

# Symbiota: a specimen-based biodiversity portal platform

Edward Gilbert  
Corinna Gries  
Nico Franz



National Science Foundation  
WHERE DISCOVERIES BEGIN

# History -> SEINet

- Prototype: 2001
- Arizona herbaria
  - DES, ARIZ, ASC, ASU
- Specimen focus
- Simple search engine
- Distributed databases
- Read-only
- Java/JSP & MS SQL

The screenshot shows a web interface for the SEINet system. At the top right is the logo 'SEINet' with a magnifying glass icon. Below it is the text 'Southwest Environmental Information Network'. On the far right is a red circular button with a white 'X' and a small icon. The main content area has a header 'Please Log In' and 'New SEINet Account'. A 'Help' link is at the top right. Below this is a breadcrumb trail 'Home > Collections Databases'. The main section is titled 'Select Collections to be Searched'. It includes a checkbox for 'Select/Deselect all Collections'. A list of collections follows, each with a small thumbnail image and a checked checkbox next to its name. The collections listed are: University of Arizona Herbarium, University of California, Riverside Plant Herbarium, Arizona State University Vascular Plant Herbarium, New York Botanical Garden, Intermountain Herbarium (Utah State University), Deaver Herbarium (Northern Arizona University), Desert Botanical Garden Herbarium Collection, Herbario de la Universidad de Sonora (DICTUS), Madrean Archipelago Biodiversity Assessment Observations, Navajo Nation Herbarium, Grand Canyon National Park, and The Cochise County Herbarium.

Please Log In

New SEINet Account

Southwest Environmental Information Network

Help

Home > Collections Databases

Select Collections to be Searched

Select/Deselect all Collections

|  |  |
|--|--|
|  | <input checked="" type="checkbox"/> University of Arizona Herbarium                          |
|  | <input checked="" type="checkbox"/> University of California, Riverside Plant Herbarium      |
|  | <input checked="" type="checkbox"/> Arizona State University Vascular Plant Herbarium        |
|  | <input checked="" type="checkbox"/> New York Botanical Garden                                |
|  | <input checked="" type="checkbox"/> Intermountain Herbarium (Utah State University)          |
|  | <input checked="" type="checkbox"/> Deaver Herbarium (Northern Arizona University)           |
|  | <input checked="" type="checkbox"/> Desert Botanical Garden Herbarium Collection             |
|  | <input checked="" type="checkbox"/> Herbario de la Universidad de Sonora (DICTUS)            |
|  | <input checked="" type="checkbox"/> Madrean Archipelago Biodiversity Assessment Observations |
|  | <input checked="" type="checkbox"/> Navajo Nation Herbarium                                  |
|  | <input checked="" type="checkbox"/> Grand Canyon National Park                               |
|  | <input checked="" type="checkbox"/> The Cochise County Herbarium                             |

next

# Need for Online Data Management

- Small collections
  - Limited resources
- Diverse data structures
- Data loss
  - Spreadsheet databases
- Browser-based data management
  - Platform independent
  - No special software installation
  - Centralized database support

# NSF Award DBI-0847966

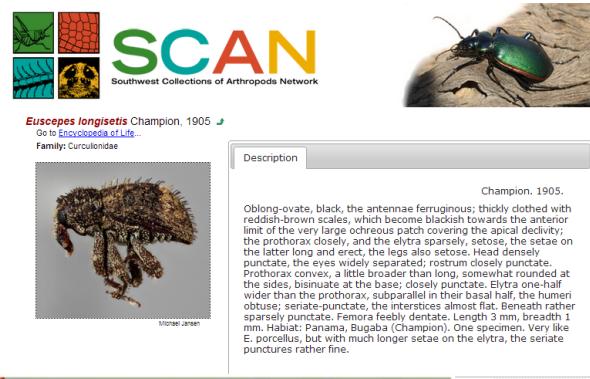
- 2008 – 2011
- Cache-based model
- PHP / MySQL
- Content Management System (CMS)
- Darwin Core
- Beyond specimens

The screenshot displays three windows of the SEINet system:

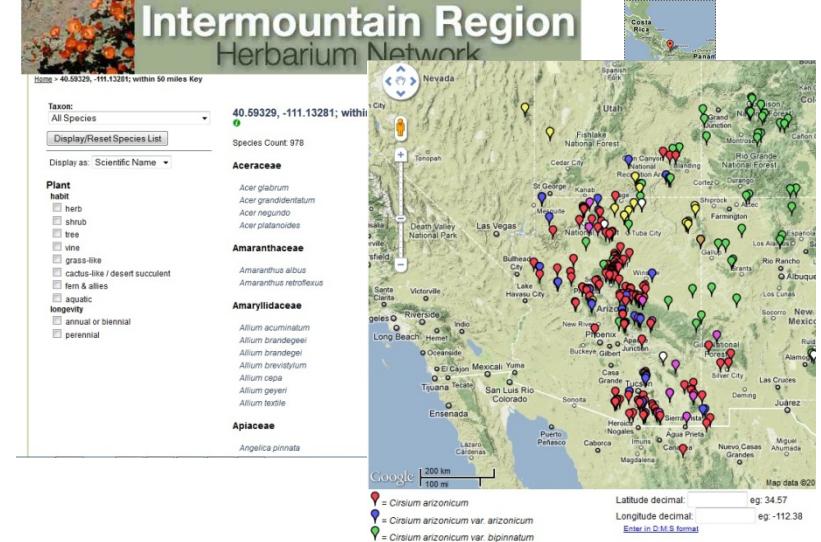
- Collections Search - Mozilla Firefox:** Shows a search interface for "Cirsium arizonicum". It includes fields for Taxonomic Criteria (e.g., Family or Scientific Name, Cladonia) and Locality Criteria (e.g., Country, State/Province, County/Parish). A bounding box tool is available for defining specific geographic areas.
- Consortium of North American Lichen Herbaria - Google Map - Mozilla Firefox:** A map of North America showing collection localities for *Cirsium arizonicum* marked with yellow pins. States and provinces are labeled.
- Cirsium arizonicum - Mozilla Firefox:** A detailed species page for *Cirsium arizonicum*. It includes a large image of a butterfly on a plant, several smaller images of flower heads, and a detailed botanical description. The description notes: "Plant: Perennial 2-10 dm; taproot ± woody, stem erect, often > 1 from base, thinly tomentose or ± glabrous"; "Leaves: At terminal ends (especially below), becoming ± glabrous; lower 1-2 dm tipped to semi-glossy petiolate, oblong-abrupt, ± lobed, lobes generally further lobed or toothed, main spines 5-15 mm; middle and upper not strongly reduced, clasping or short-decurrent"; "Flowers: corymbose; corollas 30-34 mm, red, tube 7-9 mm, slender, throat 11-14 mm, lobes linear, 12-13 mm, anther bases sharply sagittate, tips oblong, style tip with slightly swollen flange, awl-shaped, pubescent, glaucous, branches very short"; "Habitat: Open forests, sagebrush scrub"; "Distribution: 2400-3700 m"; "Fruit: H 4-6 mm, As compact, shiny brown, ovoid, glabrous; scar slightly angled, basal 2-4 mm, apical many, plumose"; "Inflorescence: primary inflorescence a head, each resembling a flower; heads discoid, generally few, short-peduncled, As closely subtended by uppermost leaves; involucles 3-4 cm, 1.5-2 cm diam when fresh, cylindric or narrowly ovoid, sparsely tomentose, phyllaries linear-lanceolate, entire, generally erect or ascending, outer and middle tipped with spines 10-20 mm, inner with tips flat or short-spined, straight, often red or purple, puberulent"; "Flowering times: Jul-Aug".

