



# SYMBIOTA: specimen-based platform to support digitization, publication, and public outreach

Edward Gilbert

Nico Franz



National Science Foundation  
WHERE DISCOVERIES BEGIN

# Symbiota Software Project

- Open source software
- Virtual fauna/flora
  - Specimen search
  - Images, maps, taxon descriptions, taxonomy, etc
- Data management
  - Specimen digitization
  - Species inventories
  - Identification keys



## Welcome to the Marine Life of Panama portal

We are working to create a single access point for knowledge about the diversity and distribution of marine organisms in Panama generated from over 40 years of marine biology research at STRI. Currently, the portal provides access to specimen records and related geo-spatial data covering fish, algae, marine invertebrates and various other marine taxa (e.g., sea snakes, seagrasses, etc.).

The portal currently includes the ability to create check lists for the entire country or for one of the 4 major biogeographic regions (Icosas del Toro and San Blas on the Caribbean coast and the Bay of Panama and Gulf of Chiriqui on the Pacific coast). Georeferenced species records can be displayed on a map with associated observation data. A multilingual glossary tool, TaxaGloss, can be used to clarify the meaning of morphological terms. Soon, we hope to incorporate identification tools like tabular keys.



### Sponge of the Day



What is this Sponges?  
Click here to test your knowledge

### Fish of the Day



What is this Fish?  
Click here to test your knowledge



### *Agoseris aurantiaca* (Hook.) Greene

Family: Asteraceae  
orange agoseris



Max Locher

### Flora of North America

#### General Descriptions

Garj I. Baird in Fl

Stems 0. Leaves erect to decumbent; petioles blades 7-38 cm, linear-lanceolate to oblanceolate, pinnatifid, lobes 2-4 pairs, linear to lanceolate, inconspicuous to subequaling lobes, rarely lac sparsely villous. Peduncles elongating after apically villous to lanate, eglandular. Involucres 2.5-3 cm at maturity. Phyllaries in 2-3 series, g purple-black spots, hirtose; and/or mistlelike unequal, margins ciliate, faces glabrous or vilic adaxially glabrous or villous; inner erect, elong epilate. Florets 15-100; corolla usually orange or white, tubes (4-)7-9 mm, ligules 4-12 x 1-3.7 dimorphic, 8-18 mm, bodies cylindrical to fusiform gradually tapered to slender beaks (2-16-17 mm strongly ridged, straight, glabrous or scabrous; 36.



Patrick Alexander



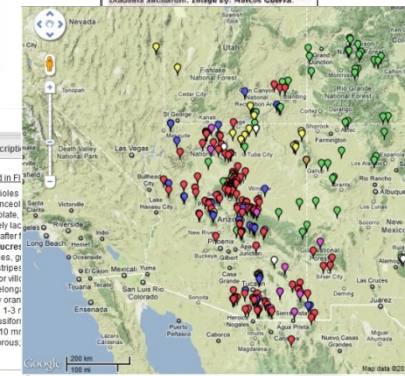
Max Locher



Max Locher



Patrick Alexander



Latitude decimal: eg 34.57  
Longitude decimal: eg -112.38  
Enter as D.M.S format



# Symbiota Data Portals

- CMS software
- Themed datasets
  - Taxonomic scope
  - Geographic scope
- Community portals
- Custom look & feel
  - CSS, config files
- 40-60 public portals

The screenshot displays the Mycology Collections Portal website. At the top, the title "MYCOLOGY COLLECTIONS PORTAL" is centered. Below the title is a navigation bar with links for Home, Explore, Crowdsourcing, Checklist Projects, Other Resources, and Acknowledgements. A user login option "Log In: New Account, Sitemap" is visible on the right. The main content area features a "Welcome to the Mycology Collections data Portal" message, followed by a paragraph describing the portal's purpose and data sources. Below this is a "Fungus of the Day" section with a photograph of orange mushrooms and a "What is this fungus?" quiz prompt. To the right is a "News and Events" sidebar with several bullet points. At the bottom, there are two "Click here to test your knowledge" links and a progress indicator.

MYCOLOGY COLLECTIONS PORTAL

Home Explore Crowdsourcing Checklist Projects Other Resources Acknowledgements Log In: New Account, Sitemap

Welcome to the Mycology Collections data Portal

The Mycology Collections data Portal (MyCoPortal) is more than just a web site - it is a suite of user-friendly, web-based data access technologies to aid taxonomists, field biologists, ecologists, educators, and citizen scientists in the study of fungal diversity. The data are derived from a network of universities, botanical gardens, museums, and agencies that provide taxonomic, environmental, and specimen-based information. Using the Symbiota (<http://symbiota.org>) system of virtual online foras, these data are directly accessible to dynamically generate geo-referenced species checklists, distribution maps, and interactive identification keys, all linked with a rich collection of digital imagery documenting fungal diversity of North America.

**Fungus of the Day**

*Morchella angusticeps*. Image by: Charles Horton Peck.

What is this fungus?  
Click here to test your knowledge

Please join the Mycology Collections Portal as collaborators or regular visitors, and send your feedback to [help@mycoportal.org](mailto:help@mycoportal.org)

**News and Events**

- Microfungi Collections Consortium (MICC) website now live.
- NSF Press Release (#15-092) - NSF awards fifth round of grants to enhance America's biodiversity collections
- NSF Press Release (#12-082) - US National Science Foundation awards support for The Macrofungi Collection Consortium, a collaboration of 35 institutions in 24 states for the purpose of databasing some 1.4 million dried scientific specimens of macrofungi (NSF ADBIC 1256157)
- December 2013 - 1,546,358 occurrence records supplied by 31 different data providers have been integrated into MyCoPortal.
- NEW - MacC records are now part of the Zooxena project. Please help us by transcribing specimen labels (S&S).
- Image provided by New York Botanical Garden.

Data Usage and Citation

Click here to test your knowledge Click here to test your knowledge

# Specimen-based Model

- Backbone of taxonomic research
- Baseline data
- Proof of Occurrence
- Expert Reviewed
- Verifiable
- Millions occurrence records



# Public Interface

- Search engine
  - Taxon
  - Locality
  - Coordinates
  - Collector
- Data return
  - Specimen list
  - Map
  - Species checklist

The screenshot displays the 'Neotropical Flora' public interface. At the top, there is a header with the title 'Neotropical Flora' and a small image of flowers. Below the header, the page is divided into several sections for search criteria:

- Select Search Parameters:** A section with a 'search' button and a note to 'Fill in one or more of the following query criteria and click "Search" to view your results.'
- Taxonomic Criteria:** Includes a checkbox for 'Include Synonyms from Taxonomic Thesaurus' and a text input field for 'Family or Scientific Name' with a dropdown arrow, currently showing 'Croton'.
- Locality Criteria:** Includes input fields for 'Country' (set to Ecuador), 'State/Province', 'County', 'Locality', and 'Elevation' (with 'to' for a range).
- Latitude and Longitude:** Includes input fields for 'Northern Latitude', 'Southern Latitude', 'Western Longitude', and 'Eastern Longitude'. It also has a 'Point-Radius search' section with 'Latitude', 'Longitude', and 'Radius' fields.
- Collector Criteria:** An empty input field.

