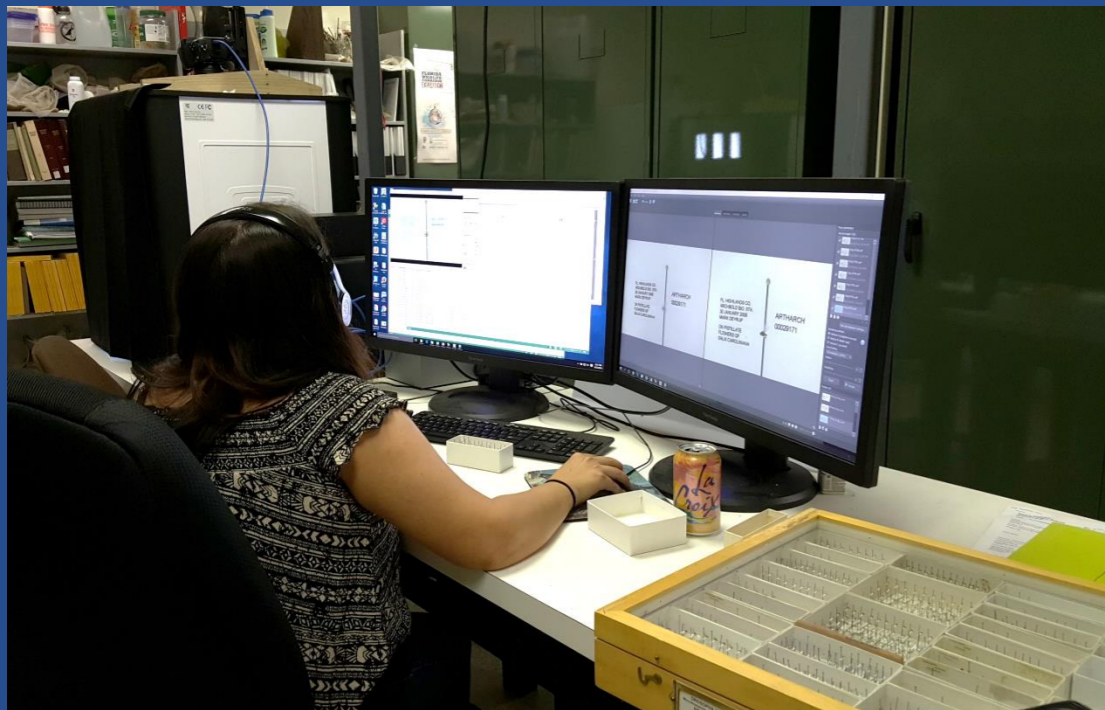
Build **complete searchable holdings list (all taxa)** & image specimens

Taxa	Specimens	Species	Databased (imaged)	Specimens OnLine
Plants	4,531	1,499	4,580 All imaged	4,531 (100%)
Bryophytes	538	200	80%	
Pollen slides	300		100%	
Arthropods	258,000	~8,000	~26,000 specimens 950 species 700 imaged	11,708 (4.5% of 258,000)
Herptiles	2,068	110	100%	
Fishes	2,248	52	0%	
Birds	2,007	554 (incl. skeletons)	100%	
Mammals	399	57	100%	

Digitization of the Archbold arthropod collection

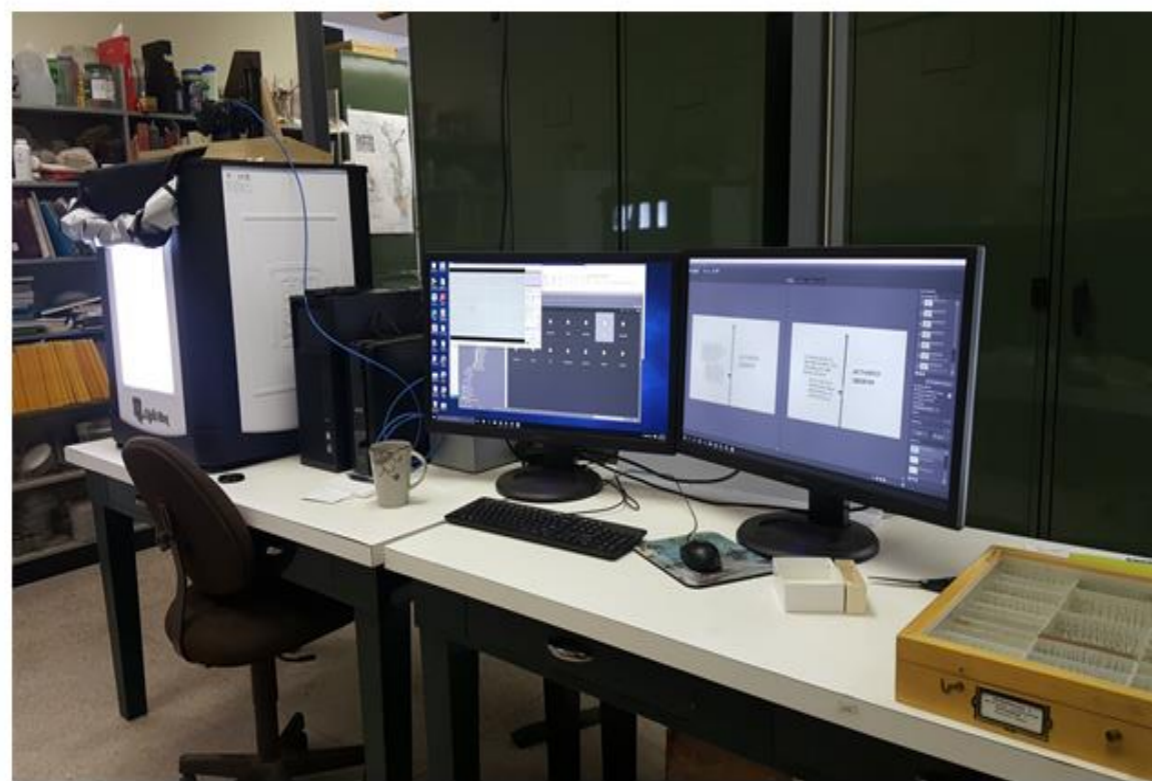
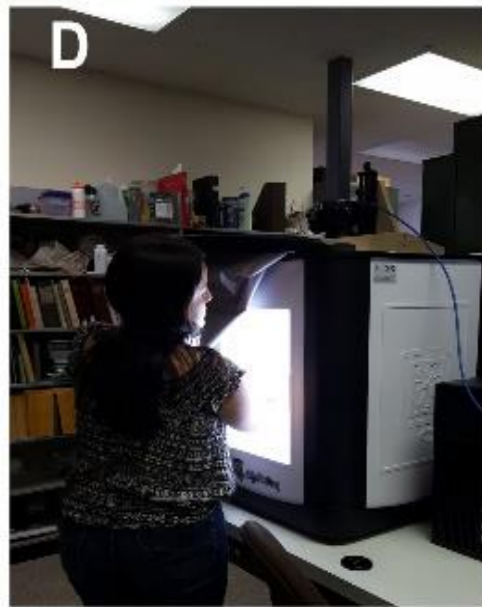
e) Expand the **storage capacity** for the arthropod collection

