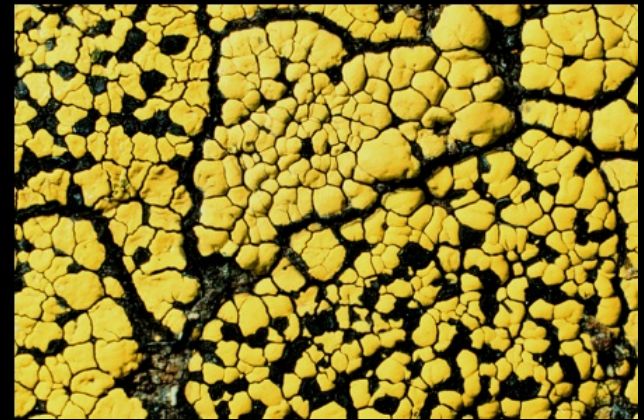


Edward Gilbert
Robert Anglin
Steven Gottschalk
Daryl Lafferty
Nico Franz
Corinna Gries
Leslie Landrum
Barbara Thiers



Specimen label digitization using OCR/NLP tools integrated within the Symbiota processing toolkit



National Science Foundation
WHERE DISCOVERIES BEGIN

Symbiota Software Project

- Open source
- Virtual flora/fauna
- Specimen search engine
- Biodiversity inventories
- Identification keys
- Images, maps, descriptions, common names, etc

SCANS

Southwest Collections of Arthropods Network

Eusepeus longisetis Champion, 1905

Go to [Eusepeus of Life](#)

Family: Curculionidae

Michael Jansen

Description

Oblong-ovate, black, the reddish-brown shades, a limit of the very large of the prothorax closely, the latter long and erect punctate, the eyes wide. Prothorax convex, a little the sides, bisinuate at wider than the prothorax obtuse; senate-punctate sparsely punctate, 6 mm. Habiat: Panama, B. E. porcellus, but with m punctures rather fine.

Map data ©2012

Intermountain Herbarium

Agoseris aurantiaca (Hook.) Greene

Family: Asteraceae
orange agoseris

Cirsium arvense
 Cirsium arvense var. *arvense*
 Cirsium arvense var. *apiculatum*

Flora of North America

Latitude decimal: eg -34.57
Longitude decimal: eg -112.38
[Enter in D.M.S. format](#)

[Garry I. Baird in Flora of North America \(vol. 19, 20 and 21\)](#)

Max Locher

Stems 0. Leaves erect to decumbent; petioles purplish, petiole margins ciliate to hairy; blades 7-18 cm, linear-lanceolate to oblanceolate, margins entire or (scarcely) pinnatifid, lobes 2-4 pairs, linear to lanceolate, spreading to antrorse, lobules usually inconspicuous to subequalling lobes, rarely lacking, faces glabrous and ± glaucous or sparsely villous. Peduncles ± elongating after flowering, 8-40(-80) cm, glabrate, or apically villous to lanate, eglandular. **Invloresces** cylindric to obconic or campanulate, 2-5.3 cm at maturity. **Phyllotaxis** in 2-3 series, green or medially rosy purple, often with purple-black spots, bracteate, and/or midribbed, or nearly all black, subequal to unequal, margins ciliate, faces glabrous or villous, eglandular, outer mostly spreading, adaxially glabrous or villous, inner erect, elongating after flowering. **Receptacles** epaulete. **Florets** 15-100, corollas usually orange, sometimes yellow; pink, red, purple, or white, tubes 4-17-9 mm, ligules 4-12 × 1-3 mm; anthers 2-5 mm. **Cypselae** ± dimorphic, 8-18 mm, bodies cylindric to fusiform or obconic, 6-6(-11) mm, abruptly or gradually tapered to slender beaks (2-5-10 mm, lengths mostly equalling bodies), ribs strongly ridged, straight, glabrous or scabrous; **pappi** in 2-3 series, 9-15 mm. **2n** = 18, 36.

Patrick Alexander

Max Locher

Patrick Alexander

Patrick Alexander

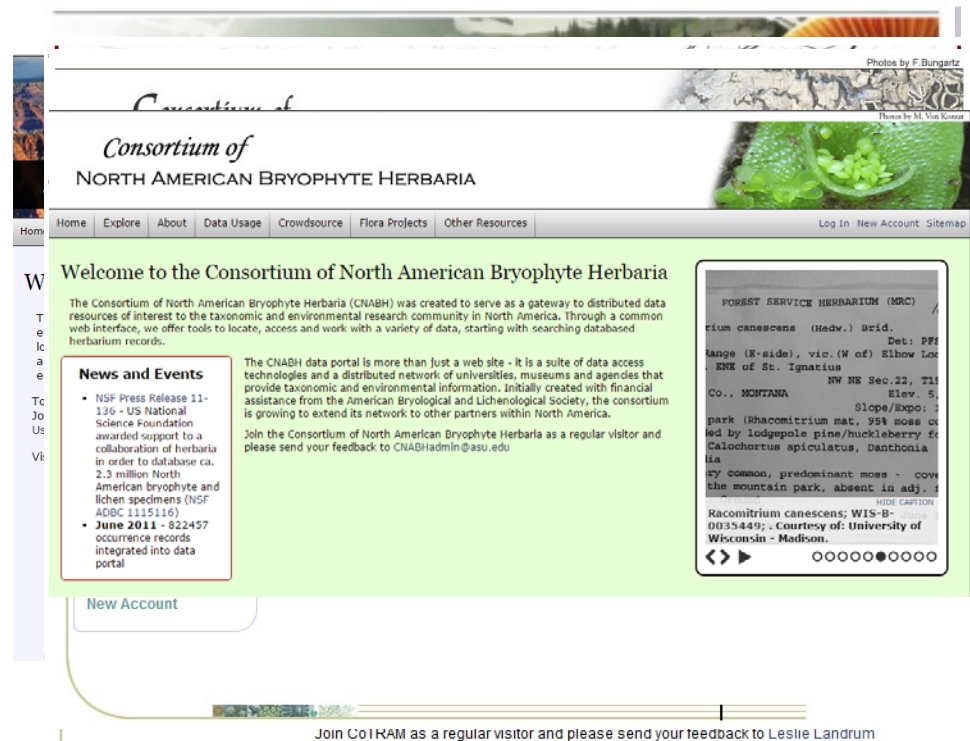
Specimen Centric Model

- Backbone of Floristic Research
- Baseline data
- Proof of Occurrence
- Expert Reviewed
- Verifiable
- Millions occurrence records



Scientific Community Portals

- Community portals
- Distinct datasets
 - Taxonomic scope
 - Geographic scope
- Custom look & feel
 - CSS
 - configuration files



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 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 2002-08-20. The record includes fields for Catalog Number (DES00052061), Other Numbers (1744-B), Collector (Dixie Z. Damrel), Number (1744-B), Date (2002-08-20), Associated Collectors (P. Boness), Verbatim Date (20 August 2002), Scientific Name (Heterotheca subaxillaris), Author (Lam.) Britt. & Rusby, ID Qualifier, Family (Asteraceae), Date Identified, Locality (United States, Arizona, Gila), and a detailed description of the specimen's habitat and collection site. The interface also shows a 'Misc' section with associated taxa and a 'Description' field.