On the right side, there is a map of South America showing the distribution of species. The map is overlaid with numerous colored dots representing different species. A legend at the bottom left of the map identifies the colors: red for *Banisteriopsis caapi*, blue for *Psychotria viridis*, green for *Diplopteryx cabrerana*, and yellow for *Psychotria carthagenensis*. The map also includes a scale bar (500 km) and a 'Terms of Use' link.

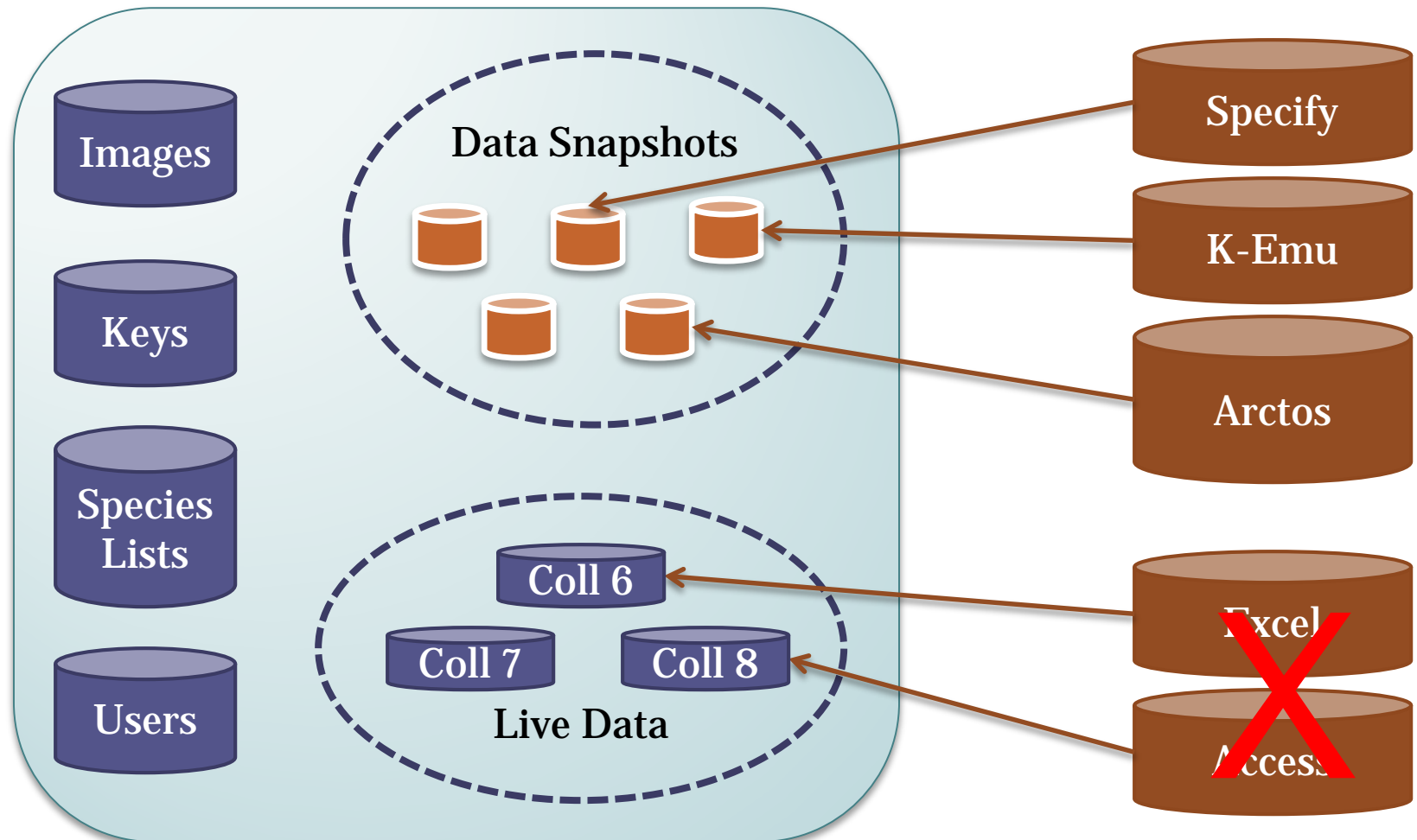
At the bottom of the interface, there is a 'Species List' section with a search box and a 'Go' button. Below this, it shows the 'Taxa Count: 43' and the family name 'EUPHORBIACEAE'. A list of species names follows, including *Croton*, *Croton abutilifolius*, *Croton aequatorius*, *Croton airifolius*, *Croton baillonianus*, *Croton callicarpifolius*, *Croton collinus*, *Croton cordatus*, *Croton cuneatus*, *Croton draco*, *Croton eugensii*, *Croton elegans*, *Croton fraseri*, *Croton hirtus*, *Croton jamesonii*, *Croton lechleri*, *Croton lehmannii*, *Croton lobatus*, *Croton magdalenensis*, *Croton malourensis*, *Croton menthodorus*, *Croton mutisianus*, *Croton olivaceus*, *Croton psathyropodus*, *Croton pallanostigma*, *Croton parvianus*, *Croton pellitus*, *Croton pilgeri*, *Croton pungens*, and *Croton purdiei*.