# Symbiota Software Project

- Open source
- Modular
- Framework architecture
- Virtual flora/fauna
- Specimen search engine
- Biodiversity inventories
- Identification keys



The screenshot shows the SCAN website interface. At the top, there is a logo consisting of four colored squares (green, red, blue, yellow) followed by the word "SCAN" in large letters, with "Southwest Collections of Arthropods Network" below it. To the right is a photograph of a shiny green beetle. Below the logo is a detailed description of the species *Euscepes longisetis* Champion, 1905, including its family (Curculionidae), a smaller image of the beetle, and a detailed scientific description.



The screenshot shows the Intermountain Region Herbarium Network website. It features a header with a photograph of flowers and the text "Intermountain Region Herbarium Network". Below the header is a map of the western United States and parts of Mexico and Canada, with numerous colored pins indicating the locations of herbarium specimens. A sidebar on the left provides filtering options for taxon, habitat, and display type. The map includes state and city labels, and a legend at the bottom explains the pin colors.

# Scientific Community Portals

- Community-based biodiversity portals
- Distinct datasets
  - Taxonomic scope
  - Geographic scope
- Custom look & feel
  - CSS, config files

The screenshot shows the homepage of the Consortium of North American Lichen Herbaria (NALH). At the top right, there are two small images with captions: "Photos by M. Von Konrat" and "Photos by F. Bungartz". The main title "Consortium of NORTH AMERICAN LICHEN HERBARIA" is centered above a large image of a lichen sample. To the left, a vertical "Main Menu" sidebar lists links such as "Search Collections", "Image Library", "Flora Projects" (with sub-links for Arizona, California, Wisconsin, Southern Subpolar Region, and USNP Project), "Dynamic Floras" (with sub-links for Dynamic Checklist and Dynamic Key), and "Log In" and "New Account". The main content area is titled "Welcome to the Consortium of North American Lichen Herbaria" and contains text about the consortium's purpose and history. It also includes a call to action for users to join and provide feedback. At the bottom, there is a decorative footer bar featuring small images of lichens and the text "Join CoTRAM as a regular visitor and please send your feedback to Leslie Landrum".

# Network of Small Herbaria

- North American Network Small Herbaria
- NANSN
- Basic Support
- Specimen digitization



**Homepage**

[Search Collections](#)  
[Dynamic Checklist](#)  
[Dynamic Key](#)  
[Image Library](#)  
[About Network](#)  
[Resource Links](#)  
[Symbiota Help Page](#)

**Other Networks**

[Great Plains](#)  
[Intermountain](#)  
[MABA Flora](#)  
[SEINet](#)  
[SERNEC](#)

[Log In](#)  
[New Account](#)  
[Sitemap](#)

## North American Network of Small Herbaria

Portal will be offline for maintenance during a 4-5 hour period in the afternoon of Saturday, Dec. 14th.  
We are sorry for any inconvenience this may cause.

The North American Network of Small Herbaria is an open access data portal provided by Symbiota and intended to foster digitization of small collections and facilitate collaboration among institutions. The establishment of this portal is the result of collaboration between Symbiota and iDigBio's Small Herbarium Working Group ([https://www.idigbio.org/wiki/index.php/Small\\_Herbarium\\_Interest\\_Group](https://www.idigbio.org/wiki/index.php/Small_Herbarium_Interest_Group)). To learn how to join the working group or network, contact Anna Monfils ([monfilak@cmich.edu](mailto:monfilak@cmich.edu)) or Gil Nelson ([gnelson@bio.fsu.edu](mailto:gnelson@bio.fsu.edu)).

Small herbaria constitute a major source of information for understanding North America's plant diversity. These collections are typically regional in scope with strong ecological, taxonomic, and geographic biases. They frequently hold specimens that are unduplicated in larger herbaria and usually represent intense samplings of community composition that significantly expand our knowledge of landscape-level biogeography. As a result, they are singularly important to the study of regionally and nationally significant natural communities.

Until recently, access to the wealth of biodiversity data stored in small herbaria has been hampered by travel requirements, insufficient staff, and long-term loans that render specimens unavailable for extended periods. With the advent of biodiversity collections digitization, small herbaria are now poised to overcome these obstacles by making label data and specimen images readily available online through searchable electronic databases. As more institutions take advantage of open-source, community-supported digitization software, the online presence of small collections will rapidly increase and with it the volume of available biodiversity data.



**Plant of the Day**

What is this plant?  
Click here to test your knowledge

# SEINet Network

- Integrated Data
- Distributed Network
  - Great Plains
  - InterMountain
  - MABA
  - SEINet – AZ
  - SEINet – NM
  - SERNEC
  - VPlants



# Power of an Integrated Dataset

Welcome Edward Gilbert!

Logout My Profile Help

**SEINet Home**

- [Search Collections](#)
- [Image Library](#)
- [Plant Games](#)
- [Links](#)

**Flora Projects**

- [Arizona](#)
- [Colorado Plateau](#)
- [New Mexico](#)
- [Intermountain](#)
- [NPS Flora](#)
- [USFWS Flora](#)
- [MABA Flora](#)
- [Sonoran Desert](#)

[Teaching Checklists](#)

**Dynamic Floras**

- [Dynamic Checklist](#)
- [Dynamic Key](#)

[Sitemap](#)

**Welcome to SEINet**

The Southwest Environmental Information Network was created to serve as a gateway to distributed data resources of interest to the environmental research community in Arizona and beyond. Through a common web interface, we offer tools to locate, access and work with a variety of data.

SEINet is more than just a web site - it is a suite of data access technologies and a distributed network of departments, museums and agencies that provide environmental information. Initially created to integrate databases within the Arizona State University, SEINet is growing to extend this network to other partners within the Southwest.

To learn more about the features and capabilities available through this site, read [Making Good Use Of SEINet](#) or visit the [Symbiota Help Pages](#). Join SEINet as a regular visitor and please send your feedback to [seinetAdmin@asu.edu](mailto:seinetAdmin@asu.edu). Visit the [Data Usage Policy](#) page for information on how to cite data obtained from this web resource.

**Development of SEINet, Symbiota, and several of the specimen databases have been supported by National Science Foundation Grants (DBI 9983132, BRC 0237418, DBI 0743827, DBI 0847966)**

**Plant of the Day**



**What is this plant?**  
Click here to test your knowledge

<http://swbiodiversity.org/seinet/>

Point (Lat, Long): 31.81002, -110.41428

Taxon Filter (optional)

Submit Coordinates

[Map](#) [Satellite](#)



Welcome Max Licher!