- Added new 6 full Cornell cabinets and one vial cabinet
- Arthropods re-organized by order, then alphabetically by family within order, genus within family; and species within genus, 1 species/ tray(s).
- Spread specimens out among existing/new drawers 95 /420 drawers or 22% done

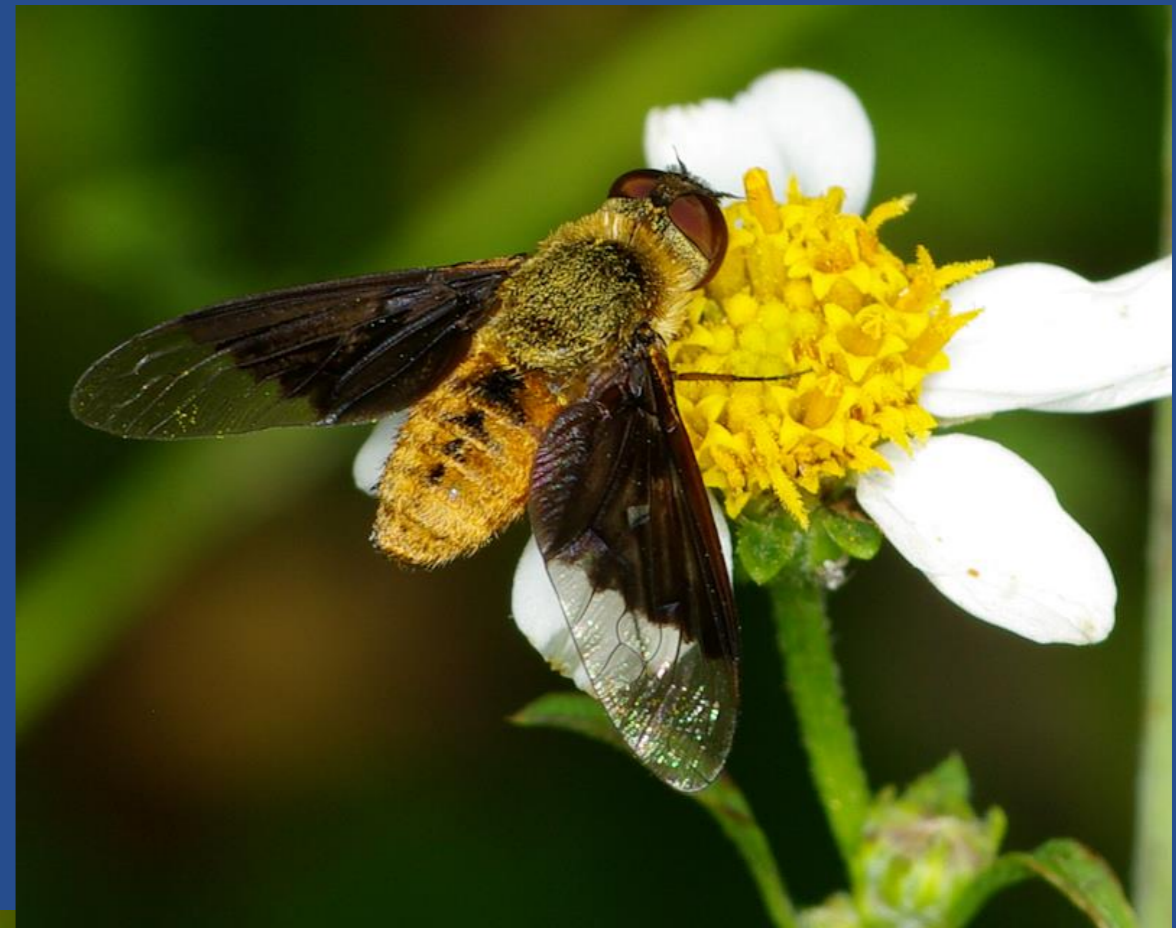
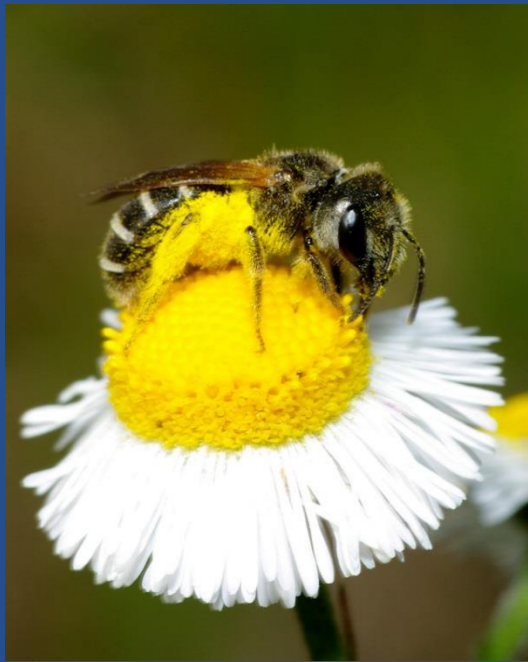


f) Arthropod digitization

- **Assistant Curator Stephanie Leon appointed Jan 2016**



SOP draft underway
includes list of equipment purchases (camera, Ortery box etc)



Flower Insect Visitors

Archbold collection >12,000
specimens with flower visitor
information on labels

Databased to date:

5,657 Hymenoptera, 3,397 Diptera,

846 Coleoptera, Lepidoptera TBD

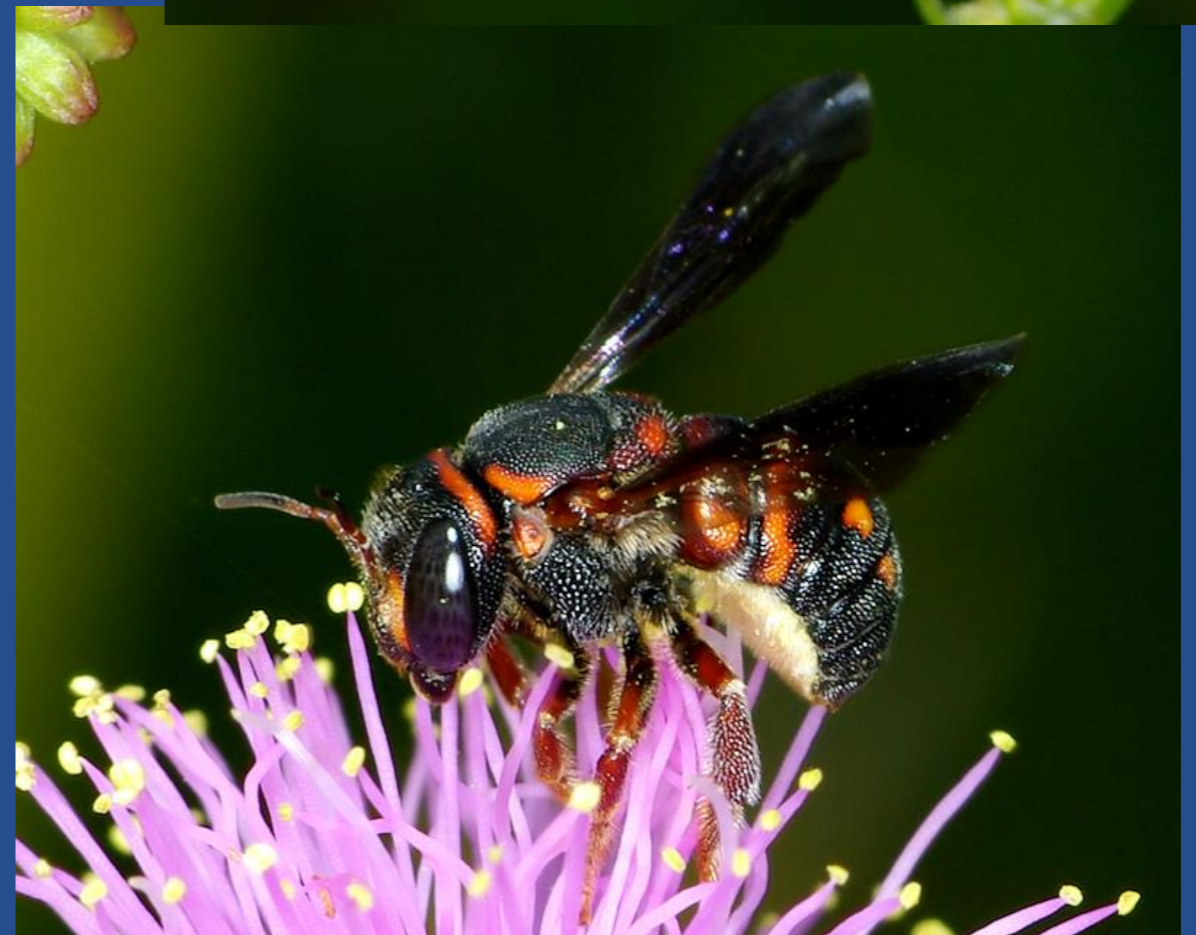
538 insect species

visiting from

1 known flower host to 69 hosts

SCAN :

[http://symbiota4.acis.ufl.edu/scan/port
al/collections/index.php](http://symbiota4.acis.ufl.edu/scan/port
al/collections/index.php)



Agapostemon splendens (Hymenoptera: Halictidae)

FL: HIGHLANDS CO.
ARCHBOLD BIO. STA.
19 MARCH 2012
MARK DEYRUP

COLLECTING POLLEN
FROM CATKINS
QUERCUS MYRTIFOLIA
RED HILL

ARTHARCH
22648



5 mm

Sweat bee



Eremnophila aureonotata (Hymenoptera: Sphecidae)