Home >> Collection Management >> Editor |< << | 1 of 996 | >> >|

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

Collector Info

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

Associated Collectors ? Verbatim Date ?

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 ? Verbatim Coordinates

Elevation in Meters Verbatim Elevation

Misc

Habitat

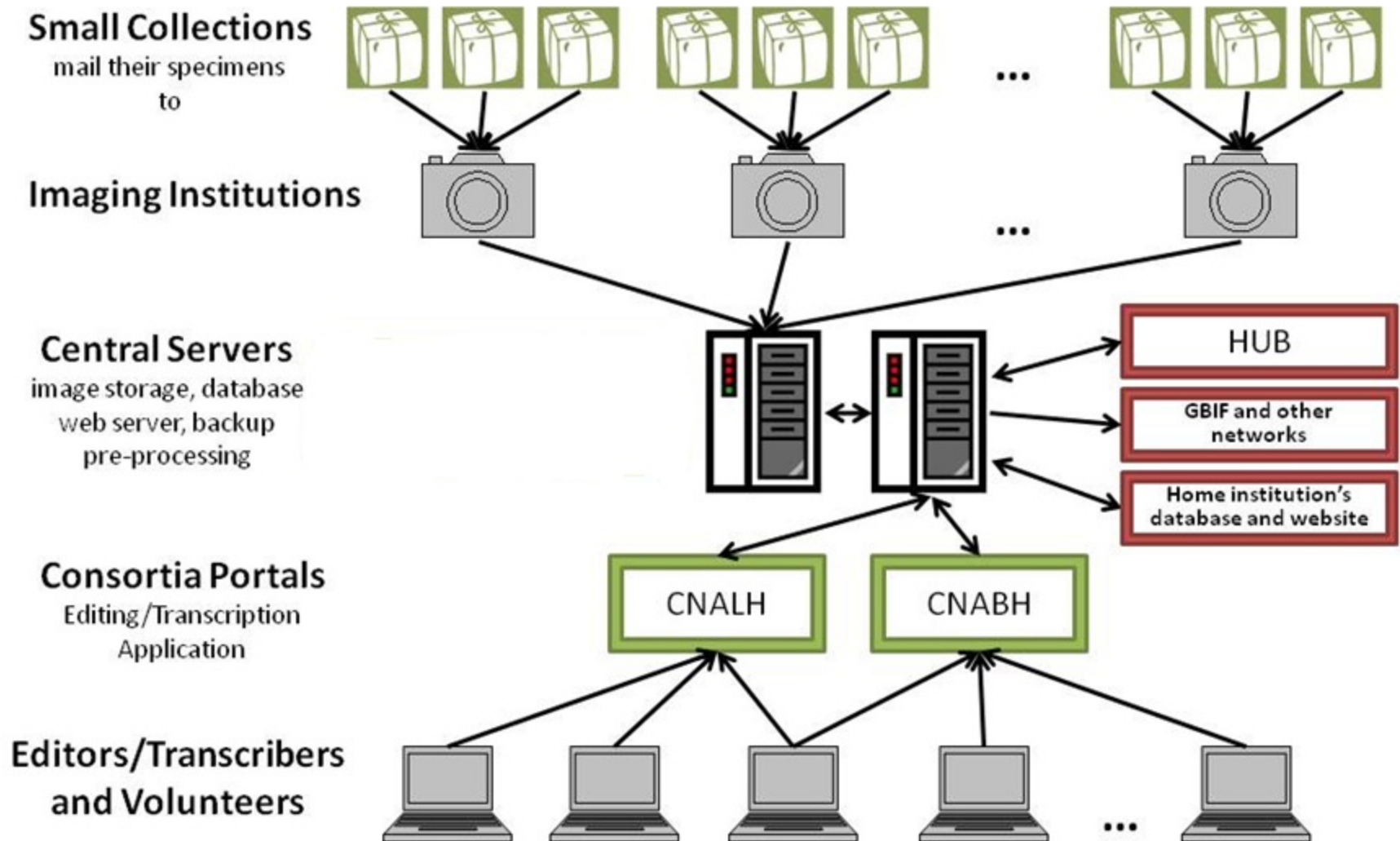
Substrate

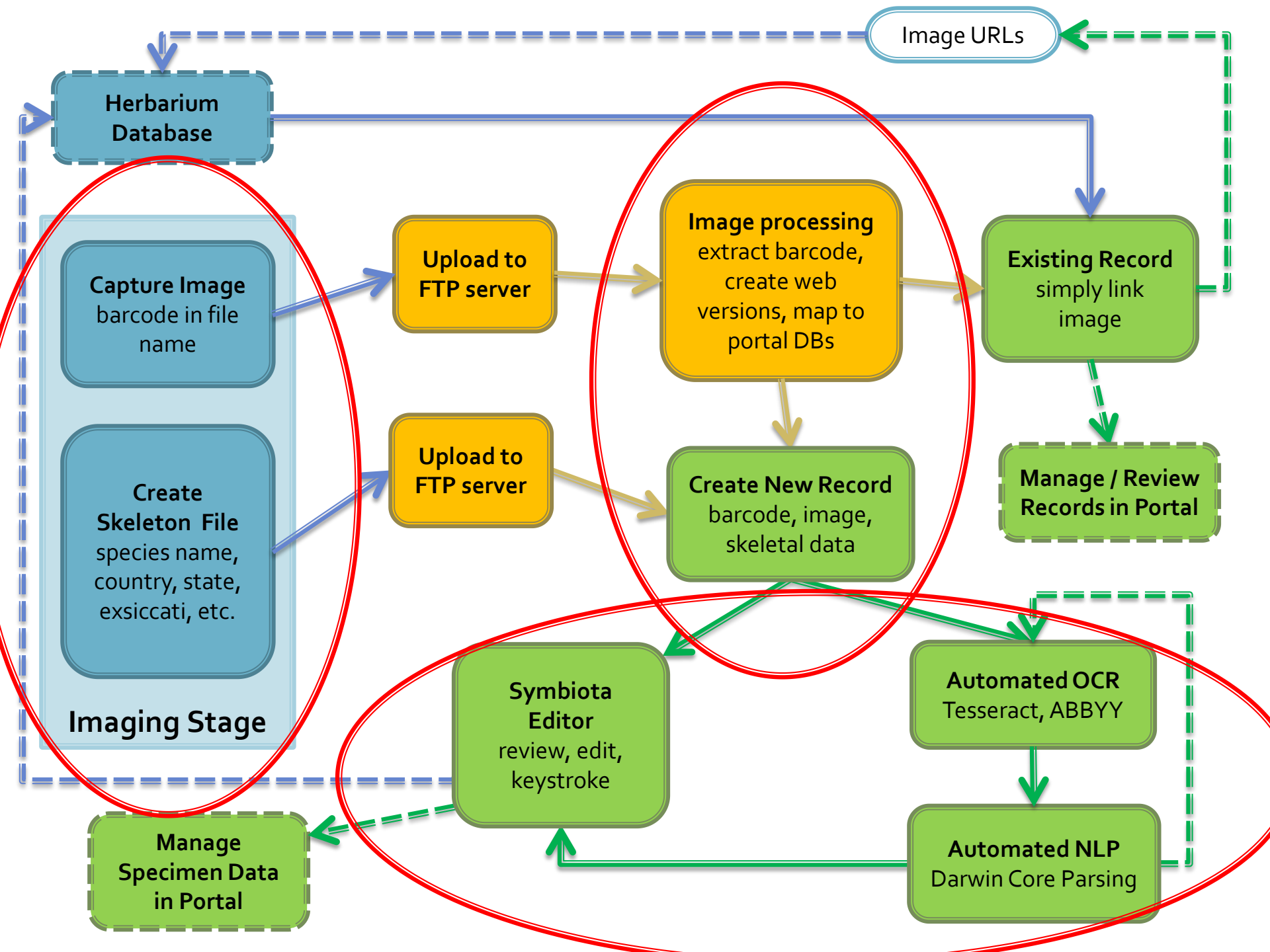
Associated Taxa

Description

Notes

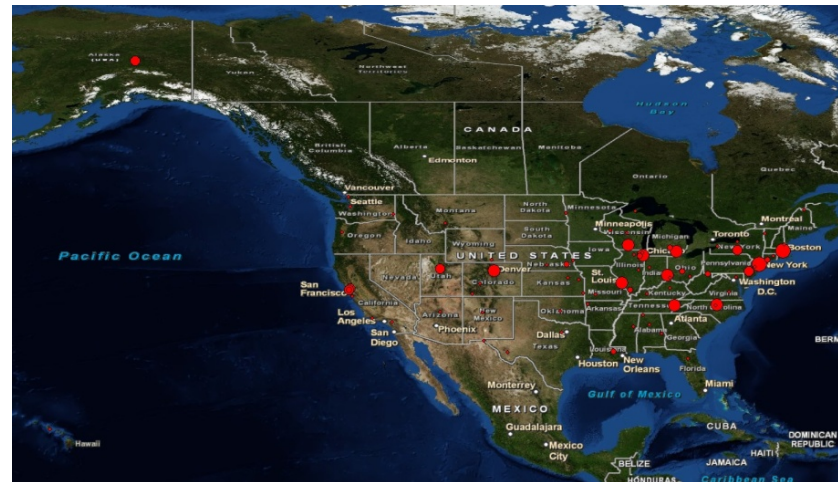
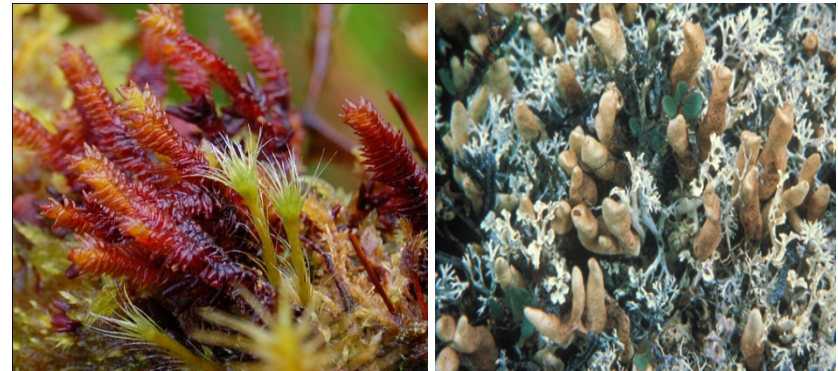
Digitization Workflow





Lichen and Bryophyte Parser

- NSF ADBC (#1115116)
- ~ 2.3 million specimen
 - 90% of all specimens
 - 900,000 lichens
 - 1.4 million bryophytes
- > 60 non-governmental US herbaria (95%)
 - Mexico, US, Canada
- 16 digitization centers



National Portals

- Lichen Consortium
 - <http://lichenportal.org>