# Symbiota - Biodiversity CMS

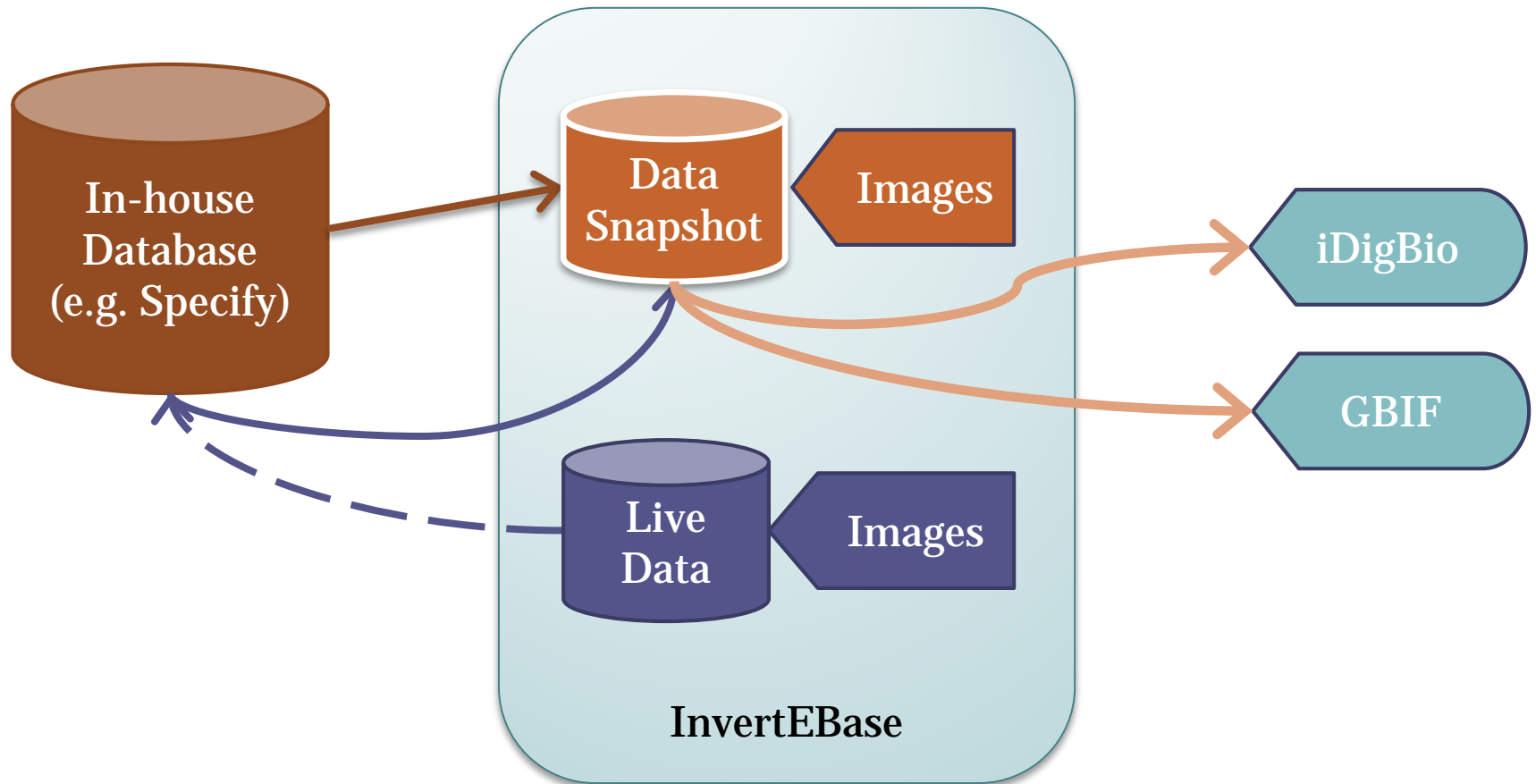
- Read-only user interface
- Password Protected
  - Browser-based
  - Platform independent
  - Globally accessible
  - No special software installation (free)
  - Make use of web services
  - Data protection (backups)

The screenshot displays the 'Editor' interface for a specimen record in the Symbiota Biodiversity CMS. The record is for *Heterotheca subaxillaris* (Lam.) Britt. & Rusby, collected by Dixie Z. Damrel on August 20, 2002, in Gila, Arizona. The interface is divided into several sections: Collector Info, Latest Identification, Locality, and Misc. The Locality section provides detailed information about the collection site, including coordinates (34.101389 N, -110.963056 W) and elevation (1579 meters). The Misc section includes habitat (Grassland valley roadside) and associated taxa (*Bothriochloa ischaemum*, *Grindelia squarrosa*, *Chloris virgata*, *Desmanthus cooleyi*, *Asclepias subverticillata*). The interface also shows a navigation bar at the top with options like 'Home', 'Collection Management', and 'Editor', and a sidebar on the right with 'Label' and 'OCR' options.

