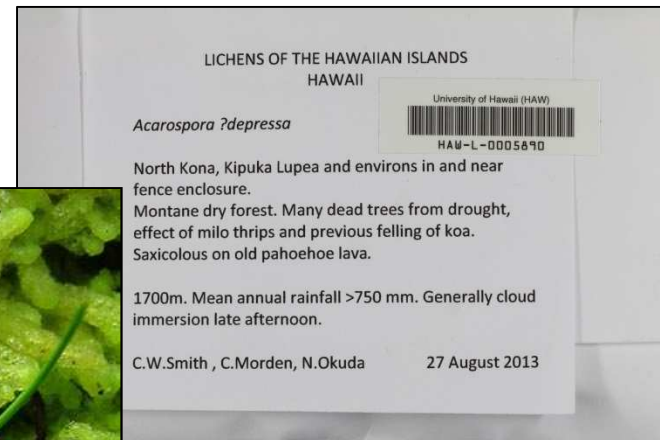


# Lichens and Bryophytes – Pacific Islands

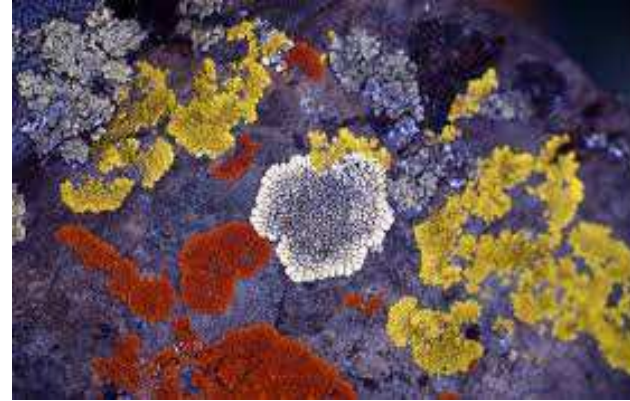


Michael Thomas, Joseph F. Rock Herbarium  
University of Hawaii at Mānoa



# Lichens & Mosses

- Lichens are composite organisms consisting of a fungus and a photosynthetic partner growing together in a symbiotic relationship. The partner is usually either a green alga or cyanobacterium.



- Mosses - after flowering plants and ferns, *mosses* are the most diverse group of plants, with more than 10,000 species.