 - 73 collections
 - 1.7 million records
 - 338,000 unprocessed
- Bryophyte Consortium
 - <http://bryophyteportal/>
 - 71 collections
 - 2.2 million records
 - 725,000 unprocessed



Consortium of
NORTH AMERICAN LICHEN HERBARIA

Main Menu

- Search Collections
- Image Library
- Flora Projects
 - Arizona
 - California
 - Colorado
 - Florida
 - Massachusetts
 - North Carolina
 - Wisconsin
 - Arctic Flora
 - Southern Subalpine Region
 - USNP Project
- Dynamic Floras

Welcome to the Consortium of North American Lichen Herbaria

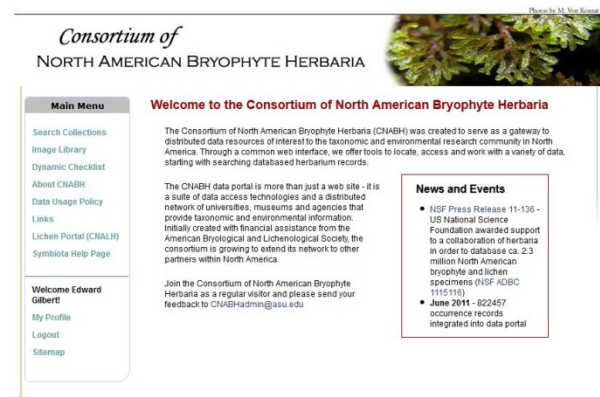
The Consortium of North American Lichen Herbaria (CNALH) was created to serve as a gateway to distributed data resources of interest to the taxonomic and environmental research community in North America. Through a common web interface, we offer tools to locate, access and work with a variety of data, such as keying to species.