# Mini-Aggregator: Snapshot vs Live



# Snapshot Digitation Workflows

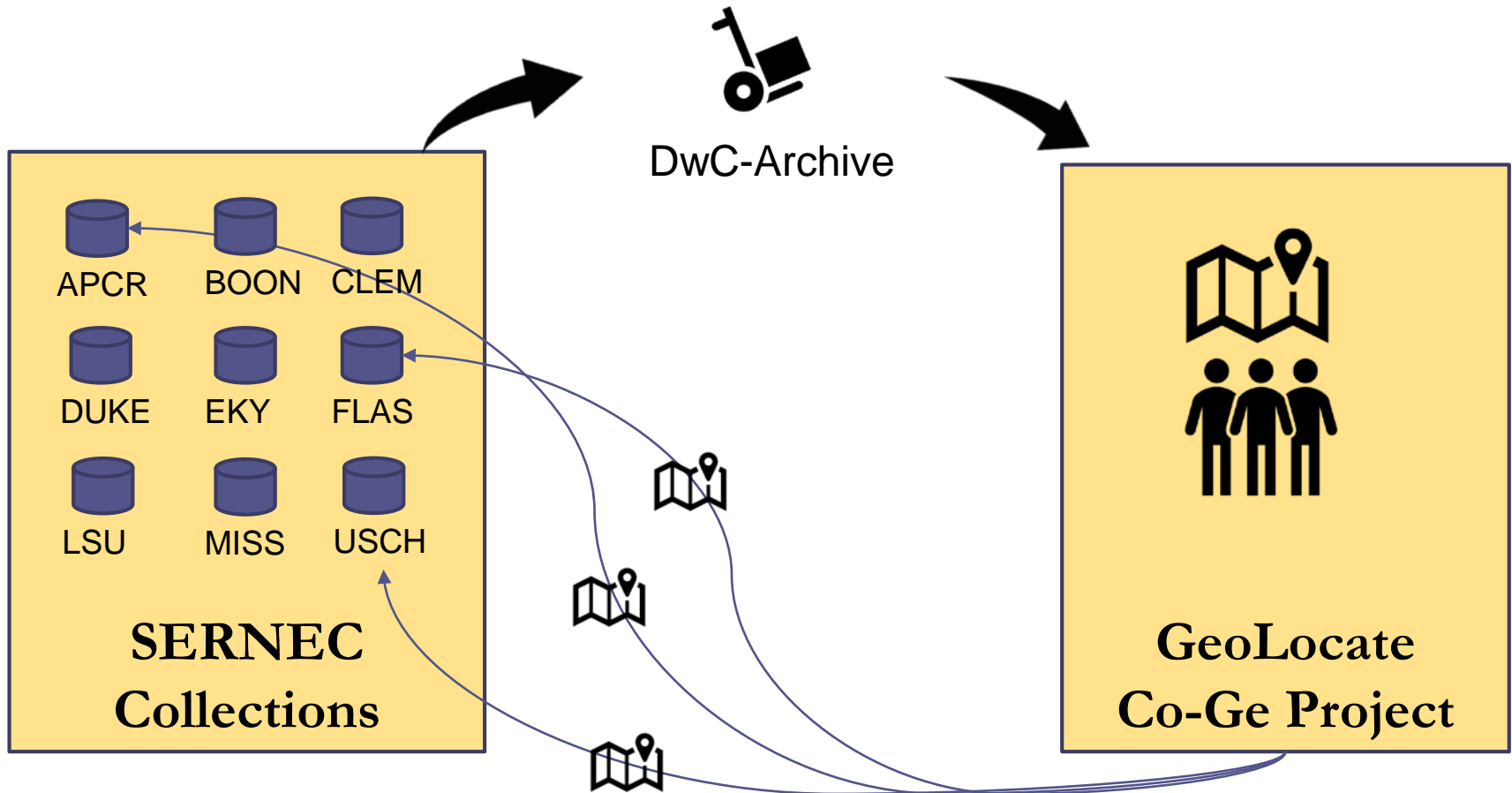




# Digitization Services

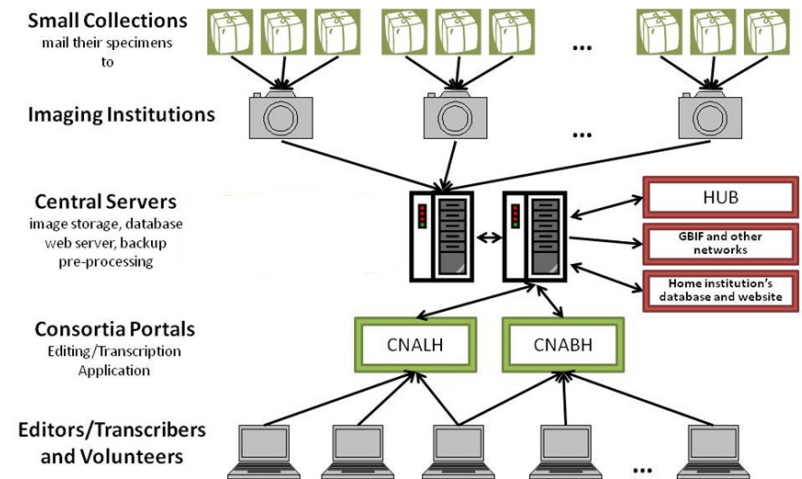
- Duplicate harvesting
- Genetic linkages
- OCR / NLP
- Crowdsourcing
- Versioning of edits
- Batch georeferencing
- GeoLocate CoGe
- Specimen comments
- Darwin Core Archive publishing
- Vouchered inventories
- Pensoft publishing
- Multiple taxonomic thesauri
- Loan management
- Exsiccati

# GeoLocate CoGe Interoperability



# Image to Specimen Workflow

- **Batch loading images**
  - SFTP image drop
  - iDigBio Media Ingest
  - iPlant image loading
- **Skeletal data capture**
  - SFTP skeletal file drop
  - Manual upload
  - via Symbiota



Occurrence Data	Determination History	Images	Genetic Links	Admin
-----------------	-----------------------	--------	---------------	-------

Collector Info

Catalog Number ? Other Numbers ? Collector ? Number ? Date ? Dupes? Auto search

CALVIN000007 Jeanette Henderson 7 2000-09-14

Associated Collectors ? Verbatim Date ?

September 14, 2000

Exsiccata Title Number

Latest Identification

Scientific Name ? Author ?

Sambucus canadensis L.

ID Qualifier ? Family ? Adoxaceae

Identified By ? Date Identified ?

Locality

Country State/Province County Municipality

USA Michigan Kent

Locality

Reeds Lake, Grand Rapids, On north side of Reeds Lake Blvd. at intersection with Hall St.

Latitude Longitude Uncertainty ? Datum ? Verbatim Coordinates

Tools TRS: T.7N., R.11W., Sec. 35

Elevation in Meters Verbatim Elevation

Misc

Habitat

Growing along wetland ditches

Substrate

Associated Taxa

Typha spp., Daucus carota, and Lythrum salicaria

Description

Notes

Life Stage ? Sex ? Individual Count ? Sampling Protocol ? Preparations ?

Phenology ? Establishment Means ? Cultivated

Curation

Type Status ? Disposition ? Occurrence ID ? Field Number ?

Owner Code ? Basis of Record ? Language Label Project Dupe Count

Label Processing Med Res High Res

Calvin College Herbarium

Name: *Sambucus canadensis* L.  
Common elder  
Family: Caprifoliaceae

Locality: Kent Co., MI; Reeds Lake, Grand Rapids, On north side of Reeds Lake Blvd. at intersection with Hall St., Sec. 35, T7N, R11W.

Habitat: Growing along wetland ditches with *Typha* spp., *Daucus carota*, and *Lythrum salicaria*.

Jeanette Henderson # 7 September 14, 2000

OCR Image Options

OCR whole image  
OCR w/ analysis

?Calvin College Herbarium  
Name: *Sambucus canadensis* L.  
Common elder Family: Caprifoliaceae  
Locality: Kent Co., MI; Reeds Lake, Grand Rapids, On north side of Reeds Lake Blvd. at intersection with Hall St., Sec. 35, T7N, R11W.  
Habitat: Growing along wetland ditches with *Typha* spp., *Daucus carota*, and *Lythrum salicaria*.  
Jeanette Henderson # 7  
September 14, 2000

Notes:

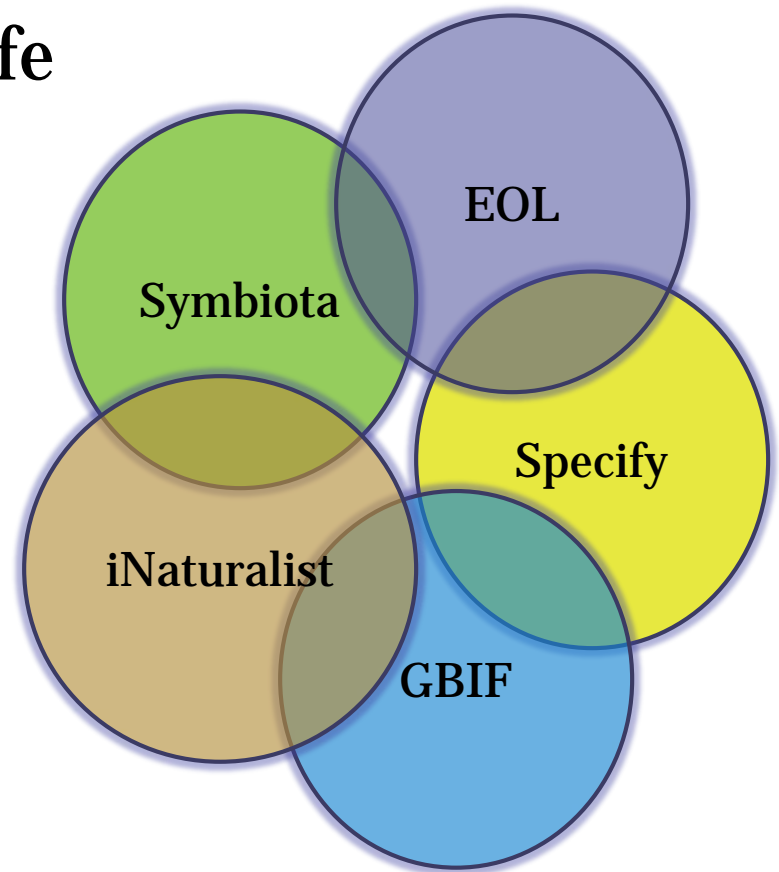
Source:  
ABBY: 2015-01-05

Source OCR F CALV Dupes L BCC Dupes 1 of 1

Delete OCR

# Outreach: Biodiversity Exploration

- Encyclopedia of Life (EOL)
- iDigBio, GBIF, Discover Life
- Navikey / Lucid / Xper2
- Specify, Collection Space
- Symbiota
  - Community Data Portals
  - Biodiversity CMS
  - Specimen based



# Power Aggregation of Collections

Home > **Dynamic Map**

Pan, zoom and click on map to capture coordinates, then submit coordinates to build a species list. [More Details](#)

