Tracking Data from Download to Publication - and Back?

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Tracking use of collections data…

- From download to use to publication – and back

- Why track data?

- What should we track?

- What are the challenges, and how can they be overcome?

Tracking use of collections data…

- From download to use to publication – and back
  - Not necessarily a simple path

- Why track data?

- What should we track?

- What are the challenges, and how can they be overcome?

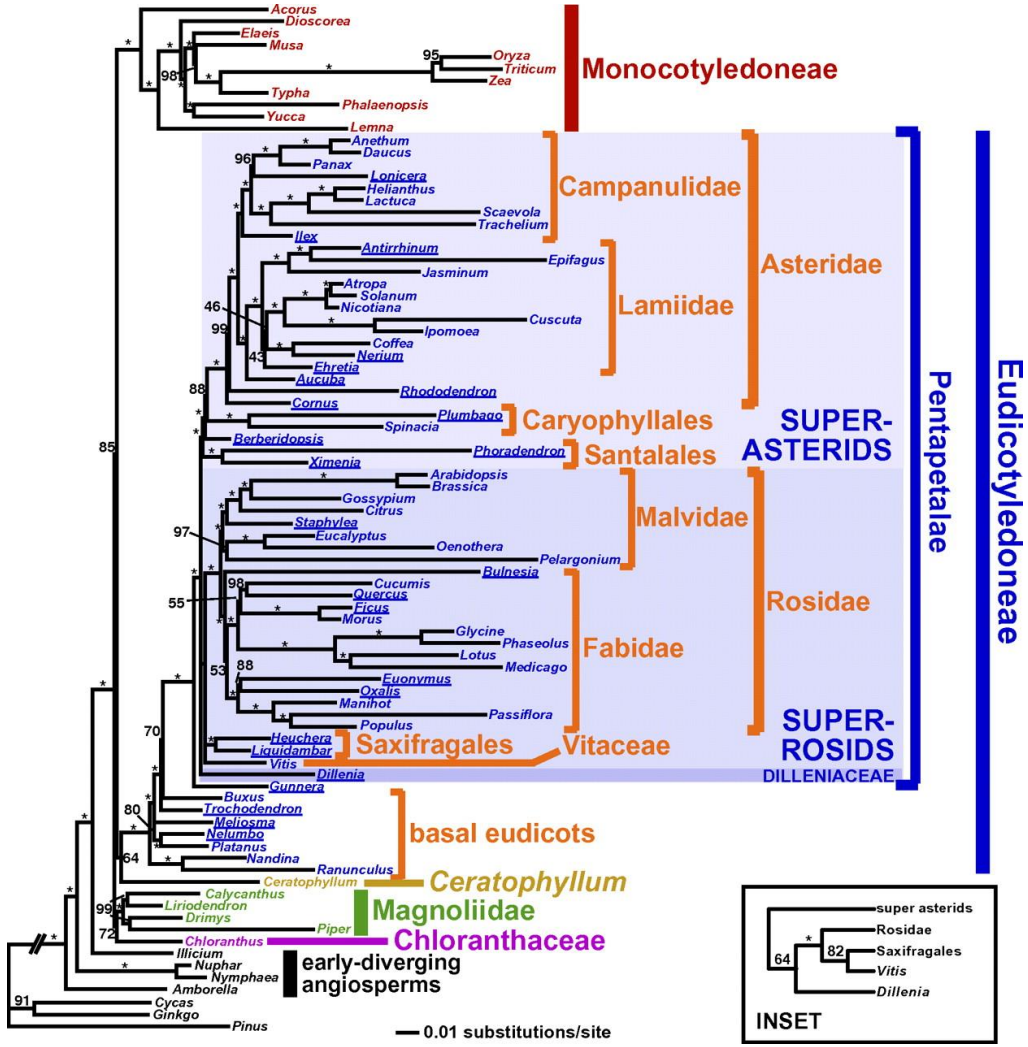
Tracking use of collections data…

- From download to use to publication – and back
  - Not necessarily a simple path
  - No consensus on what (if anything) should be done
- Why track data?
- What should we track?
- What are the challenges, and how can they be overcome?

Why track data?

- Transparency
  - Open, reproducible science
  - Opportunities for error correction and annotation
- Allows for eventual integration with other data
  - Augmentation of records – GenBank, traits, etc.
  - Community resource
- Attribution
  - Collectors, institutions, curators, data managers, et al.