The CNALH data portal is more than just a web site - it is a suite of data access technologies and a distributed network of universities, botanical gardens, museums and agencies that provide taxonomic and environmental information. Initially created to integrate databases between Arizona State University and the Santa Barbara Botanical Garden, the consortium is growing to extend its network to other partners within North America.

Join the Consortium of North American Lichen Herbaria as a regular visitor and please send your feedback to CNALHAdmin@asu.edu

News and Events

- **NSF Press Release 11-136** - US National Science Foundation awarded support to a collaboration of herbaria in order to database ca. 2.3 million North American lichen and bryophyte specimens (NSF ACBC 1115116)
- **September 2011** - 543302 occurrence records integrated into data portal supplied by 15 different data providers



Consortium of
NORTH AMERICAN BRYOPHYTE HERBARIA

Main Menu

- Search Collections
- Image Library
- Dynamic Checklist
- About CNABH
- Data Usage Policy
- Links
- Lichen Portal (CNALH)
- Symbiota Help Page

Welcome Edward Gilbert!

- My Profile
- Logout
- Sitemap

Welcome to the Consortium of North American Bryophyte Herbaria

The Consortium of North American Bryophyte Herbaria (CNABH) was created to serve as a gateway to distributed data resources of interest to the taxonomic and environmental research community in North America. Through a common web interface, we offer tools to locate, access and work with a variety of data, starting with searching databased herbarium records.

The CNABH data portal is more than just a web site - it is a suite of data access technologies and a distributed network of universities, museums and agencies that provide taxonomic and environmental information. Initially created with financial assistance from the American Bryological and Lichenological Society, the consortium is growing to extend its network to other partners within North America.

Join the Consortium of North American Bryophyte Herbaria as a regular visitor and please send your feedback to CNABHAdmin@asu.edu

News and Events

- **NSF Press Release 11-136** - US National Science Foundation awarded support to a collaboration of herbaria in order to database ca. 2.3 million North American bryophyte and lichen specimens (NSF ACBC 1115116)
- **June 2011** - 822457 occurrence records integrated into data portal

OCR - Introduction

- Optical Character Recognition
- Convert image of text into actual text
- OCR Engines
 - Tesseract
 - Google, open source, free
 - ABBYY
 - Proprietary, Windows or expensive
- Nightly Batch OCR

PLANTS OF NEW MEXICO
Herbarium of Arizona State University
Parmelia ulophyllodes (Vain.) Sav.
COUNTY Dona Ana
LOCATION Joranada Experimental Station -
New Mexico State University
HABITAT on Juniperus
COLLECTOR T. H. Nash #7914
DET. T. H. N. ELEV. 4400'
DATE 8/27/73

PLANTS OF New Mexico
Herbarium of Arizona State University
Parmelia ulophyllodes (Vain.) Sav.
COUNTY Dona Ana
Location Joranada Experimental Station -
New Mexico State University
Habitat on Juniperus
ELEV. 4400'
Collector T. H. Nash #7914 DATE 8/27/73
Det. T. H. N.

OCR Challenges

- Issues
 - Old fonts
 - Faded labels
 - Form labels
 - Handwritten labels
 - Specialized terms
- Solutions
 - Image treatments
 - OCR tuning
 - Dictionaries
 - Consensus OCR

PLANTS OF NEW MEXICO
Herbarium of Arizona State University
Parmelia ulophyllodes (Vain.) Sav.
COUNTY Dona Ana
LOCATION Joranada Experimental Station -
New Mexico State University
HABITAT on Juniperus
COLLECTOR T. H. Nash #7914
DET. T. H. N.
ELEV. 4400'
DATE 8/27/73

PLANTS OF NEW MEXICO
Herbarium of Arizona State University
Parmelia ulophyllodes (Vain.) Sav.
COUNTY Dona Ana
Joranada Experimental Station -
New Mexico State University
"on Juniperus
ELEV. 4400
DATE
T. H. Nash #7914 8/27/73

À»..\"-1

æ

TM

NLP Introduction

- Natural Language Processing
- Parse OCR text into target fields
- Augment / repair
 - OCR errors
 - Misspellings
 - Data type conversions

PLANTS OF New Mexico
Herbarium of Arizona State University
Parmelia ulophyllodes (Vain.) Sav.
COUNTY Dona Ana
Location Joranada Experimental Station -
New Mexico State University
Habitat on Juniperus
ELEV. 4400'
Collector T. H. Nash #7914 DATE 8/27/73
Det. T. H. N.

scientificName: *Parmelia ulophyllodes* (Vain.) Sav.
stateProvince: New Mexico
county: Dona Ana
Locality: Joranada Experimental Station
substrate: on Juniperus
verbatimElevation: 4400'
minimumElevationInMeters: 1341
recordedBy: T. H. Nash
recordNumber: 7914
eventDate: 1973-08-27
identifiedBy: T. H. Nash

NLP Challenges

- Issues
 - Variable layouts
 - Loose standards
 - OCR error
- Solutions
 - Authority tables
 - Levenshtein distance
 - Word stats
 - Format recognition
 - Parsing profiles
 - Duplicate harvesting

DESERT BOTANICAL GARDEN HERBARIUM
Cylindropuntia prolifica (Engelmann) F. M. Knuth