*Isla Barro Colorado*

COLÓN PROVINCE PANAMA

COLÓN PROVINCE PANAMA

PANAMA COLÓN PROVINCE

COLÓN PROVINCE PANAMA

Google

Map data ©2017 Google | Terms of Use | Report a map error



Home >> Key: 9.15568 -79.84881 within 16.1 km

**Taxon:**

All Species ▾

Display/Reset Species List

Display as: Scientific Name ▾

**Plant**

**Habit**

- tree
- shrub
- terrestrial herb
- vine - liana
- epiphyte - hemiepiphyte
- succulent
- parasite - saprophyte
- aquatic herb

**Leaf**

**glands on blade or petiole**

- present
- absent

9.15568 -79.84881 within 16.1 km

Species Count: 1504

**Acanthaceae**

- Aphelandra sinclairiana*
- Blechnum costaricense*
- Elytraria imbricata*
- Herpetacanthus panamensis*
- Hygrophila guianensis*
- Justicia graciliflora*
- Justicia pectoralis*
- Mendoncia gracilis*
- Mendoncia litoralis*
- Mendoncia retusa*
- Nelsonia brunelloides*
- Ruellia metallica*
- Teliostachya alopecuroidea*
- Thunbergia erecta*
- Trichanthera gigantea*

**Actinidiaceae**

- Saurauia laevigata*
- Saurauia yasicae*

**Agavaceae**

- Cordyline fruticosa*

**Alismataceae**

- Sagittaria lancifolia*

**Amaranthaceae**

- Alternanthera ficoidea*
- Alternanthera sessilis*
- Chamissoa altissima*
- Cyathula prostrata*
- Gomphrena decumbens*
- Iresine angustifolia*
- Iresine diffusa*

**Amaryllidaceae**

- Amaryllis belladonna*
- Crinum erubescens*
- Hymenocallis pedalis*

**Anacardiaceae**

- Anacardium excelsum*
- Anacardium occidentale*
- Astronium graveolens*
- Mangifera indica*
- Mecosticoyxylum jamaicense*



Home >> Key: 9.15568 -79.84881 within 16.1 km

Taxon:

All Species

Display/Reset Species List

Display as: Scientific Name

Plant

Habit

- tree
- shrub
- terrestrial herb
- vine - liana
- epiphyte - hemiepiphyte
- succulent

Latex

- present
- absent

Armature

- unarmed
- stem or leaves armed

Leaf

Type

- simple
- compound

Arrangement

- alternate
- opposite
- whorled
- fascicled
- basal rosette

Margin

- entire
- toothed
- lobed

Stipules

- present
- absent

Leaf Punctations

9.15568 -79.84881 within 16.1 km

Species Count: 590

Acanthaceae

*Trichanthera gigantea*

Actinidiaceae

*Saurauia laevigata*  
*Saurauia yasicae*

Agavaceae

*Cordyline fruticosa*

Anacardiaceae

*Anacardium excelsum*  
*Anacardium occidentale*  
*Astronium graveolens*  
*Mangifera indica*  
*Mosquitoxylum jamaicense*  
*Spondias mombin*  
*Spondias purpurea*  
*Spondias radlkoferi*  
*Tapirira guianensis*

Annonaceae

*Anaxagorea panamensis*  
*Annona acuminata*  
*Annona glabra*  
*Annona hayesii*  
*Annona muricata*  
*Annona purpurea*  
*Annona spraguei*  
*Crematosperma panamense*  
*Cymbopetalum lanugipetalum*  
*Desmopsis panamensis*  
*Guatteria amplifolia*  
*Guatteria dumetorum*  
*Mosannonna garwoodii*  
*Oxandra longipetala*  
*Unonopsis pittieri*  
*Xylopia aromatica*  
*Xylopia frutescens*  
*Xylopia macrantha*

Apocynaceae

*Aspidosperma cruentum*  
*Aspidosperma megalocarpon*  
*Aspidosperma spruceanum*  
*Rauvolfia littoralis*

Araliaceae





Home >> Key: 9.15568 -79.84881 within 16.1 km

Taxon: All Species

Display/Reset Species List

Display as: Scientific Name

Plant

Habit

- tree
- shrub
- vine - liana

Latex

- present
- absent

Plant Scent

- without noticeable scent
- obviously odiferous

Leaf

Type

- simple

Arrangement

- alternate
- opposite
- whorled

Venation

- pinnate
- palmate

Leaf Punctations

- present
- absent

glands on blade or petiole

- present
- absent

Inflorescence

Placement

- terminal

9.15568 -79.84881 within 16.1 km

Species Count: 23

Apocynaceae

*Rauvolfia littoralis*

Lythraceae

*Adenaria floribunda*

Melastomataceae

*Mouriri completens*

*Mouriri myrtilloides*

Myrtaceae

*Calycolpus warszewiczianus*

*Calyptranthes schiediana*

*Chamguava schippii*

*Eugenia coloradoensis*

*Eugenia galalonensis*

*Eugenia nesiotica*

*Eugenia octopleura*

*Eugenia oerstediana*

*Eugenia principium*

*Eugenia uniflora*

*Eugenia venezuelensis*

*Myrcia fosteri*

*Myrcia gatunensis*

*Myrciaria floribunda*

*Myrcia zetekiana*

*Psidium anglohondurens*

*Psidium friedrichsthalianum*

*Psidium guajava*

*Syzygium jambos*



# *Calycolpus warszewiczianus* O. Berg

Go to Encyclopedia of Life...

Family: Myrtaceae

(spanish: Guayabillo, guayabito de monte)



Andrés Hernández



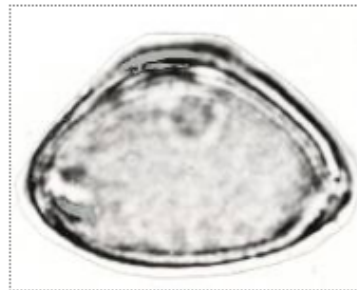
Andrés Hernández



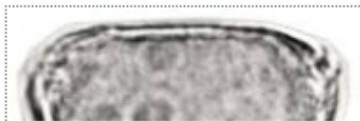
Andrés Hernández



Andrés Hernández



Open Interactive Map



Click to Display  
27 Total Images

Description

Tree Atlas - Español

A revision of *Calycolpus* by L. R. Landrum. *Systematic Botany* (2010), 35(2): pp. 368–389

***Calycolpus warszewiczianus* O. Berg:** Shrub or tree 2–7 m high, mainly glabrous to sparsely strigose; hairs simple, whitish to reddish brown, to ca. 0.3 mm long; young twigs more or less terete to weakly 4 angled, glabrous-sparsely strigose, light reddish brown, the older twigs usually gray, the older bark often somewhat stringy; leaves elliptic, lanceolate, or oblong-lanceolate, 4–9 cm long, 1–3.6 cm wide, (1.7–) 2.5–3.5 times as long as wide; apex acuminate to acuminate-caudate; base rounded to acute; petiole shallowly channeled, 2–5 mm long, ca. 1 mm thick, glabrous to sparsely strigose; midvein impressed above, prominent below; lateral veins about 20–30 pairs, faint, nearly straight; marginal vein about equaling laterals, approximately paralleling the margin; blades subcoriaceous, drying dark reddish brown, somewhat darker above than below, dull above. Flower buds 8–12 mm long; peduncles solitary or in collateral pairs, uniflorous (rarely triflorous), subterete to flattened, 0.6–2.5 (–3) cm long, ca. 1 mm wide; bracteoles subtriangular, 1–2 mm long, ca. 1 mm wide; calyx-lobes clearly divisible into base and appendage, normally with no tearing

# Biological Inventories

- **Online demo**



Home > Arizona Flora > West Fork of Oak Creek



## West Fork of Oak Creek Games

**Authors:** Edward Gilbert, Max Licher

**Citation:** Gilbert, E. E. 2002. Flora and Vegetation of the West Fork of Oak Creek Canyon, Coconino County, Arizona. M.S. thesis. Arizona State University, Tempe.