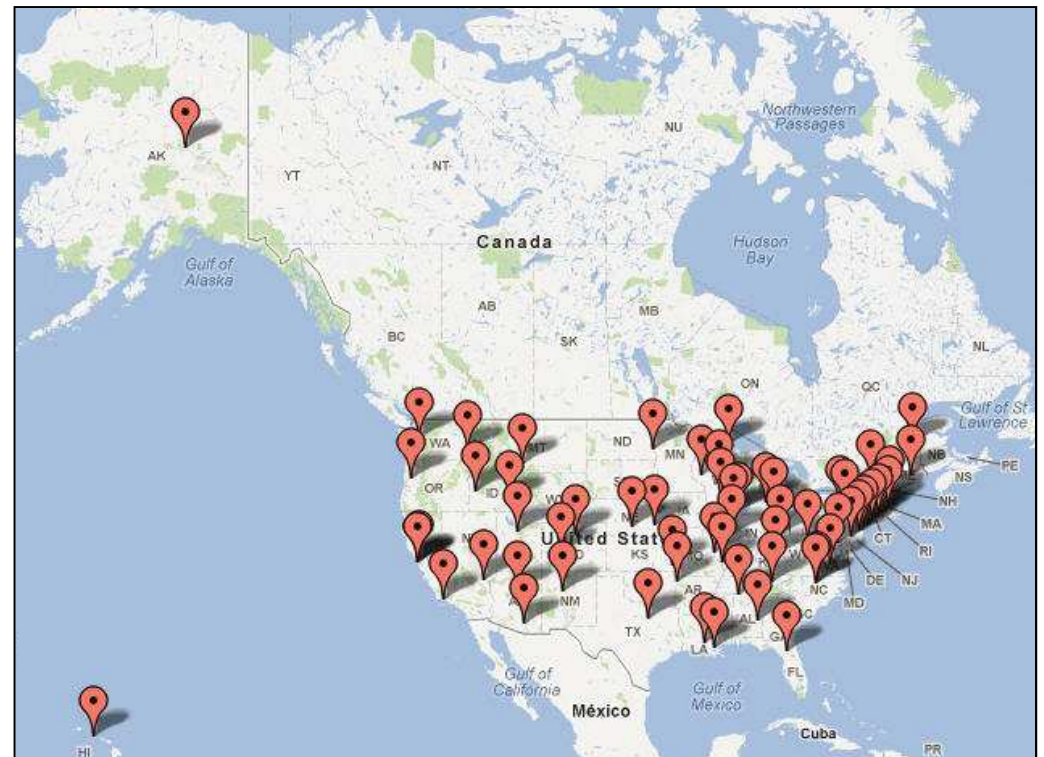


# Goals and Scope

## North American Lichens and Bryophytes: Sensitive Indicators of Environmental Quality and Change (C. Gries PI)



- 16 digitization centers (collaborators)
- > 60 non-governmental US herbaria (95%)
- ~ 2.3 million specimens (90%)
  - 900,000 lichens
  - 1.4 million bryophytes
- Photographing labels and mobilizing existing digital records



# LBCC Lichens, Bryophytes and Climate Change

- Home
- Project
- Digitization
- Data
- Information
- Volunteer
- Calendar



**Documenting North American lichen and bryophyte collections..**

**1,290,727**  
images

**2,991,566**  
records

**News...**

- ~143,000 labels were imaged this summer
- Lichen Exsiccati now searchable
- Frullania Collaborative Research Network now online
- Harriman Alaskan Expedition added to bryophyte and lichen volunteer pages

**Get Involved...**

Learn more about [volunteering to digitize bryophyte and lichen collections](#).

Visit our [lichen](#) and [bryophyte](#) record sets of historic expeditions and special collections.

Go directly to the data portals for [lichens](#) or [bryophytes](#).

**Recent LBCC Blog Posts**

- [More resources for Bryophyte taxonomy](#)
- [Georeferencing best practices](#)
- [Resources for bryophyte taxonomy](#)

[More](#)

**Other blogs**

- [How is finding a consensus among citizen science transcriptions like aligning gene sequences AND textual analysis of medieval codices? Part 2](#)
- [How is finding a consensus among citizen science transcriptions like aligning gene sequences AND textual analysis of medieval codices? Part 1](#)

[More](#)