[Logout](#)[My Profile](#)[Help](#)[Home](#) >> 31.81002, -110.41428; within 20 miles Key

## Taxon:

All Species

31.81002, -110.41428; within 20 miles

[Display/Reset Species List](#)

Species Count: 1357

Display as: Scientific Name ▾

## Plant

## habit

- herb
- shrub
- tree
- vine

## grass-like

## cactus-like / desert succulent

## fern &amp; allies

## aquatic

## longevity

- annual or biennial
- perennial

**Acanthaceae**

- Anisacanthus thurberi*
- Carlowrightia arizonica*
- Carlowrightia linearifolia*
- Carlowrightia texana*
- Dicliptera resupinata*
- Dyschoriste schiedeana*
- Elytraria imbricata*
- Justicia sonorae*
- Ruellia nudiflora*
- Tetramerium nervosum*

**Adoxaceae**

- Sambucus nigra*

**Aizoaceae**

- Trianthema portulacastrum*

**Alismataceae**

- Alisma triviale*

Welcome Max Licher!

[Logout](#)[My Profile](#)[Help](#)[Home](#) >> 31.81002, -110.41428; within 20 miles Key**Taxon:****Plant****habit** herb shrub tree**sap** latex absent (sap clear) latex present**Leaves****type** simple compound**stipules** stipules absent stipules present**arrangement** alternate opposite whorled fascicled/clustered along stem**blade margin****31.81002, -110.41428; within 20 miles**

Species Count: 62

**Adoxaceae***Sambucus nigra***Anacardiaceae***Rhus microphylla**Rhus virens***Bignoniaceae***Catalpa bignonioides**Chilopia linearis**Tecoma stans***Cannabaceae***Celtis reticulata***Cupressaceae***Juniperus coahuilensis**Juniperus deppeana***Ericaceae**



Welcome Max Licher!

[Logout](#)[My Profile](#)[Help](#)[Home](#) >> 31.81002, -110.41428; within 20 miles Key**Taxon:**

All Species

[Display/Reset Species List](#)

Display as: Scientific Name

**Plant****habit**

- shrub
- tree

**Leaves****type**

- simple
- compound

**arrangement**

- opposite
- whorled

**blade margin**

- entire
- toothed
- lobed

**Fruit****consistency at maturity**

- dry/leathery
- fleshy

31.81002, -110.41428; within 20 miles

Species Count: 10

**Adoxaceae***Sambucus nigra***Bignoniaceae***Catalpa bignonioides**Tecoma stans***Cupressaceae***Juniperus coahuilensis**Juniperus deppeana***Oleaceae***Fraxinus gooddingii**Fraxinus velutina***Rubiaceae***Cephaelanthus occidentalis***Sapindaceae**



Welcome Max Licher!

[Logout](#)[My Profile](#)[Help](#)[Home](#) >> 31.81002, -110.41428; within 20 miles Key**Taxon:**

All Species

[Display/Reset Species List](#)

Display as: Scientific Name

31.81002, -110.41428; within 20 miles

Species Count: 5

**Plant****habit**

- shrub
- tree

**Leaves****type**

- compound
- compound type

- once-pinnately compound

- trifoliolate (w/ 3 leaflets)

**arrangement**

- opposite

**Inflorescence****position**

- axillary

- terminal

**type**

- raceme

- umbel

- panicle

**Adoxaceae***Sambucus nigra***Bignoniaceae***Tecoma stans***Oleaceae***Fraxinus gooddingii**Fraxinus velutina***Sapindaceae***Acer negundo*



## Acer negundo L.

Go to [Encyclopedia of Life...](#)

Family: Sapindaceae

boxelder, more...

[*Negundo aceroides* (L.) Moench, more]



Max Licher

### VPAP Treatment

JANAS 29(1)

**Plant:** tree; to 10 m high, sparsely to densely pubescent on young growth and lower leaf surfaces, usually dioecious; young twigs glabrous to densely pubescent, often more or less glaucous, the epidermis smooth, greenish or reddish, the older twigs more or less rough, gray; buds covered by two reddish, tan, or yellowish valvate scales, these sparsely to densely hairy, the pubescent inner scales greatly elongating as the bud opens **Leaves:** mainly 3-foliate, occasionally 3-lobed, 3.5-13.5 cm long, 3.5-18 cm wide, concolorous, the terminal leaflet up to 11 cm long by 8 cm wide, the lateral leaflets up to 9 cm long by 6 cm wide; apex of leaflets acute to acuminate; base of leaflets rounded to cuneate, sometimes oblique in lateral leaflets, sometimes acuminate in terminal leaflets; petiole 2-7.5 cm long, green or reddish; margin of leaflets coarsely toothed or lobed, the teeth acuminate to obtuse **INFLORESCENCE:** inflorescences many flowered, the staminate umbel-like, the pistillate racemose **Flowers:** ca. 5 mm long, less than 1 mm wide at base of perianth, the perianth greenish-yellow, with ca. 4 subelliptic segments ca. 0.2-2 mm long, the receptacle blending with filiform pedicel; pedicels 1-4 cm long **Fruit:** samaras 2.3-3.6 cm long, the wing 0.7-1.4 cm wide, the infructescences up to 15 cm long **Misc:** Riparian habitats and other wet wooded areas; 900-2750 m (3000-9100



Max Licher



Max Licher



Max Licher



Max Licher



Map data ©2012 Google. All rights reserved. Open Interactive Map

# Specimen Centric Model

- Baseline data
- Expert reviewed vouchers
- Verifiable
- Proof of occurrence
- Reproducible
- Millions of occurrence records



# Biodiversity Inventories

- Floras & Fauna
- Graduate Research
- Park Service Inventories
- Surveys
- Voucher supported

The screenshot shows the SEINet website interface. At the top, there is a green header bar with the text "Welcome Edward Gilbert!" on the left and "Southwest Environmental Information Network" on the right. Below the header, there are two links: "Logout" and "My Profile". The main content area has a title "Welcome to SEINet" and a brief description: "The Southwest Environmental Information Network resources of interest to the environmental research interface, we offer tools to locate, access and work". To the right of the content area, there is a sidebar with a red circle highlighting the "Flora Projects" section. The sidebar also includes sections for "Dynamic Floras" and "Sitemap".

Welcome Edward Gilbert!

Logout My Profile

Southwest Environmental Information Network

Welcome to SEINet

The Southwest Environmental Information Network resources of interest to the environmental research interface, we offer tools to locate, access and work

SEINet is more than just a web site - it is a suite of departments, museums and agencies that provide information and services within the Arizona State University, SEINet is growing.

To learn more about the features and capabilities available through this site, read Making Good Use Of SEINet or visit the Symbiota Help Pages. Join SEINet as a regular visitor and please send your feedback to [seinetAdmin@asu.edu](mailto:seinetAdmin@asu.edu)

**Flora Projects**

- Arizona Flora
- MABA Flora
- New Mexico Flora
- Sonoran Desert Flora

**Dynamic Floras**

- Dynamic Checklist
- Dynamic Key

Sitemap

[Logout](#)[My Profile](#)[Help](#)**SEINet Home**[Search Collections](#)[Image Library](#)[Games](#)[Links](#)**Flora Projects**[Arizona Flora](#)[MABA Flora](#)[New Mexico Flora](#)[Sonoran Desert Flora](#)**Dynamic Floras**[Dynamic Checklist](#)[Dynamic Key](#)[Sitemap](#)

## Arizona Flora



**Project Managers:** Arizona State University Vascular Plant Herbarium

Arizona is the third or fourth most floristically rich state in the US with perhaps as many as 3900 species of vascular plants. Over the last 60 years an average of ca. 12 new species records have been reported annually.