SOUTH DAKOTA, USA

Staurothele cf. monicae (Zahlbr.)
Wet

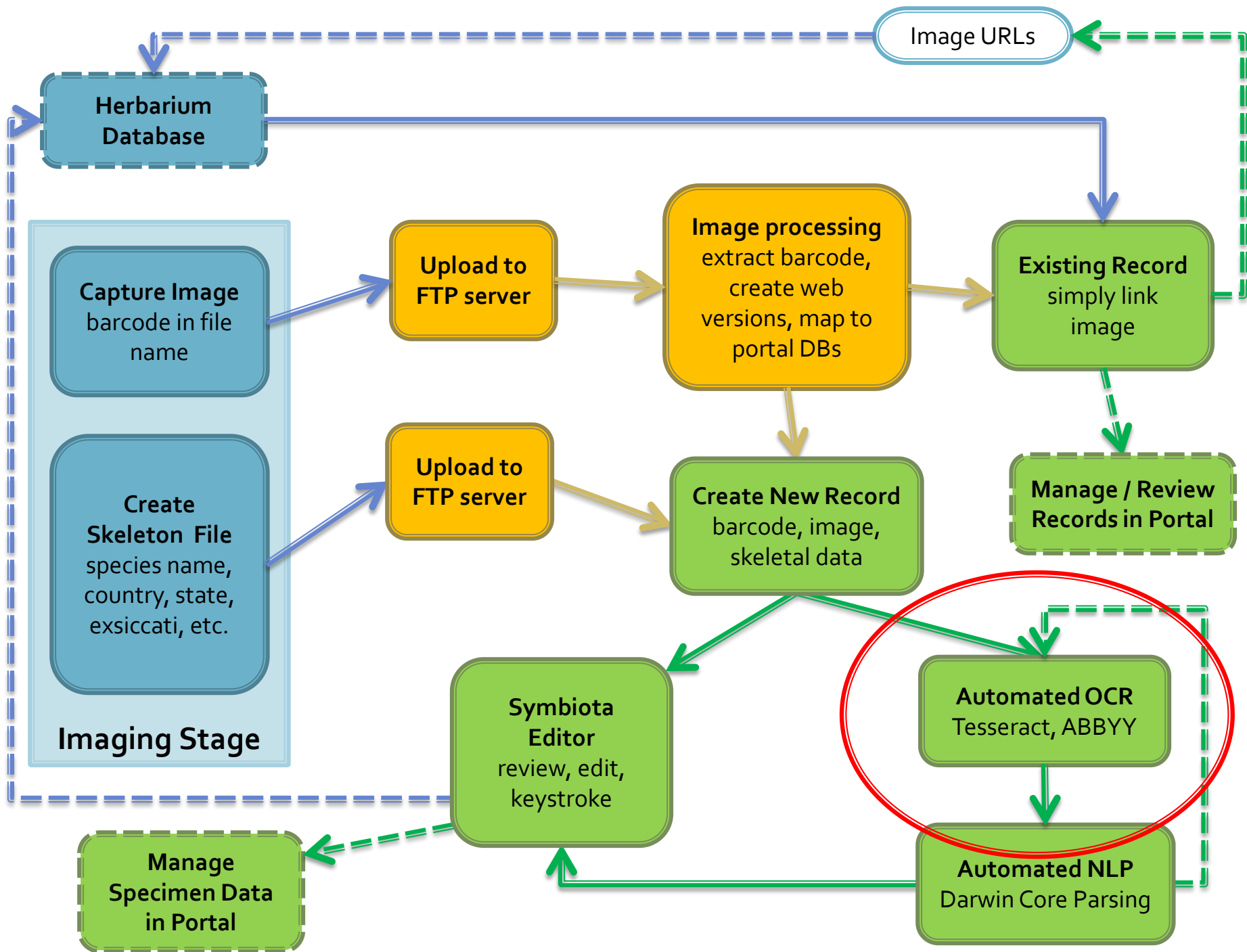
Badlands National Park
on fossil ammonites and
weathered Pierre shale
breaks W of Sage Creek
campground, shortgrass
plains
T2S, R14E, E $\frac{1}{2}$, SW $\frac{1}{4}$, Sec 2
lat 43°54'N
long 102°25'W

Date: Aug 20, 1990
Collected by Susan Will-Wolf
Det.

Pennington
County: 780-820m
Elev:
No. 2347

NPS Acc. # BADL-276 Cat. #

R. Trelease and N. Foisy
Herbarium of Desert Botanical Garden (DES)



Ready for Processing

University of Wisconsin - Madison (WIS)

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

< << | 9 of 11989 | >> > >

Occurrence Data

Determination History

Images

Genetic Links

Admin

Collector Info

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

WIS-L-0025436

Associated Collectors ? Verbatim Date ?

Exsiccati Title Number

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 ? Verbatim Coordinates

Elevation in Meters Verbatim Elevation

Misc

Habitat

Substrate

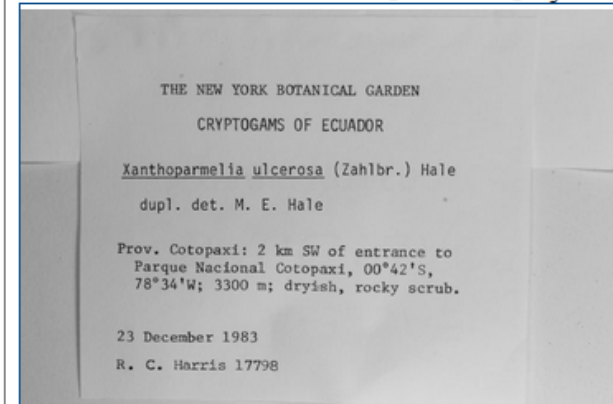
Associated Taxa

Description

Notes

Label Processing

☒ Med Res. ☐ High Res.



OCR Image

Options

- ☐ OCR whole image
☐ OCR w/ analysis

Image 1 of 1

THE NEW YORK BOTANICAL GARDEN
CRYPTOGAMS OF ECUADOR
Xanthoparmelia ulcerosa (Zahlbr.) Hale dupl. det. M. E. Hale
Prov. Cotopaxi: 2 km SW of entrance to Parque Nacional Cotopaxi, 00° 42'S, 78° 34'W; 3300 m; dryish, rocky scrub.
23 December 1983 R. C. Harris 17798

Notes:

Source:

ABBY:2013-02-25

Save OCR Edits

LICC Parser

Delete OCR

1 of 1

LBCC Parser

- Specifically tuned for lichen and bryophyte
- Logic, pattern matching, lookup tables
 - scientific name, collector, number, date , assoc. collectors, locality, coordinates, elevation, habitat, substrate, descriptions, general notes
- Recognizes label formats for specific collectors
- Programmer: Robert Anglin
 - UW-Madison

LBCC Parser

University of Wisconsin - Madison (WIS)

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

< << | 9 of 11989 | >> > >

Occurrence Data

Determination History

Images

Genetic Links

Admin

Collector Info

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

Associated Collectors ? Verbatim Date ?

Exsiccati Title Number

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 ? Verbatim Coordinates

Elevation in Meters Verbatim Elevation

Misc

Habitat

Substrate

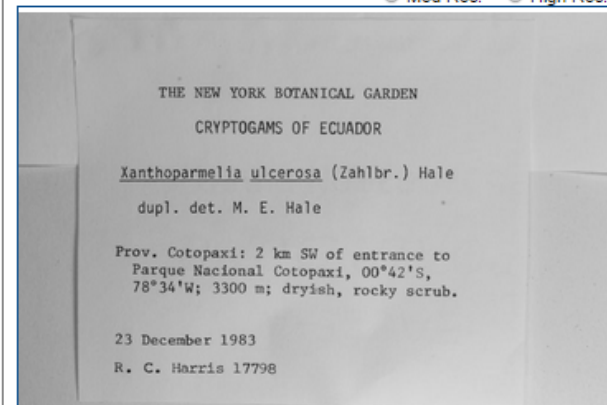
Associated Taxa

Description

Notes

Label Processing

☒ Med Res. ☐ High Res.