**Upcoming Events**

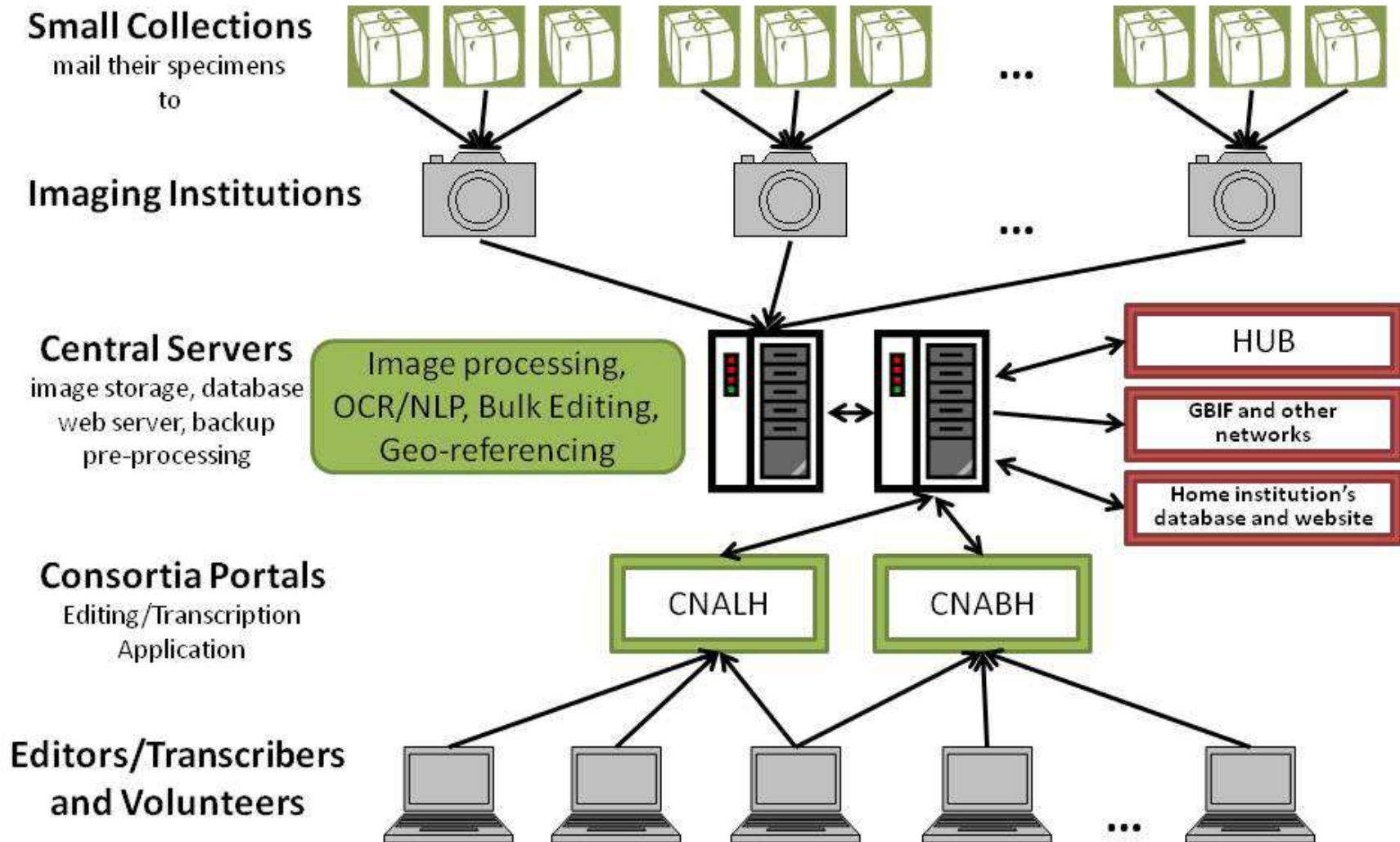
No upcoming events

[View events calendar](#)

[Login](#)

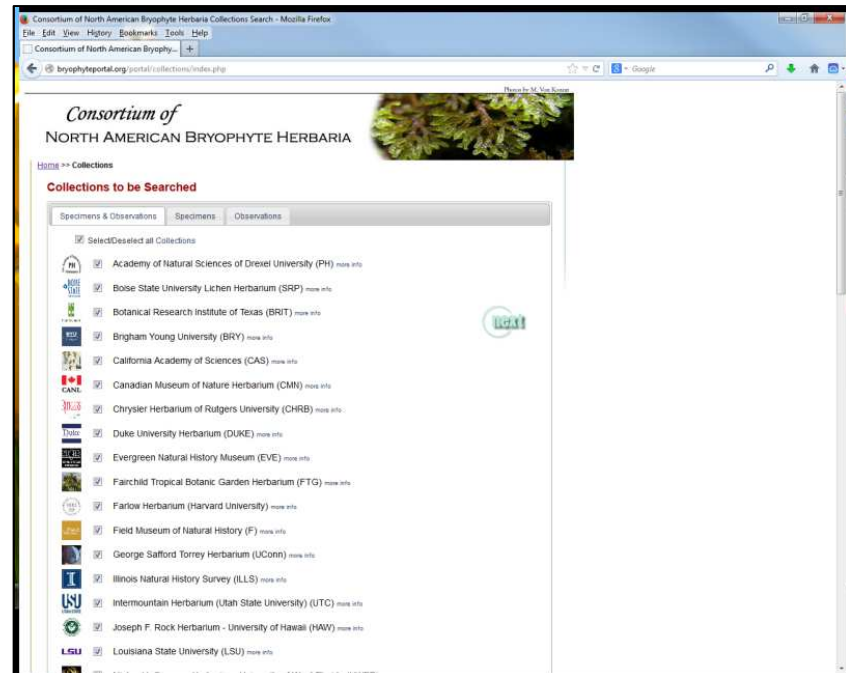
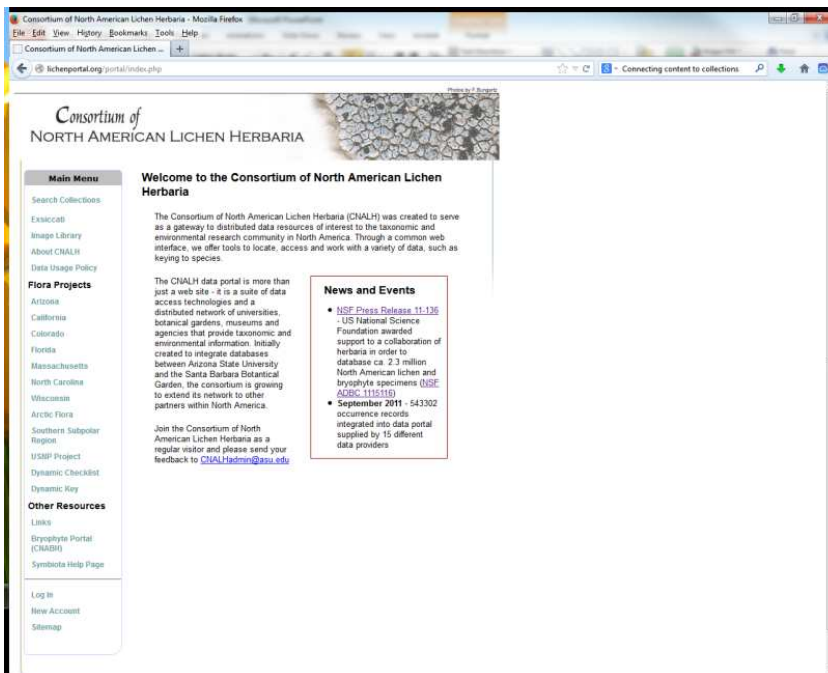