### Research Checklists



- [Arizona](#)
- [Arizona Spring Flora](#)
- [ASU Arboretum - Gold Trail](#)
- [ASU Arboretum - Maroon Trail](#)
- [Buckeye Hills Recreational Area](#)
- [Camp Creek](#)
- [Canyon de Chelly National Monument](#)
- [Casa Grande Ruins National Monument](#)
- [Castle Dome Mountains](#)
- [Chiricahua National Monument](#)
- [Eagletail Mountains Wilderness](#)
- [Escudilla Mountains](#)
- [Fort Bowie National Historic Site](#)
- [Grand Canyon National Park](#)
- [GreenLots - Tucson](#)
- [Hart Prairie](#)
- [Hassayampa River Preserve](#)
- [Hummingbird Springs Wilderness](#)
- [Lake Pleasant Regional Park](#)
- [Maricopa County, Arizona](#)
- [McDowell Mountains Regional Park](#)
- [Organ Pipe Cactus National Monument](#)
- [Papago Park](#)
- [Phoenix Cultivated Plants](#)
- [Phoenix Flora](#)
- [Pinal Mountains](#)
- [Pinaleno Mountains](#)
- [Saguaro National Park-Rincon Mountain District](#)
- [San Pedro National Riparian Conservation Area](#)
- [San Tan Mountain Semi-Regional Park](#)
- [Santa Catalina Mountains](#)
- [Santa Teresa Mountains](#)

# San Pedro National Riparian Conservation Area

Games

MD Spp.

Authors: Elizabeth Makings

Publication: Makings, E 2006. Flora of the San Pedro Riparian National Conservation Area. Desert Plants Vol. 22(2); 104 pp. Makings, E 2003. Flora of the San Pedro Riparian National Conservation Area, Cochise County, Arizona. M. S. Thesis, Arizona State University, Tempe

[More Details](#)

## Species List

Families: 95

Genera: 359

Species: 618 (species rank)

Total Taxa: 627 (including ssp. and var.)

Page 1 of 2: 1 | 2

### ACANTHACEAE

- Anisacanthus thurberi*
- Carlowrightia arizonica*
- Carlowrightia linearifolia*
- Carlowrightia texana*
- Elytraria imbricata*
- Ruellia nudiflora*

### AGAVACEAE

- Agave palmeri*
- Yucca sp.*
- Yucca elata*

### AIZOACEAE

- Trianthema portulacastrum*

### AMARANTHACEAE

- Alternanthera caracasana*
- Alternanthera pungens*
- Amaranthus albus*
- Amaranthus fimbriatus*
- Amaranthus palmeri*
- Euphorbia corollata*

### Options

Search:

Common Names  Synonyms

Filter: Original Checklist

- Common Names
- Display as Images
- Notes & Vouchers
- Taxon Authors

[Rebuild List](#)

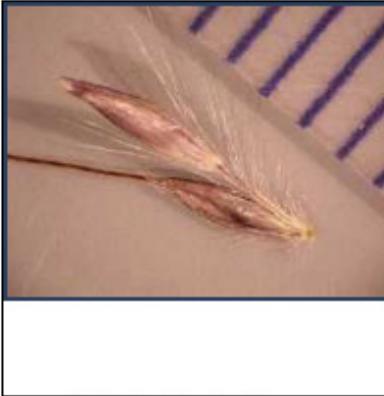




*Avena fatua*



*Bothriochloa barbinodis*



*Bothriochloa ischaemum*



*Bothriochloa laguroides ssp.  
torreyana*



*Bouteloua barbata*



*Bouteloua chondrosioides*



*Bouteloua curtipendula*



*Bouteloua eludens*



*Bouteloua eriopoda*

# San Pedro National Riparian Conservation Area

[Games](#)[MD](#) [Spp.](#)**Authors:** Elizabeth Makings**Publication:** Makings, E 2006. Flora of the San Pedro Riparian National Conservation Area. Desert Plants Vol. 22(2); 104 pp. Makings, E 2003.

Flora of the San Pedro Riparian National Conservation Area, Cochise County, Arizona. M. S. Thesis, Arizona State University, Tempe

[More Details](#)

## Species List

**Families:** 1**Genera:** 45**Species:** 100 (species rank)**Total Taxa:** 105 (including ssp. and var.)

### POACEAE

***Achnatherum eminens***

Elizabeth Makings (1538)

***Andropogon glomeratus***

rare; Elizabeth Makings (827) , Elizabeth Makings (1682)

***Aristida adscensionis***

Elizabeth Makings (824) , Elizabeth Makings (594) , Elizabeth Makings (762) , Elizabeth Makings (1300)

***Aristida purpurea var. longisetia***

Elizabeth Makings (865) , Elizabeth Makings (1513)

***Aristida purpurea var. nealleyi***

Elizabeth Makings (803) , Elizabeth Makings (1075) , Elizabeth Makings (1366)

***Aristida ternipes***

Elizabeth Makings (503)

***Aristida ternipes var. gentilis***

Elizabeth Makings (685) , Elizabeth Makings (492) , Elizabeth Makings (688) , Elizabeth Makings (488)

***Aristida ternipes var. ternipes***

Elizabeth Makings (1214) , Elizabeth Makings (1330)

***Arundo donax***

Elizabeth Makings (1650) , Elizabeth Makings (813)

***Avena fatua***

Elizabeth Makings (229)

***Bothriochloa barbinodis***

Elizabeth Makings (512) , Elizabeth Makings (1040) , Elizabeth Makings (472)

***Bothriochloa ischaemum***

Elizabeth Makings (1272) , Elizabeth Makings (1659)

***Bothriochloa laguroides ssp. torreyana***

Elizabeth Makings (822) , Elizabeth Makings (1024) , Elizabeth Makings (1048) , Elizabeth Makings (423)

***Bouteloua barbata***

Elizabeth Makings (1385) , Elizabeth Makings (599) , Elizabeth Makings (646)

***Bouteloua chondrosioides*****Options****Search:** Poaceae Common Names  Synonyms**Filter:** Original Checklist Common Names Display as Images Notes & Vouchers Taxon Authors**Rebuild List**



ASU

# Arizona State University Vascular Plant Herbarium

**Family:** Poaceae

**Accession #:** 247202

**Taxon:** *Aristida adscensionis* L.

**Collector:** Elizabeth Makings (#762)

**Date Collected:** 07 September 2001

**Habitat:** alluvial terrace, old agricultural field with scattered sacaton

**Associated Species:** *Sporobolus wrightii*, *Solanum eleagnifolium*, *Machaeranthera gracilis*,  
*annuals Conyza coulteri*, *Chloris virgata*, *Xanthocephalum gymnospermoides*

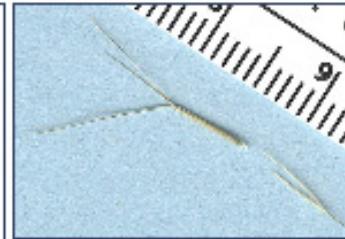
**Description:** Common annual 60 cm

**Locality:** USA; Arizona; Cochise County

Upper San Pedro River floodplain, "Cottonwood" site, approx 1 mile south of Hwy 90, ~100m west  
of San Pedro

31.8456993 -110.2279968

**Elevation:** 1239m.



# Voucher Administration

Welcome Edward Gilbert!