Thread-wasted wasp

FL: HIGHLANDS CO.
ARCHBOLD BIO. STA.
9 NOVEMBER 2006
MARK DEYRUP

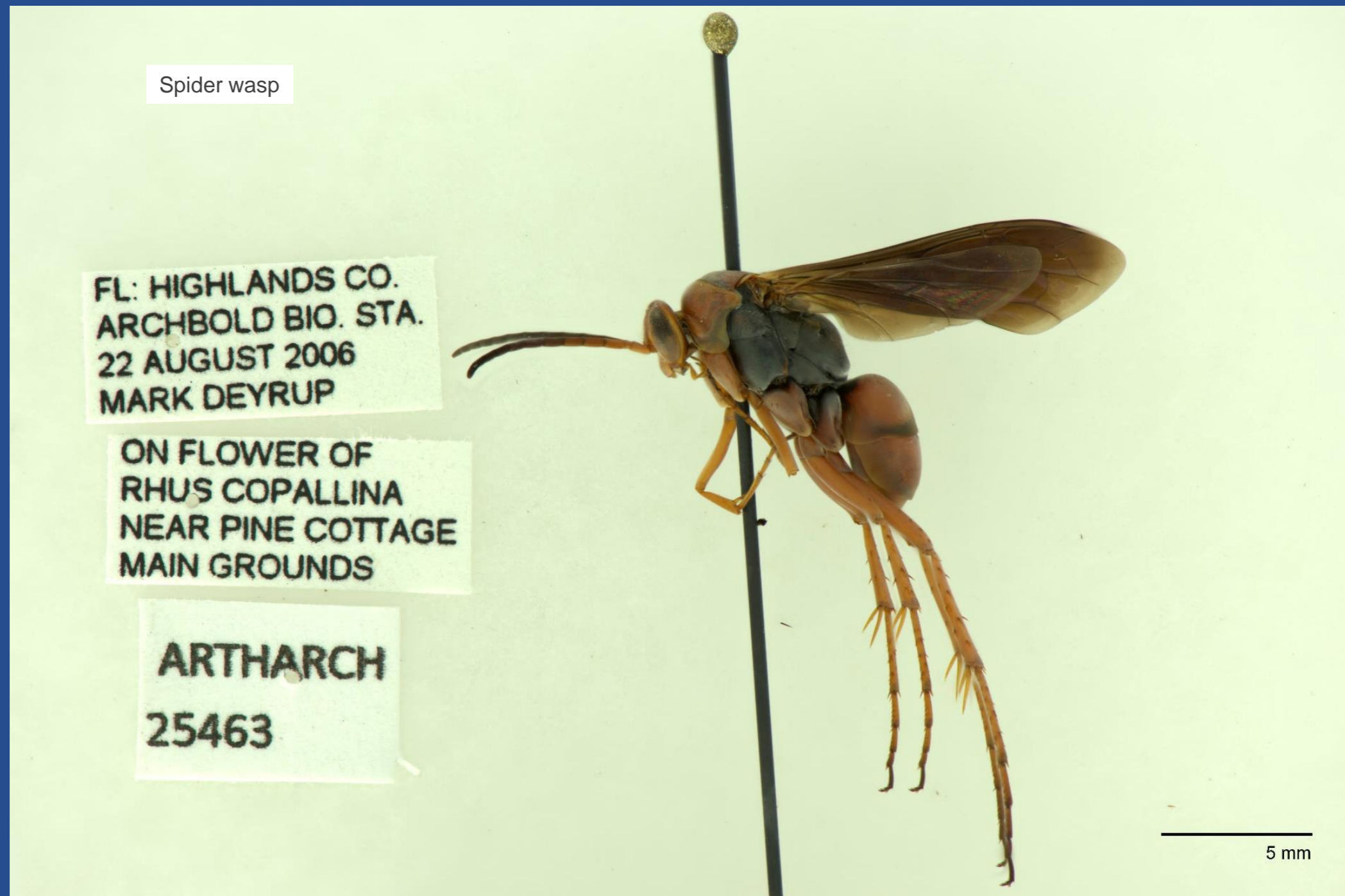
ON FLOWER OF
GARBERIA
HETEROPHYLLA

ARTHARCH
26757



5 mm

Tachypompilus ferrugineus (Hymenoptera: Pompilidae)





11,708
records to
date from
Archbold

Symbiota Collections of Arthropods Network (SCAN)

<http://symbiota4.acis.ufl.edu/scan/portal/collections/list.php>

Search By Archbold Biological Station collection

Family Halictidae - Sweat Bees

Location – Archbold Biological Station – get species list

Select With Images

[*Dieunomia heteropoda*](#) with image on
Pluchea rosea Godfrey rosy camphorweed

iDigBio linkage (search code=ABS, locality=Archbold Genus=Bombus

<https://www.idigbio.org/portal/search>

Endangered plant flower visitors:

Polygonella basiramia, 11 species Hymenoptera & 17 Diptera



Genus_Species	Order	Specimen Count
Chrysanthrax dispar	Diptera	3
Chrysanthrax mira	Diptera	1
Pieza rhea	Diptera	3
Cochliomyia macellaria	Diptera	2
Tricimba sp.	Diptera	1
Milichiella sp.	Diptera	2
Pholeomyia pseudodecora	Diptera	1
Pholeomyia obscura	Diptera	1
Pholeomyia sp.	Diptera	2
Allograpta obliqua	Diptera	4
Copestylum vittatum	Diptera	1
Microdon fuscipennis	Diptera	1
Pseudodoros clavatus	Diptera	1
Toxomerus floralis	Diptera	4
Toxomerus planiventris	Diptera	1
Lixophaga sp.	Diptera	1
Senotainia trilineata	Diptera	1
Colletes mandibularis	Hymenoptera	2
Agapostemon splendens	Hymenoptera	2
Augochlorella gratiosa	Hymenoptera	1
Augochloropsis anonyma	Hymenoptera	1
Lasioglossum miniatulus	Hymenoptera	1
Lasioglossum nymphalis	Hymenoptera	11
Philanthus politus	Hymenoptera	2
Anacrabro ocellatus	Hymenoptera	1
Megachile brevis pseudobrevis	Hymenoptera	2
Stenodynerus histrionalis rufustus	Hymenoptera	2
Tachysphex similis	Hymenoptera	1
		56



- Blue Calamintha Bee *Osmia calaminthae*, only in Highlands County, FL
- Discovered at Archbold in 2002
- Little known about the life and range
- Might depend exclusively on the nectar and pollen of Ashe's Mint *Calamintha ashei*, an endemic, threatened species.
- Katherine Burns intern supported by Florida Wildflower Foundation w/ Plant Ecology (Dr. Eric Menges) & Entomology (Dr. Mark Deyrup).
- Burns' study provides more evaluation for a 2015 petition by Defenders of Wildlife to have this bee listed under the U.S. Endangered Species Act