# Digitization Approach



# Data Access and Dissemination

## ■ National Portals (Symbiota software)



- Search across collections
- Map distributions
- Create checklists, descriptions and keys



# Pacific lichen flora

- Notwithstanding the comparatively small area of land, the lichen flora is highly diverse due to the great climatic and environmental ranges as well as the long-term isolation of many of the islands
- Includes many locally or regionally endemic taxa in addition to east Asian, Australasian, cool-temperate South American, Neotropical, western North American and Pantropical elements
- Huge constraint - few resident lichenologists in the Pacific
- Lichen flora remains poorly documented in the Pacific Islands



# Consortium of Pacific Herbaria

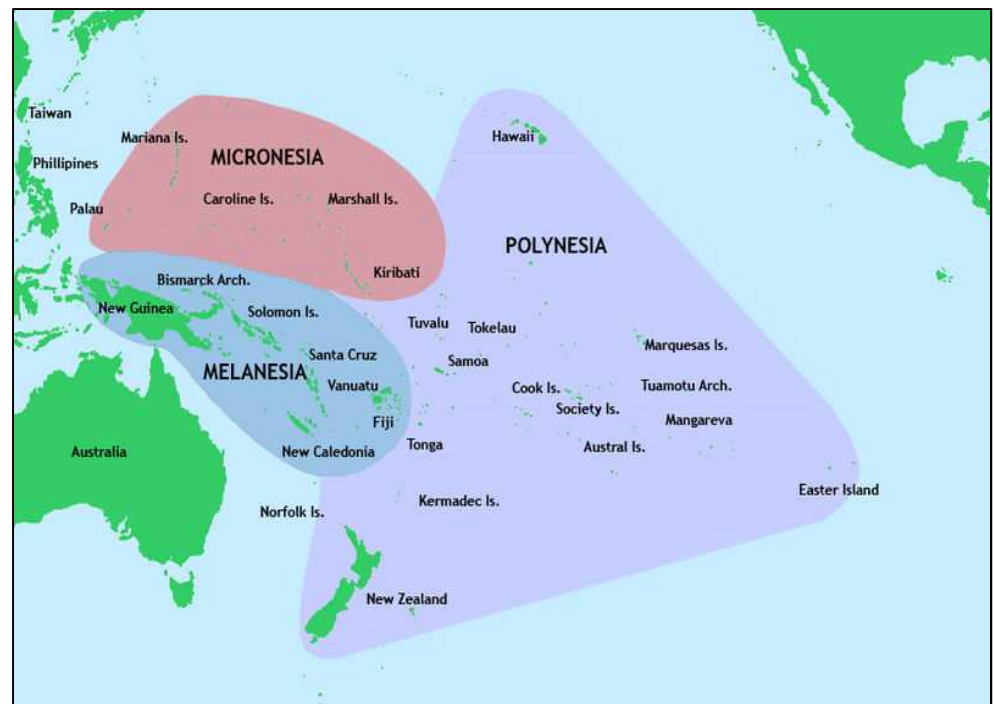
Only 7 of 20 partners have Lichen or Bryophyte collections