[Logout](#) [My Profile](#) [Help](#)

[Home](#) >> [Return to Checklist](#) >> [Checklist Administrator](#)

## San Pedro Riparian National Conservation Area

Search statement: (o.county LIKE "%Cochise%") AND (o.locality LIKE "%San Pedro%")

[Non-Voucherized Taxa](#) [Missing Taxa](#) [Voucher Conflicts](#) [Children Vouchers](#) [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: 21

| Checklist ID           | Collector                | Specimen ID          | Identified By             |
|------------------------|--------------------------|----------------------|---------------------------|
| Abutilon palmeri       | Elizabeth Makings (1331) | Abutilon abutiloides | C. J. S. Davis (Dec 2011) |
| Abutilon palmeri       | Elizabeth Makings (1277) | Abutilon abutiloides | C. J. S. Davis (Dec 2011) |
| Abutilon palmeri       | Elizabeth Makings (1317) | Abutilon abutiloides | C. J. S. Davis (Dec 2011) |
| Chamaesyce stictospora | Elizabeth Makings (1404) | Chamaesyce prostrata | Liz Makings (June 2012)   |
| Cyperus odoratus       | Elizabeth Makings (569)  | Cyperus esculentus   | Liz Makings               |
| Eleocharis parishii    | Elizabeth Makinos (1049) | Eleocharis palustris | Liz Makinos               |

# “My Profile”

Welcome Max Licher!

Logout My Profile Help

SEINet Home Search Collections Image Library Plant Games Links

Flora Projects Arizona Colorado Plateau New Mexico Intermountain NPS Flora USFWS Flora MABA Flora Sonoran Desert Teaching Checklists

Dynamic Floras Dynamic Checklist Dynamic Key

Sitemap

Species Checklists Specimen Management Edit Profile

Management

Checklists

- Sedona/Oak Creek Canyon
- Tent Rocks/Cottonwood Basin area
- Hart Prairie
- San Francisco Peaks
- Verde Valley Botanical Area

Inventory Project Administration

- Arizona Flora
- Colorado Plateau
- Plant Atlas of Arizona Projects (PAPAZ)
- Arizona Native Plant Society Checklists

Create a New Checklist

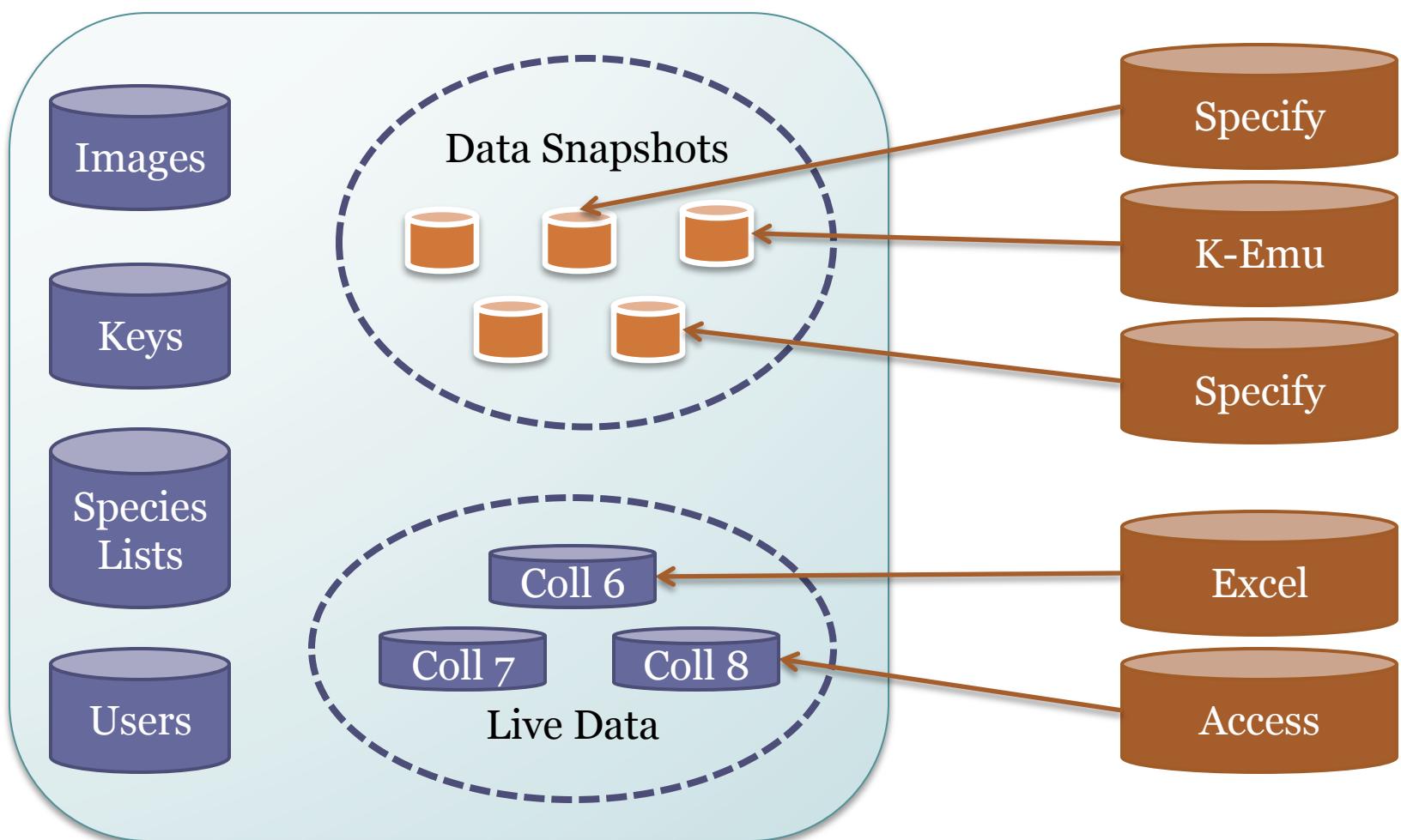
Checklist Name:

Authors:

Locality:

SEINet Southwest Environmental Information Network

# Specimen Management



# Symbiota - Biodiversity CMS

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

The screenshot shows a detailed view of the Symbiota Biodiversity CMS Occurrence Data entry form. The interface is organized into several sections:

- Occurrence Data**: A tab at the top.
- Collector Info**: Fields for Catalog Number (1281888), Occurrence ID, Collector (highlighted in yellow), Number, Date, and Duplicates.
- Associated Collectors**: A section for Other Catalog Numbers.
- Latest Identification**: Fields for Scientific Name, Author, ID Qualifier, Family, Identified By, and Date Identified.
- Locality**: Fields for Country, State/Province, County, Municipality, and Locality (highlighted in yellow).
- Locality Security**: Fields for Latitude, Longitude, Uncertainty, Datum, Elevation in Meters, and Verbatim Elevation.
- Misc**: Fields for Habitat, Associated Taxa, Description, and Notes.
- Curation**: Fields for Type Status, Disposition, Reproductive Condition, Establishment Means, Owner Code, Basis of Record (Preserved Specimen), Language, and Cultivated checkbox.
- Other**: A final section at the bottom.