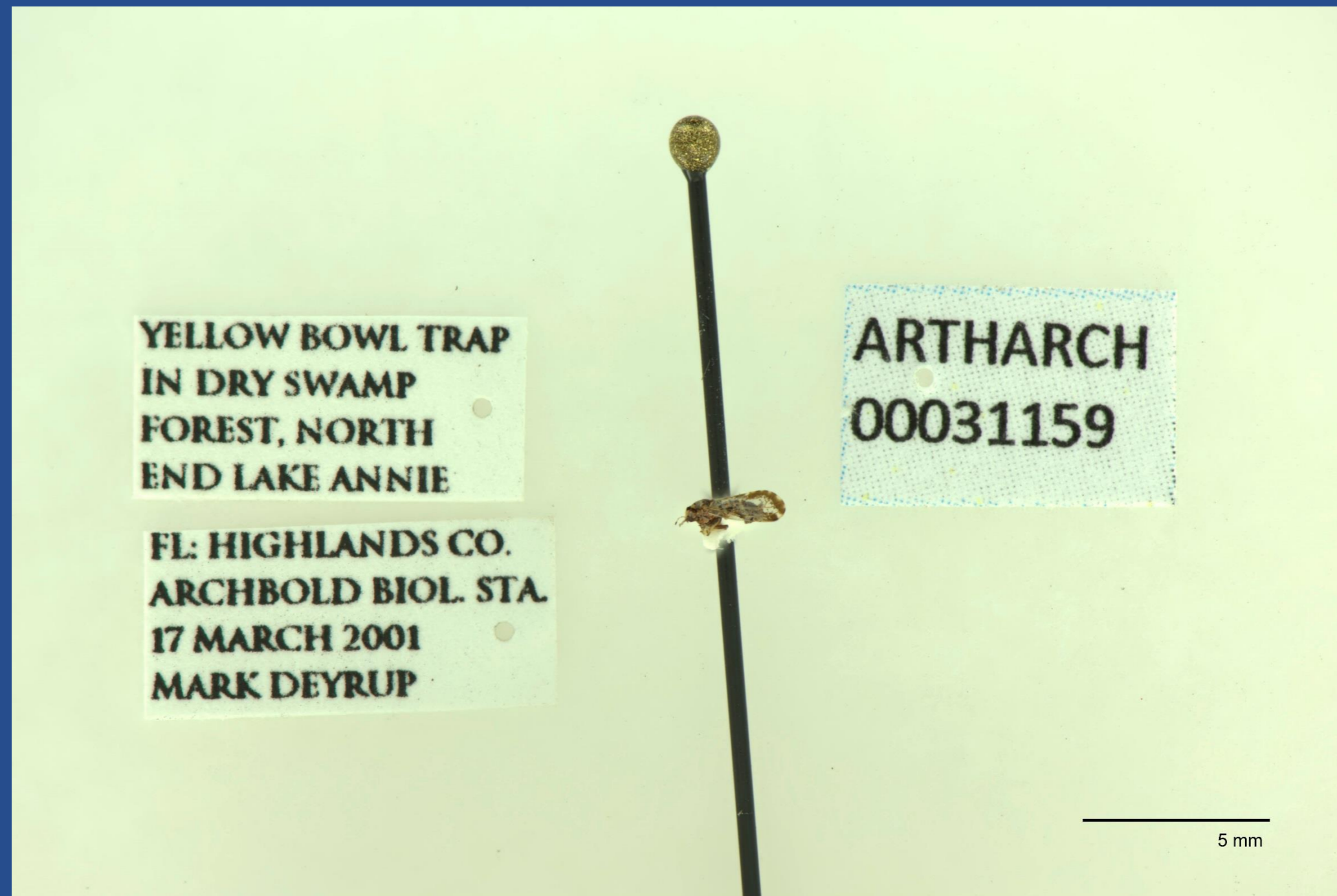
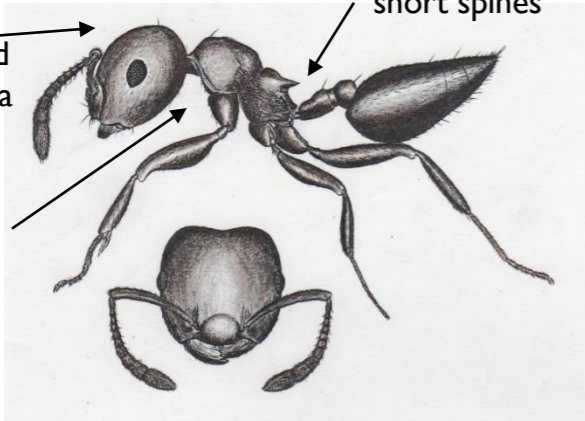


Image at least one representative specimen for each species
e.g. Invasive Species, the Asian Citrus Psyllid *Diaphorina citri*
6 specimens in Archbold collection, collected 1999-2001, not yet online.
Only 10 records in SCAN from all collections total
(FL State Arthropod Collection is not online)

Florida *Crematogaster* (Acrobat Ants)

Few erect hairs on head or mesosoma

short spines

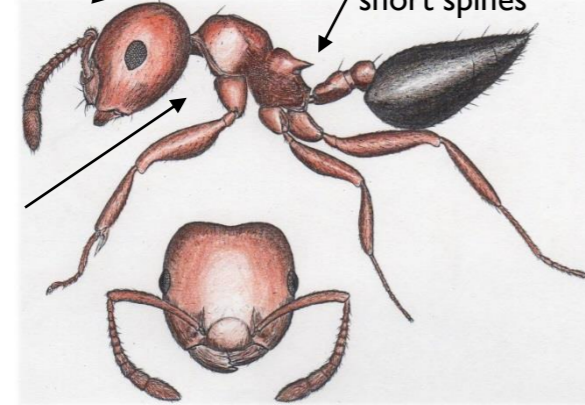


Sides of pronotum shining

ashmeadi

Few erect hairs on head or mesosoma

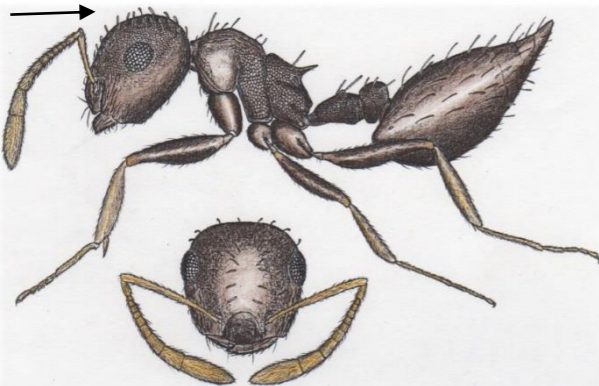
short spines



Sides of pronotum shining

pinicola

Head granulate, no shining, with flattened hairs. Head shining in all other Florida species



Mark Deyrup

obscurata

FLORIDA ANTS

The Ants of Florida Mark Deyrup

CRC Press 2016!!!