- Univ. of Hawaii
- Bishop Museum
- Univ. of Guam
- NTBG
- US National Parks (3)

56,000 specimens

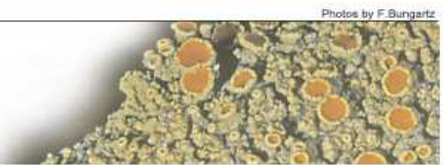
20,000 (57%) Hawaii records

Currently: <10,000 Pacific records in NA Lichen portal



	Lichen Species	Bryophyte species
Melanesia	694	3353
Micronesia	37	51
Polynesia	12875	21673

# Consortium of NORTH AMERICAN LICHEN HERBARIA



Photos by F. Bungartz

[Home](#) >> [Collection Search Page](#) >> [Joseph F. Rock Herbarium - University of Hawaii Details](#)

## Joseph F. Rock Herbarium - University of Hawaii (HAW)

Founded in 1908, the Joseph F. Rock Herbarium (HAW) serves the official university repository for botanical plant specimens. It is the result of decades of plant exploration by some of the leading researchers in the Pacific basin and collections continue to expand. Today, the herbarium is part of the University Museum Consortium, and comprises approximately 50,000 dried preserved specimens. There are currently more than 6500 lichens databased and imaged with an additional 5000 specimens remaining undetermined.

**Contact:** Michael Thomas, Collections Manager (mbthomas<at>hawaii.edu)

**Home Page:** <http://www.herbarium.hawaii.edu/>

**Management:** Data snapshot of central database

**Last Update:** 11 March 2014

**Global Unique Identifier:** e4aaabfc-9900-42c7-be83-415b8a9e75e0

**Usage Rights:** CC BY-NC-SA (Attribution-NonCommercial-ShareAlike)

**Rights Holder:** University of Hawaii

### Collection Statistics

- 4334 specimens
- 0% georeferenced
- 71 families
- 166 genera
- 920 species

### Extra Statistics

- Show Family Distribution
- Show Geographic Distribution

### Geographic Distribution

Click on the specimen record counts within the parenthesis to return the records for that term

- Argentina (4)
- Australia (48)
- Austria (14)
- Bosnia and Herzegovina (1)
- Bulgaria (2)
- Canada (205)
- Chile (12)
- Columbia (1)
- Costa Rica (73)
- Cuba (1)
- Czechoslovakia (1)

### Main Menu

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[Data Usage Policy](#)

### Flora Projects

[Arizona](#)

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[Colorado](#)

[Florida](#)

[Massachusetts](#)

[North Carolina](#)

[Wisconsin](#)

[Arctic Flora](#)

[Southern Subpolar Region](#)

[USNP Project](#)

[Dynamic Checklist](#)

[Dynamic Key](#)

### Other Resources

[Links](#)