# Data Entry from Label Images

Texas Tech University - Invertebrate Zoology (TTU:TTU-Z)

[Home](#) >> [Collection Management](#) >> [Editor](#)

Occurrence Data   Determination History   Images   Admin

|< |<< | 1 of 20650 | >> |>>|

Collector Info

Catalog Number ? Accession # ? Collector ?   Number ? Date ?    Dupes?  Auto search

Associated Collectors ?

Latest Identification

Scientific Name: ? Author: ?

ID Qualifier: ? Family: ?

Identified By: ? Date Identified: ?

Locality

Country   State/Province   County   Municipality

Locality:

Locality Security

Latitude   Longitude   Uncertainty ?   Datum ?   Elevation in Meters   Verbatim Elevation

Misc

Habitat:   
Substrate:   
Associated Taxa:   
Description:   
Notes:

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

Label Processing

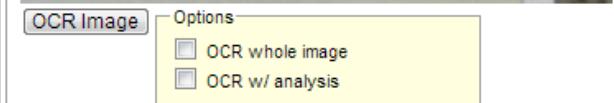
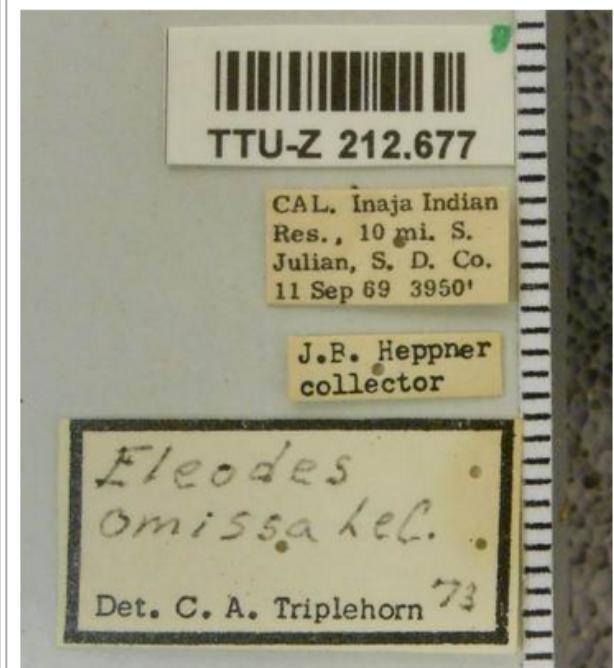


Image 1 of 1

# Data Entry: OCR

Occurrence Data   Determination History   Images   Admin

**Collector Info**

Catalog Number ? Occurrence ID ? Collector Number Date Dups  
1281888

Associated Collectors Other Catalog Numbers ?

**Latest Identification**

Scientific Name: Author:

IDQualifier? Family?

Identified By: Date Identified:

**Locality**

County State/Province County Municipality

Locality

Locality Security

Latitude Longitude Uncertainty ? Datum ? Elevation in Meters Verbatim Elevation  
     ft.

**Misc**

Habitat

Associated Taxa:

Description:

Notes:

**Curation**

Type Status: ? Disposition: ?

Reproductive Condition: ? Establishment Means: ?

Owner Code: ? Basis of Record: ? Preserved Specimen Language

**Label Processing**

Lichens of New York  
Ex Lichen Herbarium of James C. Lendemer (b. Lendemer)  
**Duplicate**  
Dictyocatenulata alba Finley & Morris  
Det. James C. Lendemer - September 29, 2004

UNITED STATES OF AMERICA, NEW YORK, ESSEX COUNTY: On the base of a small maple (*Acer*), in a mixed hardwood forest (*Acer*, *Juglans*, *Betula*) with a small maple (*Acer rubrum*) swamp, low portions of drainage for Holcomb Pond into Ausable River, along NY Route #21 - elev. 500 ft. - UTM 18 58523N 4904273N - Lat. 44° 17' 42" N. Long. 73° 55' 54" W - Assoc. spp.: *Phlyctis* sp., *sterile sorediate crustose* spp., *Graphis scripta*, *Rhinella* sp.  
Thallus corticolous, crustose, thick, gray, saccate, salient, tan; "capitulum" white; conidia globose to subglobose, multicellular, colorless, 10µm x 6-10µm.

Collection data: James C. Lendemer et al. #3025  
w/ participants of 2004 A. Leroy Andrews Foray  
September 18, 2004 - 18 September 2004 - 18 IX 2004

**OCR Image** Image 2 of 2 →  
Lichens of New York  
Ex Lichen Herbarium of James C. Lendemer (b. Lendemer)  
**Duplicate**  
Dictyocatenulata alba Finley & Morris  
Det. James C. Lendemer - September 29, 2004  
UNITED STATES OF AMERICA, NEW YORK, ESSEX COUNTY: On the base of a small maple (*Acer*), in a mixed hardwood forest (*Acer*, *Juglans*, *Betula*) with a small maple (*Acer rubrum*) swamp, low portions of drainage for Holcomb Pond into Ausable River, along NY Route #21 - elev. 500 ft. - UTM 18 58523N 4904273N - Lat. 44° 17' 42" N. Long. 73° 55' 54" W - Assoc. spp.: *Phlyctis* sp., *sterile sorediate crustose* spp.

# Crowdsouce Data Entry

New York Botanical Garden (NY)

[Home](#) >> [Crowd Sourcing Central](#) >> [Editor](#)

🔍 | ← | ← | 7 of 419 | → | →

Occurrence Data

Long Form 🔍

|   |   |                                  |  |
|---|---|----------------------------------|--|
| Collector ?                                 | Number ?  | Date ?                           | Dupes?   |
| <input type="text"/>                        | <input type="text"/>                                  | <input type="text"/>             | <input type="checkbox"/> Auto search   |
| Associated Collectors ?                     | Verbatim Date ?                                       |                                  |  |
| <input type="text"/>                        | <input type="text"/>                                  |                                  |  |
| Exsiccati Title                             | Number  |                                  |  |
| <input type="text"/>                        |   | <input type="button" value="▼"/> | <input type="text"/>   |
| Scientific Name ?                           |   |                                  |  |
| <input type="text"/> Nephroma bellum        |   |                                  |  |
| Country                                     | State/Province  | County                           |  |
| <input type="text"/>                        | <input type="text"/>                                  | <input type="text"/>             |  |
| Locality                                    |   |                                  |  |
| <input type="text"/>                        |   |                                  |  |
| Latitude                                    | Longitude   | Uncertainty ?                    | Verbatim Coordinates   |
| <input type="text"/>                        | <input type="text"/>                                  | <input type="text"/>             | <input type="button" value="Tools"/> <input type="button" value="🔍"/> <input type="button" value="↔"/> |
| Elevation in Meters                         | Verbatim Elevation                                    |                                  |  |
| <input type="text"/> - <input type="text"/> | <input type="button" value="↔"/> <input type="text"/> |                                  |  |
| Habitat                                     |   |                                  |  |
| <input type="text"/>                        |   |                                  |  |
| Substrate                                   |   |                                  |  |
| <input type="text"/>                        |   |                                  |  |
| Notes                                       |   |                                  |  |

## Label Processing

THE HARRIMAN ALASKA EXPEDITION.  
PLANTS OF YAKUTAT BAY  
COLLECTED BY WM. TRELEASE AND DE ALTON SAUNDE

*Nephroma lartzesianum*

No. 1072. Collector D.