239 species

drawings/

descriptions based

on ABS collection

w/county maps

based on ~ 12,000

excel file records,

currently databased

1,400/12,000

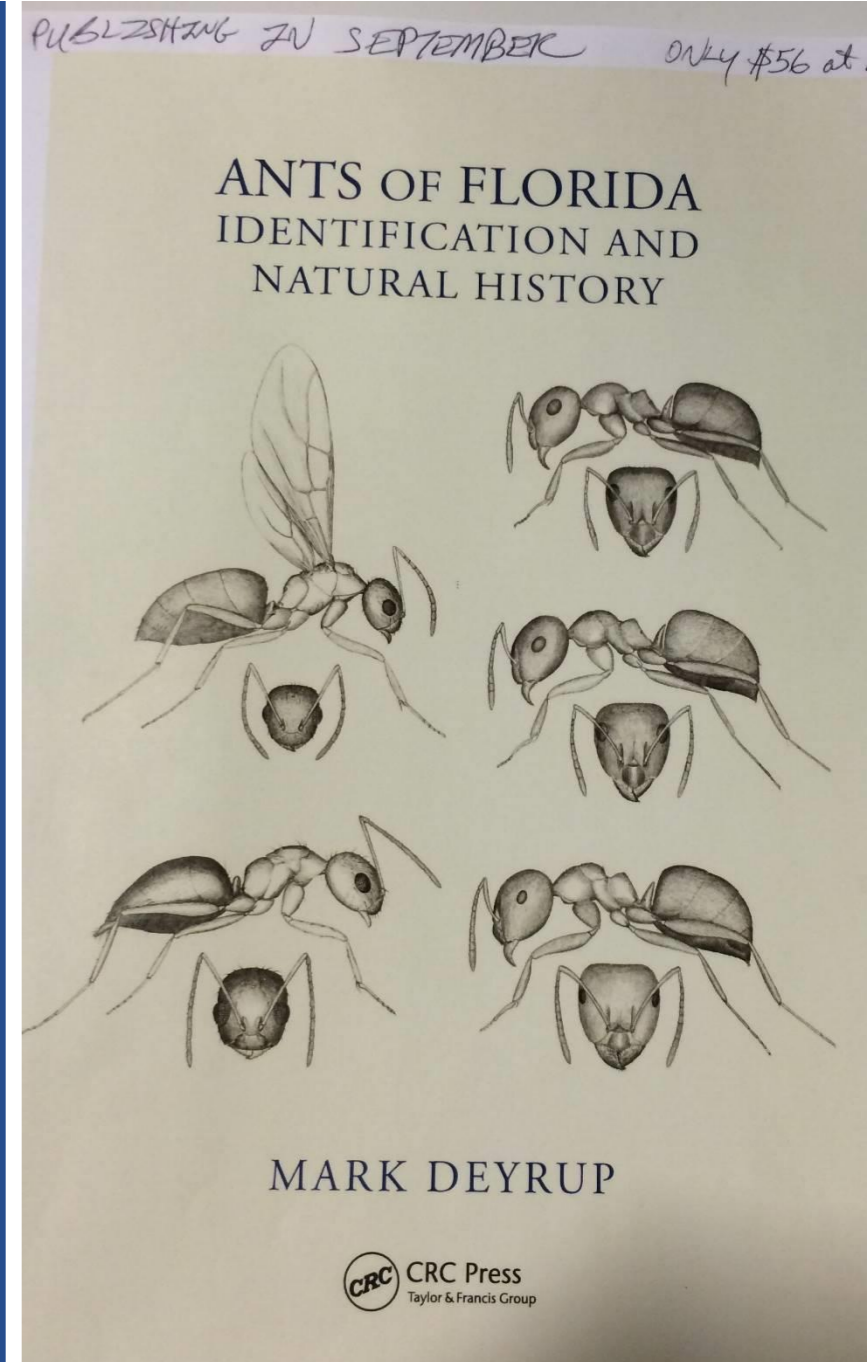
specimens 66/239

species

ALL OTHER ANTS

will be databased

under holding list



Digitize the Ant Collection subset of 57,000 specimens





= *Liatris oblongifera* (Blake) Robins

PLANTS OF FLORIDA
HERBARIUM OF THE ARCHBOLD BIOLOGICAL STATION
L. J. Brass No. 15353 July 5 1945
Ammopursus Ohlingerii (Blake) Small
Scattered in sandscrub; erect perennial with long fleshy yellowish taproot; stems 70-90 cm; showy rose-purple flowers
Lake Annis, Highlands County



iDigBio Weekend Digitization Blitz Yields 4,276 Specimen Images for Archbold Biological Station

SERNEC

<http://nansh.org/portal/collections/index.php>



Complete holdings List
Herbarium: Status databasing & OnLine



Prodigal specimens and field notes return!!!

Positive outcomes of CSBR award Objective 2—holdings list:

- CoPI Deyrup requested those with Archbold specimens on loan to complete work and return specimens for databasing. Notable “return” to date >1,800 specimens of ichneumon wasps, 301 species, including 9 undescribed species new to science.
- Ancillary data: Jim Layne’s field notes (30 yr) returned for archiving plus thousands of necropsy/specimen preparation cards. Also a refocus on Leonard Brass’ botanical field notes.
- Award stimulated: curation of the fish/herptile collection; reorganizing bird collection adding catalogue records for skeletons as well as bird skins; and sorting egg collection
- Question of other collections—pollen slides, diatom and zooplankton images, sediment cores?

“Archbold Diaspora”; specimens collected at Archbold, held in other collections and now online...

The screenshot shows a web browser window with the URL `portal.vertnet.org/search?q="Archbold+Biological+Station"+type:specimen+class:Mammalia`. The page title is "Search VertNet". Below the search bar, there are filter options: "Is fossil", "Has tissues" (checked), "Has media", "Has type status", "Is mappable", and "In circle on map". The search term "Archbold Biological Station" is entered in the "All these words" field. Below the search bar, there are two tabs: "Table" and "Map". The "Table" tab is active, showing a table of search results. The table has columns for Identification, Taxonomy, Location, Recorded By, Sex, Date, Map, and Media. There are two rows of results. A green banner above the table says "Pro tip! Click on a table row to see the full occurrence details." The footer of the page includes the text "VertNet © version 2015-08-30T17:21:16+02:00" and the National Science Foundation logo with the tagline "WHERE DISCOVERIES BEGIN".

File Edit View History Bookmarks Tools Help

Nan Shepherd women writ... x Cynthia and George Mitch... x Swain, Hilary - Outlook We... x Archbold Biological Station x VertNet

portal.vertnet.org/search?q="Archbold+Biological+Station"+type:specimen+class:Mammalia

Search Publishers Join Resources About Feedback Login

Search VertNet

Need Help? → [Advanced Search Guide](#) → [Institution Codes](#) →

Find records with...

These filters: Is fossil **Has tissues** Has media Has type status Is mappable In circle on map

All these words: "Archbold Biological Station"

Any of these words: Identify all records that contain at least one of the words submitted. Operators OR and AND can help to focus queries.

Table **Map**

1-100 of 5,187

Pro tip! Click on a table row to see the full occurrence details.