OCR Image

Options

- ☐ OCR whole image
- ☐ OCR w/ analysis

Image 1 of 1

THE NEW YORK BOTANICAL GARDEN
CRYPTOGAMS OF ECUADOR
Xanthoparmelia ulcerosa (Zahlbr.) Hale dupl. det. M. E. Hale
Prov. Cotopaxi: 2 km SW of entrance to Parque Nacional Cotopaxi, 00° 42'S, 78° 34'W; 3300 m; dryish, rocky scrub.
23 December 1983 R. C. Harris 17798

Notes:

Source:

ABBY:2013-02-15

Save OCR Edits

LBCC Parser

Delete OCR

1 of 1

LBCC Parser

University of Wisconsin - Madison (WIS)

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

[<](#) [<<](#) | 9 of 11989 | [>>](#) [>](#) [>>](#)

Occurrence Data

Determination History

Images

Genetic Links

Admin

Collector Info

Catalog Number ? Other Numbers ? Collector ? Number ? Date ? Dupes?
WIS-L-0025436 Richard C Harris 17798 1983-12-23 ☐ Auto search

Associated Collectors ? Verbatim Date ?

Exsiccata Title Number

Latest Identification

Scientific Name ? Author ?
Xanthoparmelia ulcerosa (Zahlbr.) Hale
ID Qualifier ? Family ? Parmeliaceae
Identified By ? M. E. Hale Date Identified ?

Locality

Country State/Province County Municipality
Ecuador Cotopaxi

Locality

Prov. Cotopaxi: 2 km SW of entrance to Parque Nacional Cotopaxi

☐ Locality Security

Latitude Longitude Uncertainty ? Datum ? Verbatim Coordinates
0.7 -78.566667 Tools << 00° 42'S, 78° 34'W

Elevation in Meters Verbatim Elevation
3300 - << 3300 m

Misc

Habitat
dryish, rocky scrub.
Substrate

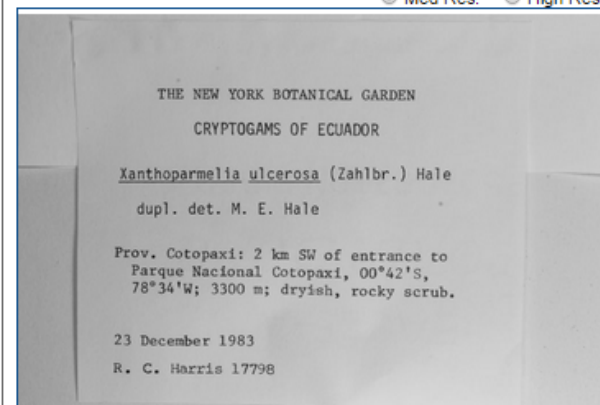
Associated Taxa

Description

Notes

Label Processing

☒ Med Res. ☐ High Res.



OCR Image

Options

- ☐ OCR whole image
- ☐ OCR w/ analysis

Image 1 of 1

i>THE NEW YORK BOTANICAL GARDEN
CRYPTOGAMS OF ECUADOR
Xanthoparmelia ulcerosa (Zahlbr.) Hale dupl. det. M. E. Hale
Prov. Cotopaxi: 2 km SW of entrance to Parque Nacional Cotopaxi, 00° 42'S, 78° 34'W; 3300 m; dryish, rocky scrub.
23 December 1983 R. C. Harris 17798

Notes:

Source:

ABBY:2013-02-25

Save OCR Edits

LBCC Parser

Delete OCR

1 of 1

SALIX - overview

- Logic, pattern matching, lookup tables
 - Scientific name, collector, number, date, coordinates, elevation
- Word frequency tables
 - locality, habitat, substrate, description, notes
- Daryl Lafferty
 - Arizona State University associate
- Open source PHP class
 - Input: OCR text block
 - Output: Darwin Core array

SALIX - example

Occurrence Data	Determination History	Images	Genetic Links	Admin
Collector Info				
Catalog Number ?	Other Numbers ?	Collector ?	Number ?	Date ?
ASU0081742		Liz Makings	4485	2014-09-07
<input type="checkbox"/> Duplicates? <input type="checkbox"/> Auto search				
Associated Collectors ?		Verbatim Date ?		
		7 September 2014		
Exsiccata Title				Number
Latest Identification				
Scientific Name ?		Author ?		
Boerhavia coccinea		P. Mill.		
ID Qualifier ?	Family ?			
	Nyctaginaceae			
Identified By ?		Date Identified ?		
Locality				
Country	State/Province	County	Municipality	
United States	Arizona	Maricopa		
Locality				
Tonto National Forest, tributary to Sycamore Creek off Hwy 87				
<input type="checkbox"/> Locality Security				
Latitude	Longitude	Uncertainty ?	Datum ?	Verbatim Coordinates
33.730580	111.514076			33.730580° 111.514076°
Elevation in Meters		Verbatim Elevation		
617		2024 ft		
Misc				
Habitat				
Mesquite Wash; sandy cobble floodplain with dense riparian vegetation				
Substrate				
Associated Taxa				
Prosopis velutina; Populus fremontii, Fraxinus velutina; Juglans major, Salix gooddingii, Sorghum halepense, Baccharis salicifolia, B. sarothroides, Hymenoclea monogyra; Artemisia dracunculoides; Datura wrightii, Oenothera elata, Boerhavia coccinea; Euphorbia pedunculifera, E. capitellata, Amaranthus palmeri, Ipomoea cristulata, Kallstroemia grandiflora, K. parviflora				
Description				
common perennial				
Notes				