June 22

OCR Image Options

OCR whole image  
 OCR w/ analysis

Image

THE HARRIMAN ALASKA EXPEDITION.  
Plants of Yakutat Bay Collected by Wm. Trelease  
and De Alton Saunders.  
Collector & f  
June 1899.  
Nephroma bellum (Spreng.) Tuck.  
Lichen substances extracted:  
Det. C. M. Wetmore, 1958, no. ^  
The Lichen Genus Nephroma in North and Middle America.

# Plant Atlas of Arizona Project

- Arizona Native Plant Society
- Grand Canyon Trust
- Desert Botanical Garden
- U.S. Forest Service
- Northern Arizona University
- Museum of Northern Arizona



# My Profile

Welcome Max Licher!

Logout My Profile Help

SEINet Home Search Collections Image Library Plant Games Links

Flora Projects Arizona Colorado Plateau New Mexico Intermountain NPS Flora USFWS Flora MABA Flora Sonoran Desert Teaching Checklists

Dynamic Floras Dynamic Checklist Dynamic Key

Sitemap

Southwest Environmental Information Network

SEINet 

**Management**

**Checklists**

- Sedona/Oak Creek Canyon  
- Tent Rocks/Cottonwood Basin area  
- Hart Prairie  
- San Francisco Peaks  
- Verde Valley Botanical Area  

**Inventory Project Administration**

- Arizona Flora 
- Colorado Plateau 
- Plant Atlas of Arizona Projects (PAPAZ)  
- Arizona Native Plant Society Checklists 

**Create a New Checklist**

Checklist Name:

Authors:

Locality:

Species Checklists Specimen Management Edit Profile

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

Latest Identification

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

Locality

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

Misc

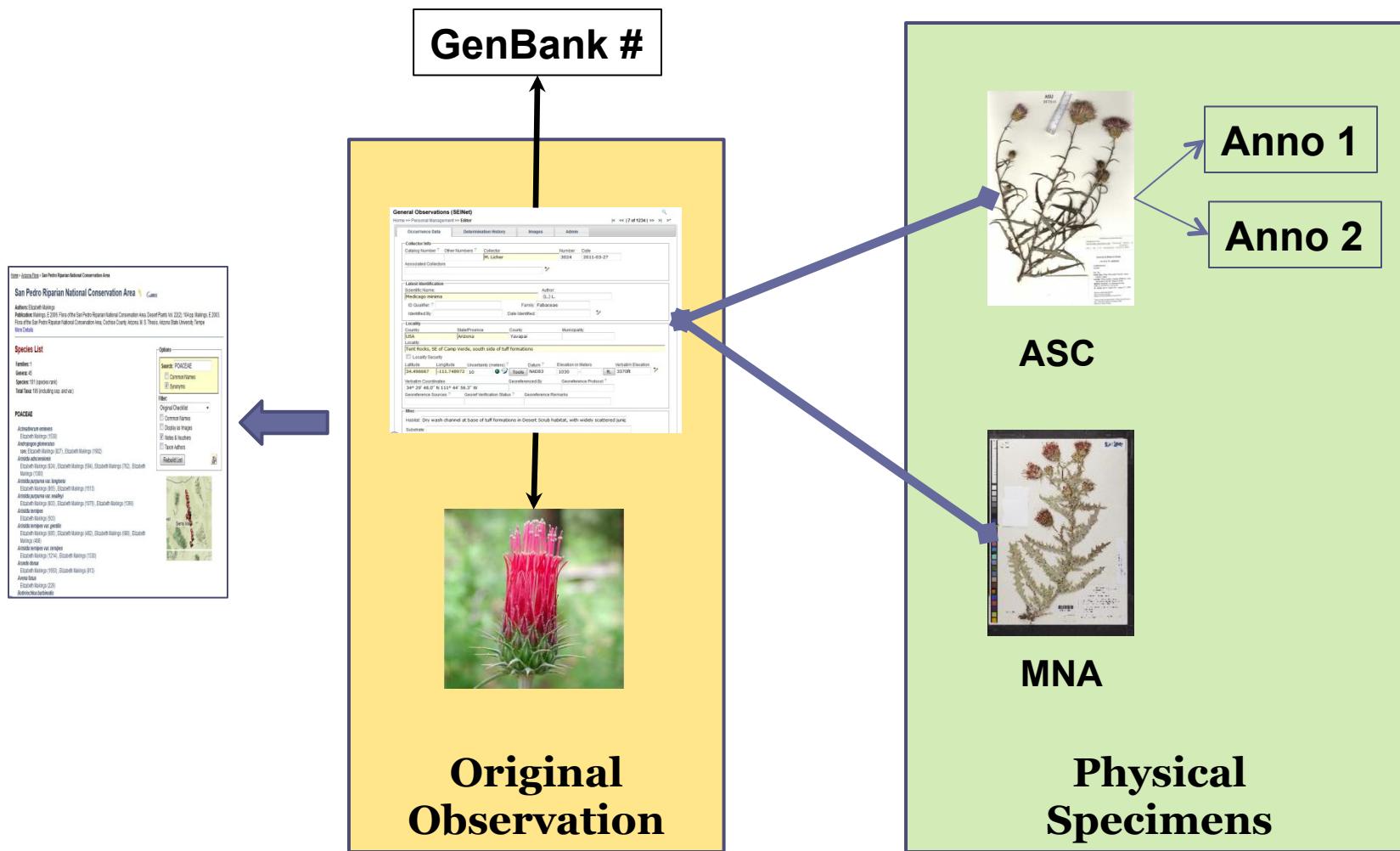
Habitat: Dry wash channel at base of tuff formations in Desert Scrub habitat, with widely scattered juniper.