Identification	Taxonomy	Location	Recorded By	Sex	Date	Map	Media
MSU MR MR.22354	Mammalia: Sigmodon hispidus littoralis	United States, Florida, Highlands: Archbold Biological Station	Gene Sleder	female	1974-02-11	<input type="button" value="Map"/>	<input type="button" value="Media"/>
MSU MR MR.23939	Mammalia: Sigmodon hispidus littoralis	United States, Florida, Highlands: Archbold Biological Station, 15 mi....	Karl A. Shump, Jr.	male	1974-02-07	<input type="button" value="Map"/>	<input type="button" value="Media"/>

VertNet © version 2015-08-30T17:21:16+02:00 | National Science Foundation WHERE DISCOVERIES BEGIN

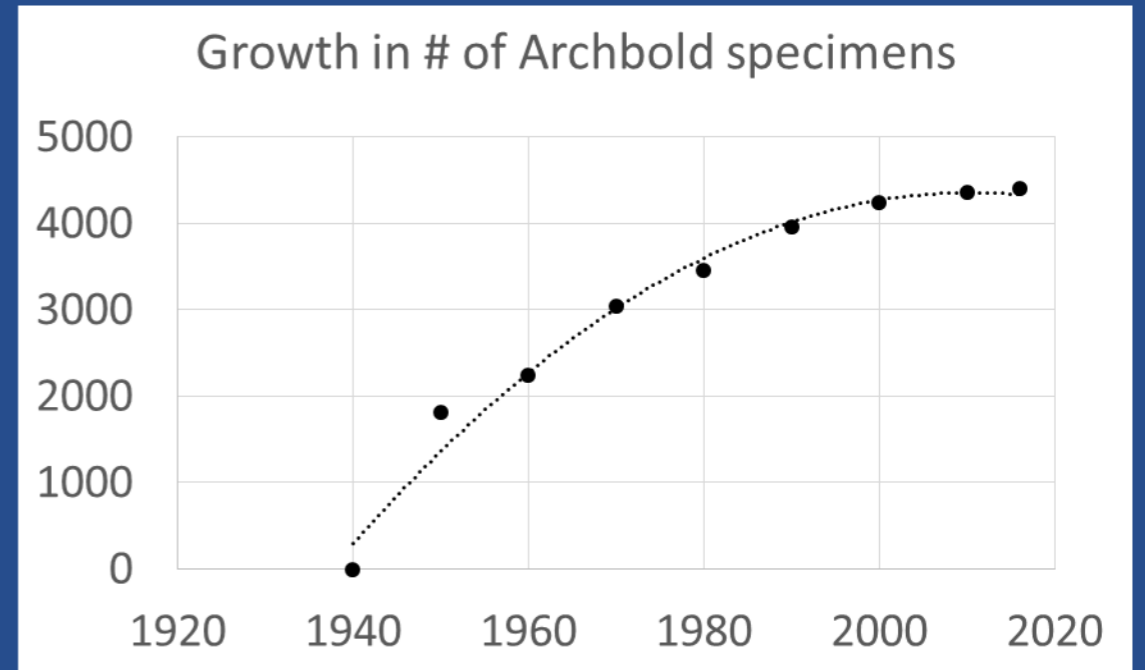
Vertebrates collected at Archbold online at Vertnet (more in iDigBio)

	Amphib.	Reptiles	Birds	Mammals
American Museum Natural History	0	0	1	5,438
California Acad. Sci.	2	0	0	0
Carnegie Mus. Nat. Hist.	1	5	0	0
Cornell Univ. Mus. Vertebrates	3	0	23	5
Field Mus. Nat. Hist. (Chicago)	0	0	112	32
Florida Mus. Nat. Hist. (UF)	0	0	33	158
Univ. Kansas Mus. Nat. Hist.	0	3	1	8
Los Angeles Co. Mus.	7	2	0	0
Michigan State Univ. Mus.	0	1	0	15
Mus. Vert. Zool. (Berkeley)	0	0	0	4
Mus. Comp. Zool. (Harvard)	6	0	0	0
Ohio State Univ. Mus.	0	2	0	0
Oklahoma Mus. Nat. Hist.	0	0	0	17
Slater Mus. Nat. Hist., Univ. Puget Sound, Tacoma	0	0	1	0
Tall Timbers Research Station	0	0	1	0
Texas A&M Biodiversity Coll.	0	0	0	4
Univ. Arizona Mus. Nat. Hist.	2	0	0	0
Univ. Wash. Burke Mus. Nat. Hist.	0	0	5	3
U.S. Natl. Mus.	4	2	0	2
Yale Peabody Mus. Nat. Hist.	0	8	0	0
TOTAL	25	23	177	5,686

Specimens in Archbold plant collection = 4,531

from Archbold = 1,379, ~400 Buck Island Ranch

- **Leonard J. Brass** (1944-1966) **2,871** specimens (63% of collection),
- S.P. Vander Kloet (1978-1986) 490
- A.F. Johnson (1979-1986) 137
- A.J. Herndon (1979-1984) 80
- Rebecca Yahr (1994-1996) 41
- 912, remainder 1995-2010, by various collectors



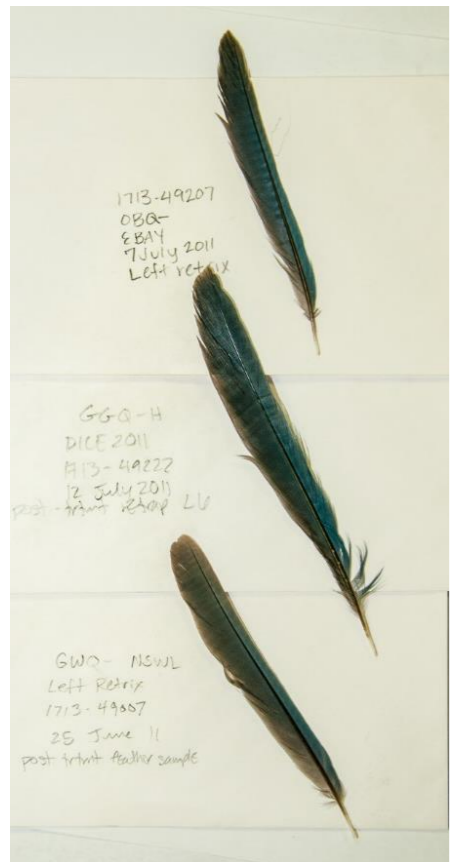
Plant specimens collected at Archbold & online elsewhere (and there are more to note from iDigBio)

- Univ. of South Florida = 416 (414 Leonard Brass)
- Florida State University = 89 (89 Leonard Brass)
- FMNH University of Florida = 81 (71 Leonard Brass)
- Louisiana State Univ., Tucker Herbarium, Alan Herndon (1979-92) = 113
- Missouri Botanical Garden, by numerous collectors = 40
- 5 other known collections = 24
- Need to search for Brass specimen sheets in collections not yet online



John Benning

Benning, J.W. 2015. Odd for an Ericad: Nocturnal pollination of *Lyonia lucida* (Ericaceae). *American Midland Naturalist* 174:204-217.