[More Details](#)

**Families:** 92  
**Genera:** 334  
**Species:** 580  
**Total Taxa (details):** 583

Page 1 of 2: 1 | 2

### ADOXACEAE

#### *Sambucus nigra*

Edward Gilbert 921 [ASU] , Edward Gilbert 177 [ASU] , Edward Gilbert 561 [ASU] , C.F. Deaver 3105 [ASC] , more...

#### *Sambucus nigra subsp. cerulea*

infrequent, riparian; Elinor Lehto L-21331 [ASU]

### AMARANTHACEAE

#### *Amaranthus blitoides*

Call of the Canyon only

#### *Amaranthus powellii*

locally frequent, Call-of-the-Canyon and upper canyons; Edward Gilbert 970 [ASU] , M. Licher 13 [ASU] , Edward Gilbert 825 [ASU] , Edward Gilbert 392 [ASU]

#### *Amaranthus retroflexus*

Edward Gilbert 480 [ASU]

#### *Chenopodium album*

rare, throughout canyon & Call of the Canyon; Edward Gilbert 790 [ASU] , Edward Gilbert 862 [ASU]

#### *Chenopodium atrovirens*

Edward Gilbert 852 [ASU]

#### *Chenopodium capitatum*

#### *Chenopodium capitatum var. parvicapitatum*

M. Licher 5 [ASU]

#### *Chenopodium fremontii*

### Options

#### Search:

- Common Names  
 Synonyms

#### Filter:

Original Checklist 

- Display Synonyms  
 Common Names  
 Display as Images  
 Notes & Vouchers  
 Taxon Authors  
 Show Taxa Alphabetically





## Arizona State University Vascular Plant Herbarium

### ASU : Plants

**Catalog #:** ASU0077238

**Occurrence ID (GUID):** 828c4eac-7c94-4b08-92a9-a76104953749

**Secondary Catalog #:** 242898

**Taxon:** *Chenopodium atrovirens* Rydb.

**Family:** Amaranthaceae

**Determiner:** Nuri Benet-Pierce (3 April)

Show Determination History

**Collector:** Edward Gilbert 852

**Date:** 2001-09-03

**Locality:** USA, Arizona, Coconino, Upper canyon of the West Fork of Oak Creek, about 10 miles NNE of Sedona. Short ways down Fernow Draw from forest service road 231, just below first confluence.

35.0147 -111.858

**Verbatim Coordinates:** DMS: 35d 0m 52.9s N; 111d 51m 29.2s W

**Elevation:** 1982 meters

**Verbatim Elevation:** 6500ft

**Habitat:** riparain

**Reproductive Condition:** flowers

### Specimen Images



[Open Medium Image](#)

[Open Large Image](#)



## *Amaranthus blitoides* S. Watson

Go To Encyclopedia of Life...

Family: Amaranthaceae

### Mat Amaranth

[*Amaranthus blitoides* var. *reverchonii*]



Max Licher

FNA Indiana Flora Field Guide Gleason & Cronquist Web Links

Sergei L. Mosyakin & Kenneth R. Robertson in Flora of North America (vol. 4)

**Plants** annual, glabrous. **Stems** prostrate or ascending (very rarely suberect), much-branched (usually from base), (0.1-)0.2-0.6(-1) m. **Leaves:** petiole  $\pm \frac{1}{2}$  as long as blade; blade obovate, elliptic, or spatulate, 1-2(-4)  $\times$  0.5-1(-1.5) cm, base cuneate and tapering, margins usually entire, plane, rarely slightly undulate, apex obtuse, rounded, mucronulate. **Inflorescences** axillary glomerules, green. **Bracts** of pistillate flowers narrow, thin, 1.5-5 mm,  $\pm$  equaling or slightly exceeding tepals. **Pistillate flowers:** tepals (3-)4-5, narrowly ovate to broadly linear, unequal or subequal, 1.5-3 mm, thin, apex acute or acuminate; style branches spreading; stigmas 3. **Staminate flowers** intermixed with pistillate; tepals 3(-4); stamens 3. **Utricles** broadly ovoid, 1.7-2.5 mm, equaling tepals, mostly smooth (slightly verrucose or rugose in dry plants), dehiscence regularly circumscissile. **Seeds** black, lenticular to broadly plumply lenticular, 1.3-1.6 mm diam., rather dull. Flowering summer-fall. Disturbed habitats: roadsides, riverbanks, railroads, fields, waste places, sandy flats; 0-2200 m; Alta., B.C., Man., Ont., Que., Sask.; Ala., Alaska, Ariz., Ark., Calif., Colo., Conn., Del., D.C., Fla., Ga., Idaho, Ill., Ind., Iowa, Kans., Ky., La., Maine, Md., Mass., Mich., Minn., Mo., Mont., Nebr., Nev., N.H., N.J., N.Mex., N.Y., N.Dak., Ohio, Okla., Oreg., Pa., R.I., S.C., S.Dak., Tenn., Tex., Utah, Vt., Va., Wash., W.Va., Wis., Wyo.; introduced and often completely naturalized in South America, Eurasia, and other regions. The name *Amaranthus graecizans* often has been misapplied to both *A. blitoides* and *A. albus* in older North American floras and manuals. *Amaranthus blitoides* was probably originally native to central and partly eastern United States, but now it is widely and successfully naturalized almost everywhere in temperate North America and in many subtropical to warm-temperate regions. It has not been reported from Mississippi or North Carolina but since it is found in all other conterminous United States it can be expected to occur in these two as well.

Varieties have been described within *Amaranthus blitoides*; most of them are of no taxonomic significance, being mostly ecologic



Max Licher



Max Licher



Max Licher



Max Licher



Open Interactive Map





Home > Arizona Flora > West Fork of Oak Creek

## West Fork of Oak Creek Games

**Authors:** Edward Gilbert, Max Licher

**Citation:** Gilbert, E. E. 2002. Flora and Vegetation of the West Fork of Oak Creek Canyon, Coconino County, Arizona. M.S. thesis. Arizona State University, Tempe.