Substrate:

| Plants of Arizona  | Plants of Arizona  |
|--|--|
| <i>Castilleja exilis</i> A. Nels.<br>Scrophulariaceae<br>USA, Arizona, Yavapai County, Mesquite Spring, Cottonwood Basin SE of Camp Verde.<br>34° 29' 02.5" N 111° 46' 16.7" W [NAD83]<br>Elev. 930m. (3040ft)<br>Damp bank at spring location, N facing slope. Riparian zone in desert scrub habitat.<br>Annual herb, 45 to 85 cm, green bracts with red tips; infrequent.<br>Associated species: <i>Solidago altissima</i> , <i>Dalea candida</i> , <i>Epipactis gigantea</i> , <i>Schoenoplectus americanus</i> , <i>Toxicodendron rydbergii</i> , <i>Mimulus cardinalis</i> , <i>Salix laevigata</i> , <i>Fraxinus velutina</i> , <i>Salix gooddingii</i> , <i>Andropogon glomeratus</i> | <i>Castilleja exilis</i> A. Nels.<br>Scrophulariaceae<br>USA, Arizona, Yavapai County, Mesquite Spring, Cottonwood Basin SE of Camp Verde.<br>34° 29' 02.5" N 111° 46' 16.7" W [NAD83]<br>Elev. 930m. (3040ft)<br>Damp bank at spring location, N facing slope. Riparian zone in desert scrub habitat.<br>Annual herb, 45 to 85 cm, green bracts with red tips; infrequent.<br>Associated species: <i>Solidago altissima</i> , <i>Dalea candida</i> , <i>Epipactis gigantea</i> , <i>Schoenoplectus americanus</i> , <i>Toxicodendron rydbergii</i> , <i>Mimulus cardinalis</i> , <i>Salix laevigata</i> , <i>Fraxinus velutina</i> , <i>Salix gooddingii</i> , <i>Andropogon glomeratus</i> |
| M. Licher 2792<br>16 July 2010<br>Northern Arizona University Herbarium  | M. Licher 2792<br>16 July 2010<br>Northern Arizona University Herbarium  |

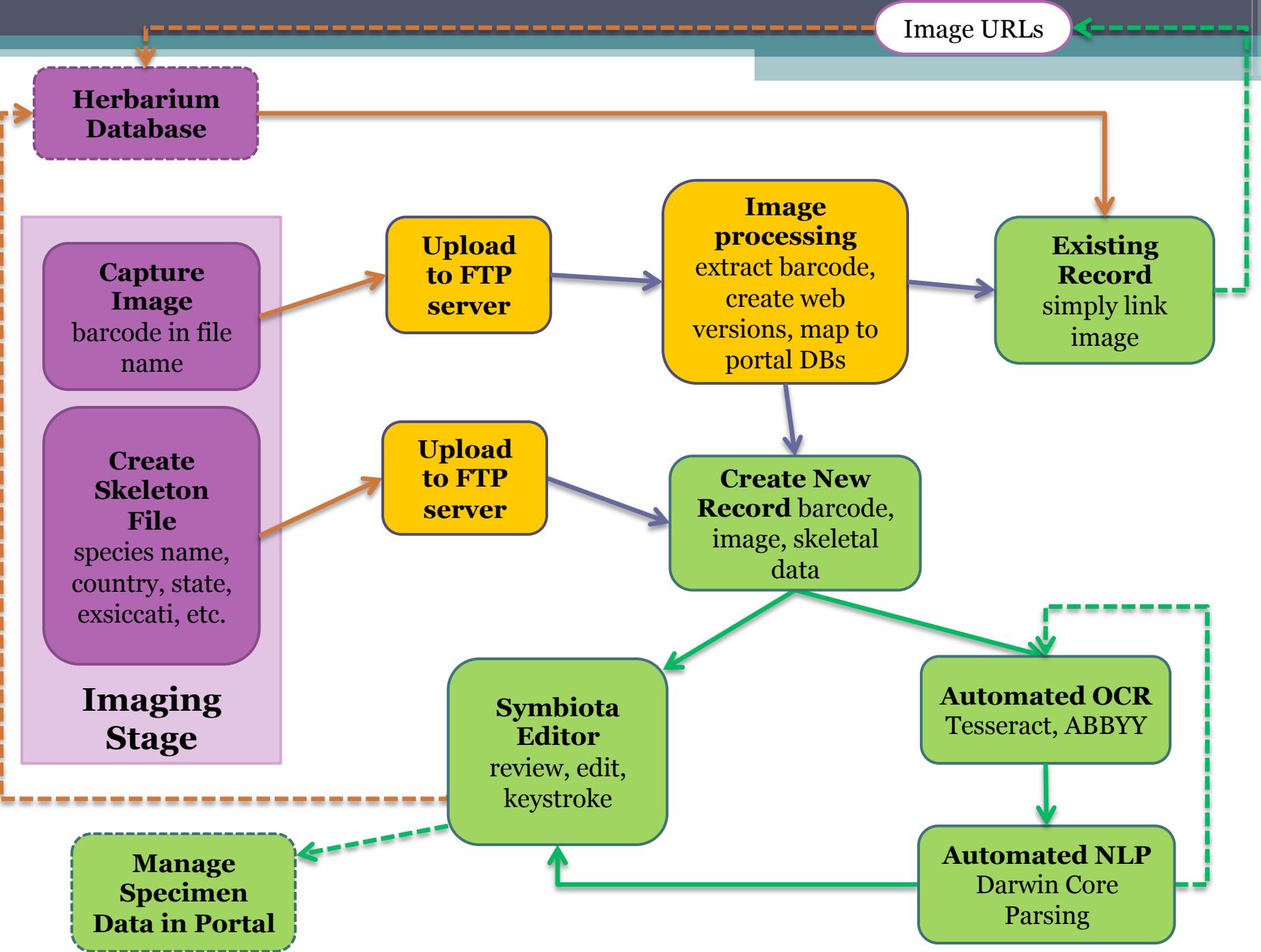
| Plants of Arizona  | Plants of Arizona  |
|--|--|
| <i>Castilleja exilis</i> A. Nels.<br>Scrophulariaceae<br>USA, Arizona, Yavapai County, Mesquite Spring, Cottonwood Basin SE of Camp Verde.<br>34° 29' 02.5" N 111° 46' 16.7" W [NAD83]<br>Elev. 930m. (3040ft)<br>Damp bank at spring location, N facing slope. Riparian zone in desert scrub habitat. | <i>Eragrostis ciliaris</i> (All.) Vign. ex Janchen<br>Poaceae<br>USA, Arizona, Yavapai County, Confluence of Mesquite and Cottonwood Springs, Cottonwood Basin SE of Camp Verde.<br>34° 28' 59.2" N 111° 46' 22.1" W [NAD83]<br>Elev. 920m. (3010ft)<br>Sandy riparian creek bed without surface water in desert |

# Voucher Network



# Current and Future Developments

- Filtered-Push network
- Specify data flows
- GeoLocate
- SALIX integration
- Mobile Apps
  - Portable Field Guides



# Acknowledgments

- National Science Foundation
- Herbaria!!!
- Arizona State University
- University of Arizona
- Utah State University
- Harvard University
- Global Institute of Sustainability
- Sky Island Alliance
- National Park Service
- M. Licher, E. Makings, R. Lindley, A. Mendoza, B. Brandt, and so many more



National Science Foundation  
WHERE DISCOVERIES BEGIN

**ASU** SCHOOL OF  
Life Sciences  
ARIZONA STATE UNIVERSITY