Label Processing	
<input checked="" type="radio"/> Med Res.	<input type="radio"/> High Res.
Nyctaginaceae	
Boerhavia coccinea P. Mill.	
USA. Arizona. Maricopa County.	
Tonto National Forest; Mesquite Wash, tributary to Sycamore Creek off Hwy 87; sandy cobble floodplain with dense riparian vegetation; common perennial.	
33.730580°, -111.514076°	
Elevation: 2024 ft 620 m	
Associated species: Prosopis velutina, Populus fremontii, Fraxinus velutina, Juglans major, Salix gooddingii, Sorghum halepense, Baccharis salicifolia, B. sarothroides, Hymenoclea monogyra, Artemisia dracunculoides, Datura wrightii, Oenothera elata, Boerhavia coccinea, Euphorbia pedunculifera, E. capitellata, Amaranthus palmeri, Ipomoea cristulata, Kallstroemia grandiflora, K. parviflora	
Liz Makings 4485 7 September 2014	
OCR Image	Options
	<input type="checkbox"/> OCR whole image
	<input type="checkbox"/> OCR w/ analysis
Image 1 of 1	
?Plants of Arizona	
Nyctaginaceae	
Boerhavia coccinea P. Mill.	
USA. Arizona. Maricopa County.	
Tonto National Forest; Mesquite Wash, tributary to Sycamore Creek off Hwy 87; sandy cobble floodplain with dense riparian vegetation; common perennial.	
33.730580°, -111.514076°	
Elevation: 2024 ft 620 m	
Associated species: Prosopis velutina, Populus fremontii, Fraxinus velutina, Juglans major, Salix gooddingii, Sorghum	
Notes:	
Source:	
ABBY: 2014-12-23	
Save OCR Edits	
SALIX Parser	
LBCC Parser	
1 of 1	

SALIX – word frequency table

Fields: locality, habitat, substrate, description, notes

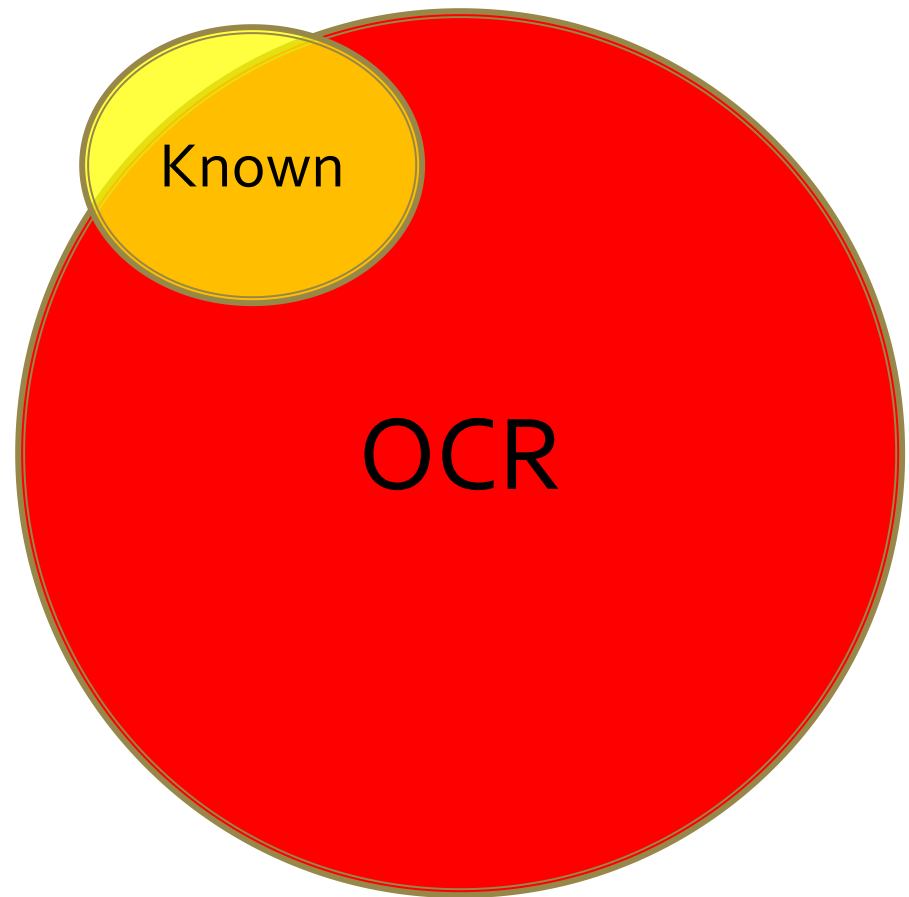
First Word	Second	Locality	habitat
creek		49992 (72%)	16990 (24)
eagle	creek	239 (98%)	5 (2%)
creek	bottom	85 (12%)	544 (76%)
along	creek	315 (14%)	1530 (69%)
sycamore		1453 (76%)	354 (19%)
under	sycamore	1 (8%)	9 (75%)
riparian		874 (7%)	9185 (73%)
pedro	riparian	242 (66%)	1 (0%)
mesquite		386 (14%)	1841 (66%)

SALIX - review

- Previously completed records required to build word frequency table
- Tuned and tailored to portal
 - Word stats specific to portal data
- Improves with use
 - Word stats adjusted with new records

Gottschalk Method

- No parsing
- Uses OCR to establish correlation between post processed and unprocessed



Preprocessing: Create finger print

use only the left-most 15 characters: remove punctuation, special characters, spaces, and numbers

Raw Line of OCR

■SANTO DOMINGO. REPUBLICA DOMINICANA
• República Dominicana: Prov. El Seibo:
; T. Zanoni, J. Pimentel § R. García
^ BOTANICAL
BOTANICO NACIONAL DR. RAFAEL M. MOSCOSO"
JARDIN BOTANICO NACIONAL"DR. RAFAEL M. MOSCOSO"
■ ■ ■ JARDIN BOTANICO NACIONAL*"DR. RAFAEL M. MOSCOSO"
JARDIN BOTANICO NACIONAL-"DR. RAFAEL M. MOSCOSO"

Fingerprint

santodomingorep
repúblicadomini
tzanonijpimente
botanical JARDIN
jardinbotanicon
jardinbotanicon
jardinbotanicon
jardinbotanicon

Probability Matrix

Catalog Number	fingerprint	Known Countries	Probs
1442947	tzanonirgarcíaj	Dominican Republic	1.0000
1442947	provindependenc	Dominican Republic	1.0000
1442947	nlesteelevm	Dominican Republic	1.0000
1442947	republicadomini	Dominican Republic	1.0000
1442947	mayo	Cuba	0.3333
1442947	mayo	Haiti	0.3333
1442947	mayo	Dominican Republic	0.3333

Gottschalk Method

- Dependent on post processed records
 - with images and OCR!
- Improves as specimens are processed
- Duplicate specimens are a plus
- Return corrected values
 - Translates abbreviations
 - OCR errors less of an issue
 - Better for country, state than substrate, locality, etc

OCR Filtering

- Theme filtering
- Word clouds
- Target similar label formats
- Use raw OCR to locate “Nash” labels
- Exclude:
 - Determined by Nash
 - Author of scientific name
 - Associated collector
 - County

Exsiccati

University of Wisconsin - Madison (WIS)

Record Search Form

Collector: Number: Date:

Catalog Number: Other Catalog Numbers:

Entered by: Date entered: Date modified:

Processing Status: ☐ With images ☐ Without images

Custom Field 1: OCR Fragment CONTAINS Exs

Sort by: ascending

Home >> Collection Management >> Editor

< << | 1 of 5447 | >> > >

Occurrence Data

Determination History

Images

Genetic Links

Admin

Collector Info

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

WIS-L-0000188 | 0000188WIS | | |

Associated Collectors ? Verbatim Date ?