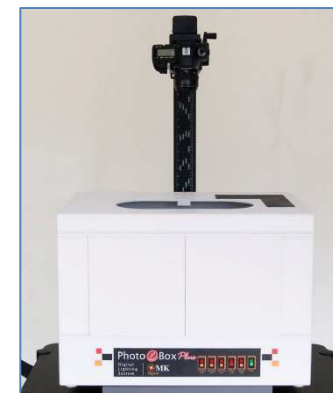
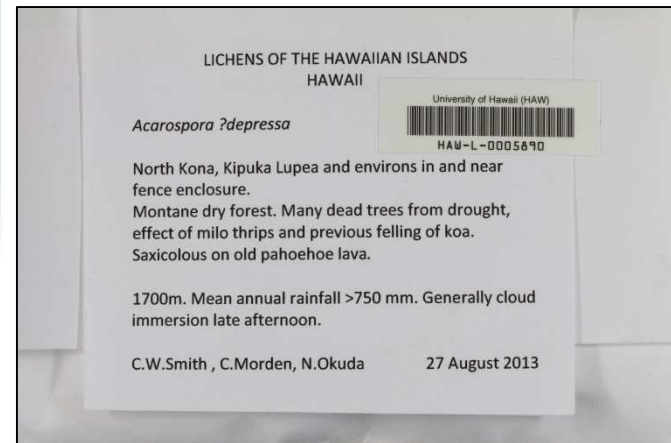
[Bryophyte Portal \(CNABH\)](#)

[Symbiota Help Page](#)

[Log In](#)

[New Account](#)

[Sitemap](#)



# OCR and NLP

CNALH Occurrence Editor - Mozilla Firefox

File Edit View History Bookmarks Tools Help

CNALH Occurrence Editor

lichenportal.org/portal/collections/editor/occurrenceeditor.php?csmode=1&occindex=3&occid=1070649&collid=0#

University of Wisconsin - Madison (WIS)

Home >> Crowd Sourcing Central >> Editor

Occurrence Data

Collector ? Number ? Date ? Dupes? Long Form <<

1967-06-23

Associated Collectors ? Verbatim Date ?

Exsiccata Title Number

Scientific Name ?

Cladonia leiodea

Note: Full editing permissions are needed to edit an identification

Country State/Province County

United States Hawaii Hawaii

Locality

South Hilo

Latitude Longitude Uncertainty ? Verbatim Coordinates Tools

Elevation in Meters Verbatim Elevation

1305 4280 ft.

Habitat

Substrate

Notes

Save Edits

Status Auto-Set Pending Review

Label Processing

HAWAIIAN ISLANDS HAWAII

South Hilo District.

CLADONIA leiodea Wagn.

Pahoehoe lava (1855 eruption) rock outcrop in full sun, in rather dry, 3 m tall, very open Metrosideros collina woodland chaparral (with Dubautia scabra, Vaccinium, Coprosma ernodeoides, Styphelia tameiameia, Stereocaulon volcanica, Rhynchospora lazarum). Lowest eastern slopes of Mauna Kea volcano 16.2 miles WSW of HILO on Hawaii Highway 20. Alt. 4280 ft.

Hugh H. & Carolyn M. Iltis June 23, 1967 No.: 411

OCR Image Options Image 1 of 1

OCR whole image

OCR w/ analysis

1> HAWAIIAN ISLANDS HAWAII

South Hilo District.

CLADONIA

Pahoehoe lava (1855 eruption) rock outcrop in full sun, in rather dry, 3 m tall, very open Metrosideros collina woodland chaparral (with Dubautia scabra, Vaccinium, Coprosma ernodeoides, Styphelia tameiameia, Stereocaulon volcanica, Rhynchospora lazarum). Lowest eastern slopes of Mauna Kea volcano 16.2 miles WSW of HILO on Hawaii Highway 20. Alt. 4280 ft.

Hugh H. & Carolyn M. Iltis June 23, 1967 No.: 411

Notes:

Source:

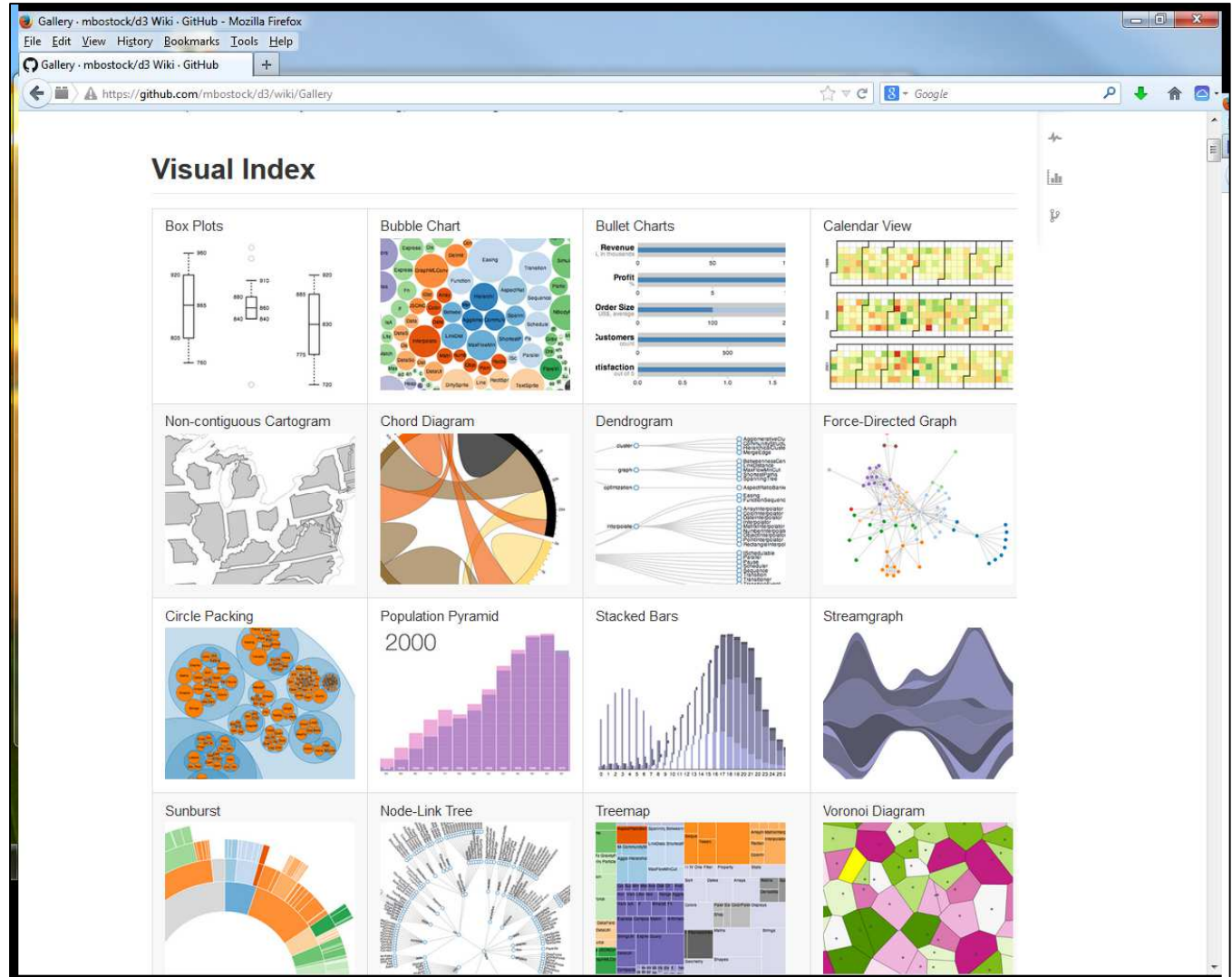
# Archives – 35 mm slides

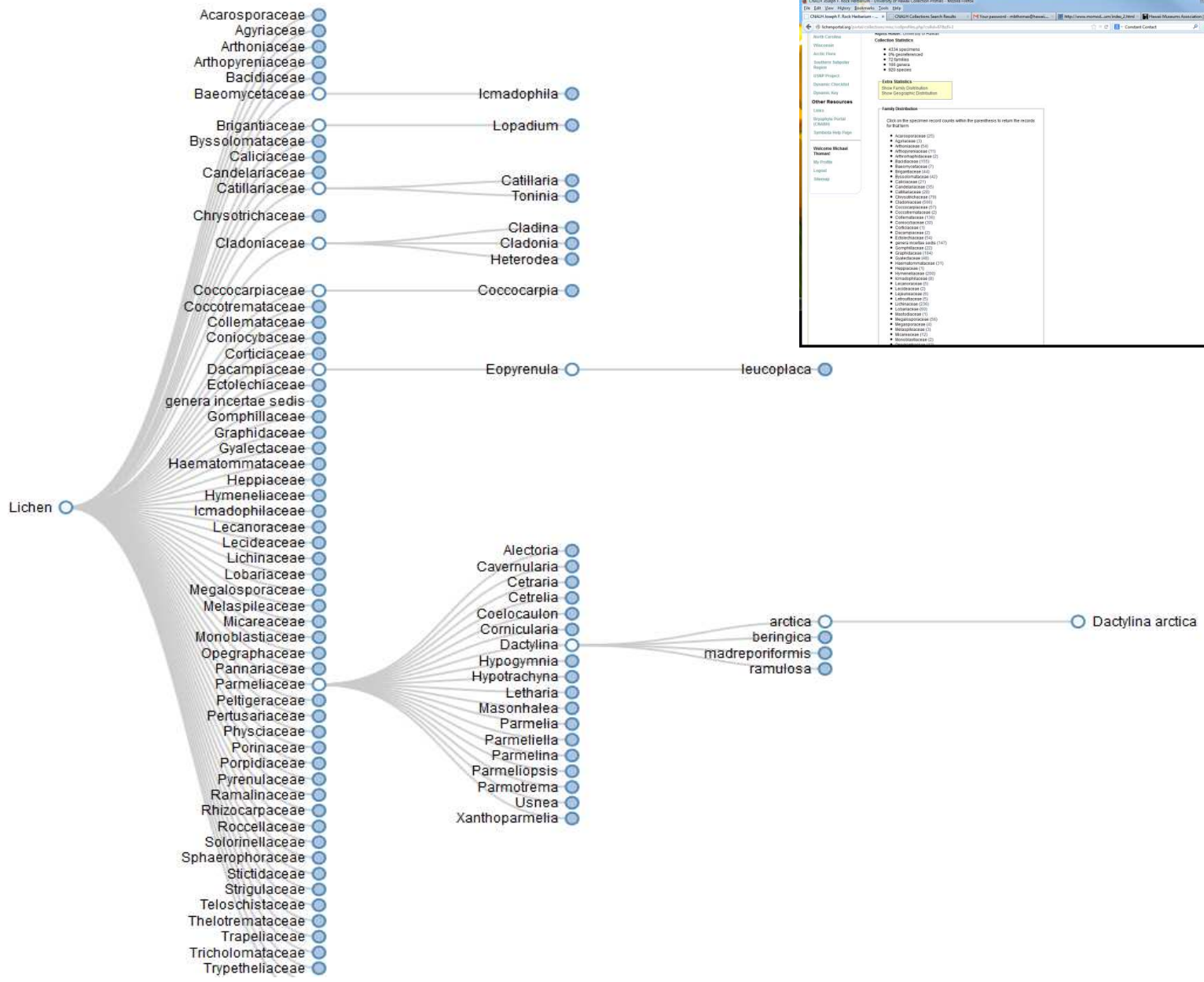
- C. Smith's 35 mm slides digitized (1960-90s)
  - Nikon Super CoolScan 9000 ED
  - 50 slides per session
- 2000 photographs
- Metadata editing completed
- Plan to add collection to portal following taxonomic review



# Data Visualization

D3.js is a JavaScript library for visualizing data.





Search Results for 'Dactylina arctica' from the University of Alaska Herbarium. The results show a list of specimens with their collection dates and locations. The search results are as follows:

Specimen ID	Collection Date	Location
1000000001	1958	Barrow
1000000002	1958	Barrow
1000000003	1958	Barrow
1000000004	1958	Barrow
1000000005	1958	Barrow
1000000006	1958	Barrow
1000000007	1958	Barrow
1000000008	1958	Barrow
1000000009	1958	Barrow
1000000010	1958	Barrow
1000000011	1958	Barrow
1000000012	1958	Barrow
1000000013	1958	Barrow
1000000014	1958	Barrow
1000000015	1958	Barrow
1000000016	1958	Barrow
1000000017	1958	Barrow
1000000018	1958	Barrow
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1000000095	1958	Barrow
1000000096	1958	Barrow
1000000097	1958	Barrow
1000000098	1958	Barrow
1000000099	1958	Barrow
1000000100	1958	Barrow



# Acknowledgments

Dr. Cliff Smith, Emeritus

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