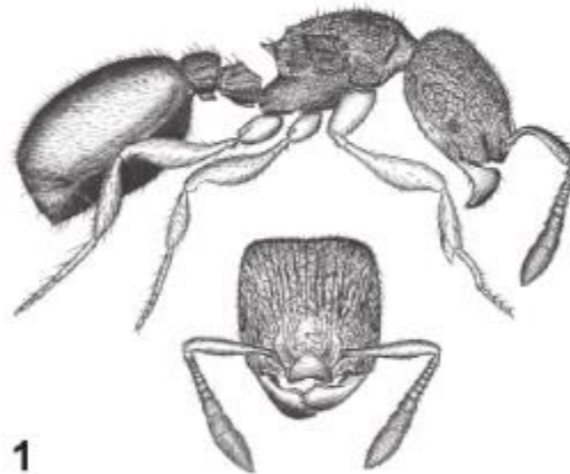


Tringali, A., R. Bowman, and A. Husby. 2015. Selection and inheritance of sexually dimorphic juvenile plumage coloration. *Ecology and Evolution* 5:5413-5422

Collection-related research continues
 Publications by Staff and Visiting Scientists:
 STABIB (searchable online)
 Keyword = collections

2015 & 2016 (n=21) through 06/23/2016
 Most derived from use of the entomology collection, with two using bird collection and one from herptile collection.

Planning new data publications



Myrmecina cooperi

Mark Deyrup 2015 A new species of *Myrmecina* (Hymenoptera: Formicidae) from southeastern North America *FL Entomologist* 98:1204-1206

Collections-related publications 2015 – 2016



Build Archbold's **collaboration with iDigBio**:

Archbold workshop

iDigBio webinar

Drafting an SOP manual

OBFS 2015 and 2016 workshops



l to r

Hilary Swain (PI)

Gil Nelson (iDigBio)_

Viv Sclater

(ABS Data Manager)

Stephanie Leon

(Assist Curator)

Mark Deyrup

(Entomologist)

Bekki Waskovich

(Assist Data Manager)

Broader Impact Goals of Archbold CSBR award

- Establish Collections Research **Internships** at Archbold ✓
- Establish an annual multi-taxon **training workshop** for Archbold post-baccalaureate research interns ✓
- Provide a small **Art Exhibit** and public event to increase public awareness ✓
- Offer **workshop for regional Land Managers** ✓ **70 attendees**



Science BUGS

May 12-June 2, 2016

ABS Learning Center
Event Lobby Gallery
Hours: Monday-Friday
8a.m.-5p.m.



Highlands Parasitic Crazy Ant

Dr. Mark Deyrup



Tim Lethbridge

Spined Assassin Bug

Science Bugs celebrates 75
years of entomology at Archbold
Biological Station.

"I hope the *Science Bugs* exhibit will give
visitors a better appreciation for the
intricate beauty of bugs seen close up."

-Dr. Mark Deyrup



Yellowjacket Hover

Dustin Angell



Archbold Biological Station

123 Main Drive, Venus, FL 33960 / 863-465-2571 / www.archbold-station.org

Public outreach



Art Exhibit

Recruiting Science Data Volunteers



Dr. Reed Bowman (left) showing volunteers the Archbold mammal collection during the 2015 Volunteer Appreciation Event. Ed Cunningham (right) helps with digitizing data from the mammal collection. Janet Phipps and Marylou Woodard (to the right) work together compiling extensive data entries for the Florida Scrub-Jay monthly census.

Archbold scientists are constantly in the field collecting data about species such as Gopher Tortoises, Florida Scrub-Jays, plants, and scrub bugs. It is a challenge to keep up with data entry and checking that data are correct is essential for good science. **Archbold is always looking for local, computer savvy people willing to help us with the job of conscientious data entry!** Data [volunteer opportunities](#) exist in the Avian Ecology Program with Dr. Reed Bowman and Entomology Program with Dr. Mark Deyrup. All are welcome to inquire about this unique opportunity to work with Archbold scientists and staff while learning about Florida plants and animals. Since 1995, **volunteers have become a very important part of Archbold's activities.** Contact [863-465-2571](tel:863-465-2571) or email [here](#) for [more information](#). Thank you to all our wonderful volunteers and we hope to meet some new ones!

biologicalStation?business_id=880389335333058

Search



Archbold Biological Station added 4 new photos.

Published by Jennifer Brown [?] · May 18 at 5:00pm · *

Happy International Museum Day from the Archbold Biological Station Collection!

After 75 years of steady growth, Archbold's collection is going digital. The collection includes over 270,000 well-preserved, and well-labeled specimens of plants, birds, fish, amphibians, reptiles, mammals and arthropods. It is probably unrivaled in scope and size among biological field station collections in North America, and is likely one of the largest on-site collections encompassing the div... [See More](#)



2,115 people reached

[View Results](#)

2,115 People Reached

182 Reactions, Comments & Shares

130 Like 96 On Post 34 On Shares

7 Love 6 On Post 1 On Shares

2 Wow 2 On Post 0 On Shares

13 Comments 6 On Post 7 On Shares

30 Shares 30 On Post 0 On Shares

193 Post Clicks

62 Photo Views 12 Link Clicks 119 Other Clicks

NEGATIVE FEEDBACK

0 Hide Post 0 Hide All Posts

0 Report as Spam 0 Unlike Page

Social media- Facebook posts

Archbold Enews articles

Summary and Next Steps

NSF CSBR enabled linking our regional collection to global networks

- Increased information available online
- Interoperability of data among multi-taxa on site and with regional, and (inter)national, collections.
- E.g. of “illuminated data”
 - small institution without extensive IT expertise
 - no dedicated full-time curators (except entomology)
- In Year 2—finish the ants Lepidoptera, and birds.

SUMMARY and NEXT STEPS