Exsiccati Title Number

Lichenes Wisconsinenses Exsiccati [Thomson: Lich. Wiscon. Exs.] 5

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 ? Verbatim Coordinates

Elevation in Meters Verbatim Elevation

-

Georeferenced By Georeference Sources ? Georeference Remarks

Label Processing

☒ Med Res. ☐ High Res.

Correction label

Lichenes Wisconsinenses Exsiccati

No. 5. Anaptychia palmatula (Michx.) Vain.

(issued as A. fusca)

Det. by A. H. Magnusson

On *Quercus borealis*

T.23 N., R.4 E., Sec.26

7 miles northwest of Wisconsin Rapids, Wood Co.

March 20, 1945

Coll. & Det. by John W. Thomson, Jr.

OCR Image

Options

- ☐ OCR whole image
- ☐ OCR w/ analysis

Image 3 of 3 >>>

?Correction label

Lichenes Wisconsinenses Exsiccati

No. 5. Anaptychia palmatula (Michx.) Vain.

(issued as A. fusca)

Det. by A. H. Magnusson

wmm*m r ? , .n _ ir_

On *Quercus borealis* T.23 N., R.4 E., Sec.26

7 miles northwest of Wisconsin Rapids, Wood Co.

March 20, 1945

Exsiccati

University of Wisconsin - Madison (WIS)

Home >> Collection Management >> Editor

< << | 6 of 5447 | >> > >*

Occurrence Data

Determination History

Images

Genetic Links

Admin

Collector Info

Catalog Number ? Other Numbers ? Collector ? Number ? Date ? Dupes? ☐ Auto search
WIS-L-0000436 | 0000436WIS | John W. Thomson, Jr | 1946-08-23

Associated Collectors ? Verbatim Date ?

Exsiccati Title Number
Lichenes Wisconsinenses Exsiccati [Thomson: Lich. Wiscon. Exs.] 22

Latest Identification

Scientific Name ? Author ?
Lecidea friesii Ach.
ID Qualifier ? Family ? Lecideaceae
Identified By ? Date Identified ?

Locality

Country State/Province County Municipality
United States Wisconsin Oneida

Locality
17 miles west of Woodruff

☐ Locality Security

Latitude Longitude Uncertainty ? Datum ? Verbatim Coordinates
Tools T.39 N., R.4 E., Sec.6

Elevation in Meters Verbatim Elevation
- <<

Georeferenced By Georeference Sources ? Georeference Remarks
1 mi.
Georeference Protocol ? Georef Verification Status ? footprint (polygon)

Misc

Habitat
On charred stumps
Substrate
Associated Taxa

Label Processing

☒ Med Res. ☐ High Res.

lichenes wisconsinenses exsiccati

No. 22. Lecidea scalaris Ach.

On charred stumps
T.39 N., R.4 E., Sec.6
17 miles west of Woodruff, Oneida Co.
May 23, 1946
Coll. & Det. by John W. Thomson, Jr.

OCR Image

Options

- ☐ OCR whole image
☐ OCR w/ analysis

Image 1 of 1

?lichenes wisconsinenses exsiccati
No. 22. Lecidea scalaris Ach.
On charred stumps
T.39 N., R.4 E., Sec.6
I
17 miles west of Woodruff, Oneida Co. May 23, 1946
Coll. & Det. by John W. Thomson, Jr.

Notes:

Source:

ABBY:2014-08-01

Save OCR Edits

LBCC Parser

Delete OCR

1 of 1

Expeditions defined by OCR

ALCAN Expedition



Map of the Alaska Highway (ALCAN Highway)

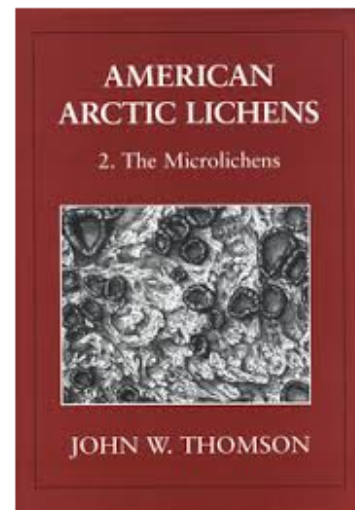
The ALCAN Highway was constructed during World War II for the purpose of connecting the contiguous United States to Alaska through Canada. It begins at the junction with several Canadian highways in Dawson Creek, British Columbia, and runs to Delta Junction, Alaska, via Whitehorse, Yukon. Completed in 1942 at a length of approximately 2,700 km (1,700 mi).



John Thomson



Teuvo Ahti



Flora of American Arctic Lichen

The eminent American lichenologist, John W. Thomson, and the young Finnish lichenologist, Teuvo Ahti, who has since become the world expert in the large lichen genus *Cladonia*, traveled the Alcan Highway together in 1967, after John had spent a sabbatical in Helsinki. The road was primarily gravel at that point in time, and they had to change tires 13 times. This was one of John's early expeditions to the American arctic. Across his 40 year career at the University of Wisconsin, he mounted 14 major expeditions across the Canadian and American arctic resulting in an American Arctic Lichen Flora published in two volumes. The Alcan trip of John and Teuvo cemented a lifelong friendship and spurred continued collaboration over several decades. They were among the first lichenologists to traverse the highway and the lichens collected provided an important contribution to the final flora treatments.

[Find ALCAN Records](#)

[Find Thompson Records](#)

[Find Ahti Records](#)

Combined methods

- Batch processing
- Duplicate harvesting
 - Last name, number, date
 - Exact duplicates or duplicate events
- High similarity indexes
- OCR block comparison
- Consensus record

Acknowledgments

- National Science Foundation
- Arizona State University - GIOS and SOLS
- New York Botanical Garden
- University of Wisconsin - Madison
- Harvard University
- GeoLocate, iDigBio, STRI, Filtered Push, Specify