[More Details](#)



**Families:** 92  
**Genera:** 334  
**Species:** 580  
**Total Taxa (details):** 583

Page 1 of 6: [1](#) | [2](#) | [3](#) | [4](#) | [5](#) | [6](#)

### Options

#### Search:

- Common Names
- Synonyms

#### Filter:

Original Checklist ▼

- Common Names
- Display as Images
- Show Taxa Alphabetically

[Rebuild List](#)



**Sambucus nigra**  
[ADOXACEAE]

**Sambucus nigra**  
subsp. *cerulea*

**Amaranthus**  
*blitoides*  
[AMARANTHACEAE]

**Amaranthus powellii**

**Amaranthus retroflexus**

**Chenopodium album**

**Chenopodium atrovirens**



**Chenopodium capitatum**

**Chenopodium capitatum**  
var. *parvicapitatum*

**Chenopodium fremontii**

**Chenopodium hians**

**Chenopodium pratericola**

**Dysphania graveolens**

**Salsola tragus**


**Allium bisceptrum**  
[AMARYLLIDACEAE]

**Allium bisceptrum**  
var. *palmeri*



[Home](#) >> [Return to Checklist](#) >> **Checklist Administration**

## West Fork of Oak Creek

Coconino; West Fork [New Vouchers](#)[Missing Taxa](#)[Voucher Conflicts](#)[Reports](#)

### Possible Voucher Conflicts

List of specimen vouchers where the current identifications conflict with the checklist. Voucher conflicts are typically due to recent annotations of specimens located within collection. Click on Checklist ID to open the editing pane for that record.

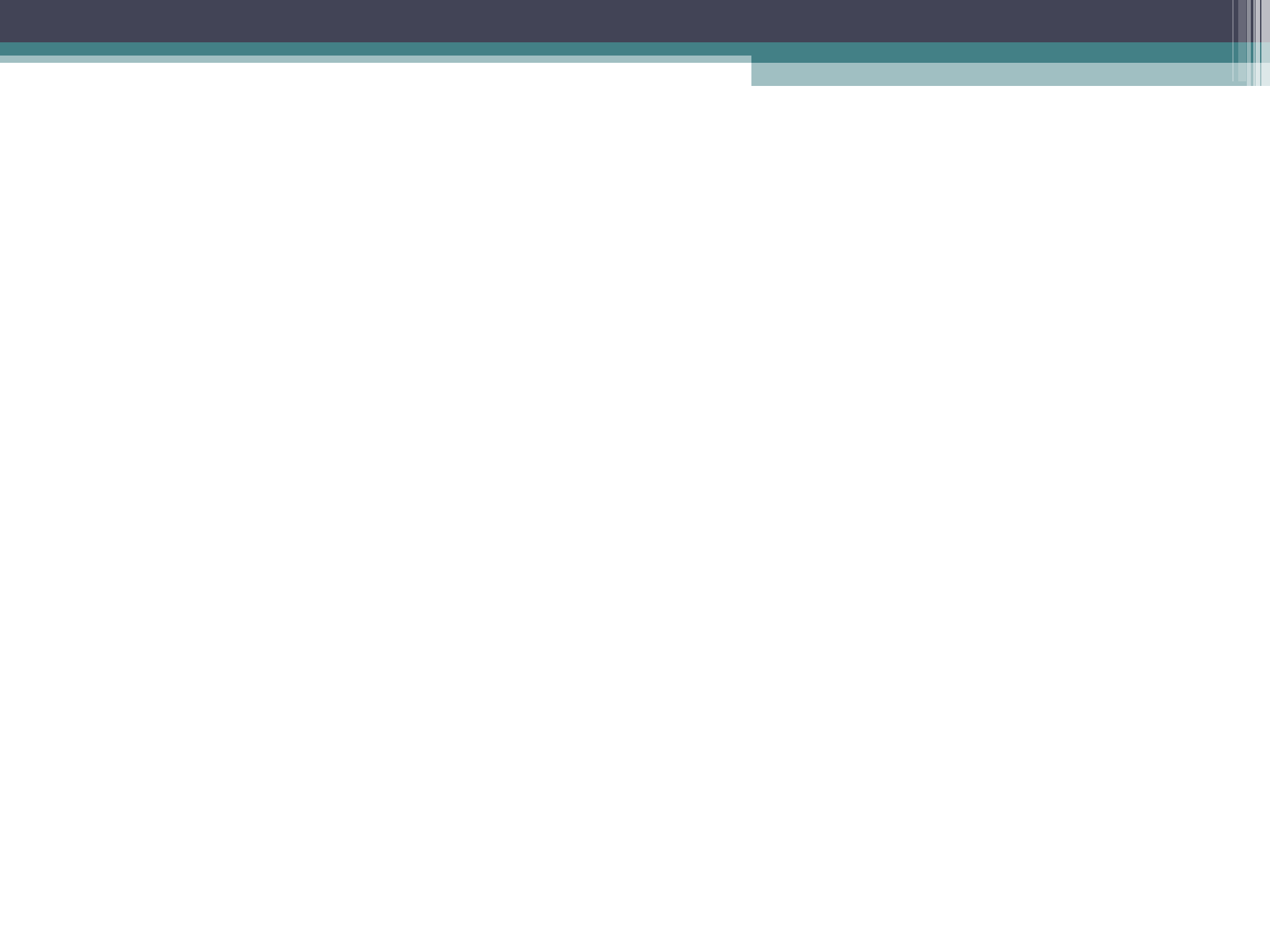
**Conflict Count: 3**

<input type="checkbox"/>	Checklist ID	Voucher Specimen	Corrected Specimen ID	Identified By
<input type="checkbox"/>	Quercus X pauciloba	Edward Gilbert (189)	Quercus gambelii x turbinella	
<input type="checkbox"/>	Quercus X pauciloba	Edward Gilbert (437)	Quercus gambelii x turbinella	
<input type="checkbox"/>	Viola nephrophylla	Edward Gilbert (15)	Viola sororia subsp. affinis	

 Remove taxa from checklist if all vouchers are removed**Batch Action:** [Link Vouchers to Corrected Identification](#)

\* Corrected taxon will be added to checklist if not yet present





# Support Grassroot Collaborations

- 1900+ data managers
- 1700+ floras/inventories
- 600 checklist editors
  - Jesus Sanchez, Steve Buckley
- 100+ field researcher
- 40,000 field images
- 300+ photographers
  - Patrick Alexander, Max Licher, Sue Carnahan, Liz Making



# Personal Specimen Management

- Data entry
- Data Management
- Label Printing
- Cloud management
  - Password Protected
  - Web browser
  - Platform independent
  - Globally accessible
  - No special software
- Initially “Observations”

General Observations (SEINet)  
Home >> Personal Management >> Editor

Occurrence Data | Determination History | Images | Admin

Collector Info  
Catalog Number: 3024 | Other Numbers: | Collector: M. Licher | Number: 3024 | Date: 2011-03-27  
Associated Collectors:

Latest Identification  
Scientific Name: Medicago minima | Author: (L.) L.  
ID Qualifier: | Family: Fabaceae  
Identified By: | Date Identified:

Locality  
Country: USA | State/Province: Arizona | County: Yavapai | Municipality:  
Locality: Tent Rocks, SE of Camp Verde, south side of tuff formations  
 Locality Security  
Latitude: 34.496667 | Longitude: -111.748972 | Uncertainty (meters): 10 | Datum: NAD83 | Elevation in Meters: 1030 | Verbatim Elevation: 3370ft  
Verbatim Coordinates: 34° 29' 48.0" N 111° 44' 56.3" W | Georeferenced By: | Georeference Protocol:  
Georeference Sources: | Georeference Status: | Georeference Remarks:

Misc  
Habitat: Dry wash channel at base of tuff formations in Desert Scrub habitat, with widely scattered juniper  
Substrate:

Plants of Arizona  
Scrophulariaceae  
*Castilleja exilis* A. Nels.  
USA, Arizona, Yavapai County, Mesquite Spring, Cottonwood Basin SE of Camp Verde.  
34° 29' 02.5" N 111° 45' 16.7" W [NAD83]  
Elev: 930m. (3040ft)  
Damp bank at spring location, N facing slope. Riparian zone in desert scrub habitat.  
Annual herb, 45 to 65 cm, green bracts with red tips; infrequent  
Associated species: *Solidago altissima*, *Dalea candida*, *Epipactis gigantea*, *Schoenoplectus americanus*, *Toxicodendron rydbergii*, *Mimulus cardinalis*, *Salix laevigata*, *Fraxinus velutina*, *Salix gooddingii*, *Andropogon glomeratus*  
M. Licher 2792 16 July 2010  
Northern Arizona University Herbarium



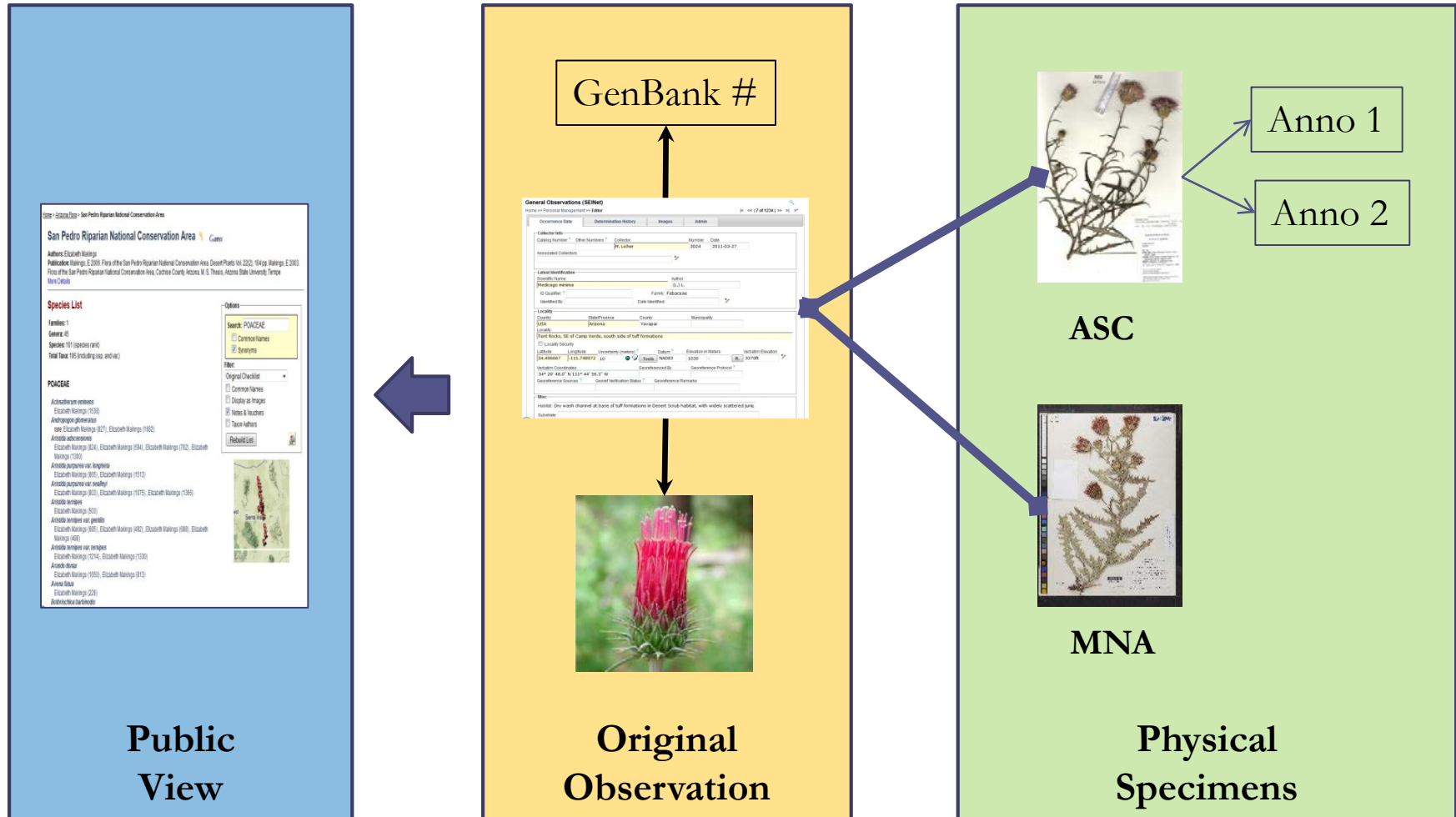
Plants of Arizona  
Scrophulariaceae  
*Castilleja exilis* A. Nels.  
USA, Arizona, Yavapai County, Mesquite Spring, Cottonwood Basin SE of Camp Verde.  
34° 29' 02.5" N 111° 45' 16.7" W [NAD83]  
Elev: 930m. (3040ft)  
Damp bank at spring location, N facing slope. Riparian zone in desert scrub habitat.

Plants of Arizona  
Scrophulariaceae  
*Castilleja exilis* A. Nels.  
USA, Arizona, Yavapai County, Mesquite Spring, Cottonwood Basin SE of Camp Verde.  
34° 29' 02.5" N 111° 45' 16.7" W [NAD83]  
Elev: 930m. (3040ft)  
Damp bank at spring location, N facing slope. Riparian zone in desert scrub habitat.  
Annual herb, 45 to 65 cm, green bracts with red tips; infrequent  
Associated species: *Solidago altissima*, *Dalea candida*, *Epipactis gigantea*, *Schoenoplectus americanus*, *Toxicodendron rydbergii*, *Mimulus cardinalis*, *Salix laevigata*, *Fraxinus velutina*, *Salix gooddingii*, *Andropogon glomeratus*  
M. Licher 2792 16 July 2010  
Northern Arizona University Herbarium



Plants of Arizona  
Poaceae  
*Eragrostis cilianensis* (All.) Vign. ex Janchen  
USA, Arizona, Yavapai County, Confluence of Mesquite and Cottonwood Springs, Cottonwood Basin SE of Camp Verde.  
34° 29' 59.2" N 111° 46' 22.1" W [NAD83]  
Elev: 920m. (3020ft)  
Sandy riparian creek bed without surface water in desert

# Voucher Network



# Acknowledgments

- National Science Foundation
  - ADBC and iDigBio
- Herbaria, collection managers
- Regional TCN projects
- Individual content providers
- SEINet Steering Committee
  - Gil Nelson, Ed Gilbert, Leslie Landrum, Anna Monfils, Zack Murrell, Richard Rabeler, Patrick Sweeney, Barbara Thiers
- Arizona State University – GIOS, SOLS, BioKic
- Robin Schroeder, Ben Brandt, etc