Vouchers...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Elaeis
Musa
Oryza
Triticum
Zea
Typha
Phalaenopsis
Yucca
Monocotyledoneae
Lemna
Anethum
Daucus
Panax
Lonicera
Helianthus
Lactuca
Scaevola
Trachelium
Campanulidae
Ilex
Antirrhinum
Epifagus
Jasminum
Atropa
Solanum
Nicotiana
Cuscuta
Ipomoea
Coffea
Nerium
Ehretia
Aucuba
Lamiidae
Asteridae
Rhododendron
Cornus
Plumbago
Spinacia
Caryophyllales
SUPER-ASTERIDS
Berberidopsis
Phoradendron
Santalales
Ximenia
Arabidopsis
Brassica
Gossypium
Citrus
Staphylea
Eucalyptus
Oenothera
Malvidae
Pelargonium
Bulnesia
Cucumis
Quercus
Ficus
Morus
Glycine
Phaseolus
Lotus
Medicago
Fabidae
Rosidae
Euonymus
Oxalis
Manihot
Passiflora
Populus
SUPER-ROSIDS
Heuchera
Liquidambar
Vitis
Saxifragales
Vitaceae
Dillenia
DILLENIACEAE
Pentapetalae
Eudicotyledoneae
Gunnera
Buxus
Trochodendron
Meliosma
Nelumbo
Platanus
Nandina
Ranunculus
basal eudicots
Ceratophyllum
Ceratophyllum
Calycanthus
Liriodendron
Drimys
Piper
Magnoliidae
Chloranthus
Chloranthaceae
Illicium
Nuphar
Nymphaea
Amborella
early-diverging angiosperms
Cycas
Ginkgo
Pinus
0.01 substitutions/site
super asterids
Rosidae
Saxifragales
Vitis
Dillenia
INSET


Kodak
KODAK Color Control Patches
HERBARIUM
177581
FLORIDA STATE UNIVERSITY
FLORIDA

Citing museum specimens...

Anthocyanidin Variation in *Clarkia*

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Key Word Index—*Clarkia*; Onagraceae; anthocyanidins; intersectional relationships; chemosystematics.

Abstract—Previous reports of anthocyanin variation in *Clarkia* indicated intersectional differentiation, suggesting an additional marker for evaluating infrageneric relationships. Therefore, an investigation of anthocyanidin content of 19 species representing seven of the 10 sections was conducted. The anthocyanidins malvidin, cyanidin and delphinidin were detected. Interspecific variation in anthocyanidin profile was observed: some taxa possessed only malvidin, whereas others exhibited all three anthocyanidins. However, this variation does not coincide with proposed sectional boundaries based on evidence from morphology and enzyme electrophoresis. This suggests that anthocyanidins are homoplasious characters in *Clarkia*.

Experimental

Nineteen species of *Clarkia* were examined for anthocyanidin variation. Floral anthocyanin samples were collected from living plant material of 18 populations representing 13 species (see below). Samples were also obtained for an additional eight species from herbarium specimens (WS). Extraction and hydrolysis of anthocyanins, thin-layer chromatography and identification of anthocyanidins were conducted following the procedures of Dorn and Bloom [7] and Soltis and Soltis [9].

Collection locations. Section *Godetia*: *Clarkia purpurea,* California. Tulare Co.: 0.5 mi E of junction with road to Glennville on White River Rd.; Madera Co.: Rd. 211, 4.35 mi SSW of junction with Rd. 210. *C. williamsonii,* California. Madera Co.: 20.9 mi S of Rock Creek Campground on Mammoth Pool Rd.; Hwy. 41, 2.1 mi N of junction with Hwy. 49; Tulare Co.: Rd. 245, 1.0 mi N of junction with Rd. 465. *C. davyi,* California. Mendocino Co.: Russian Gulch State Park; Hwy. 1, S of Ft. Ross Historic Site. Section *Peripetasma*: *C. cylindrica,* California. Kern Co.: Rd. 226; Caliente-Bodfish Rd. *C. dudleyana,* California. Kern Co.: mile-marker 46.5 on Hwy. 155; Tulare Co.: Rd. 245, 1.0 mi N of junction with Rd. 465. *C. biloba,* California. Mariposa Co.: Hwy. 49, 12.3 mi W of junction with Hwy. 140. Section *Phaeostoma*: *C. xantiana,* California. Kern Co.: Rd. 483; Breckenridge Mtn. Rd. *C.*

Herbarium specimens (WS). Section *Clarkia*: *Clarkia pulchella.* Section *Eucharidium*: *C. breweri, C. concinna.* Section *Myxocarpa*: *C. rhomboidea.* Section *Peripetasma*: *C. lewisii, C. modesta.* Section *Rhodanthos*: *C. arcuata, C. lassenensis.*

Modeling the distribution of species

- Location information and environmental data
- Maxent to model the range of each species
- For Florida plants:
  - 1,490 plant species (of 4100 species)
  - >511,000 georeferenced points
  - Environmental features: temperature, precipitation, soil, etc.

Julie Allen

Charlotte Germain-Aubrey

What should we track?

- Downloaded data
- Filtered data
- Cleaned data
- Analyzed data
- Etc.

- e.g. via
  - GUIDs (multiple)
  - doi, per GBIF
  - NOT in supplements, pdfs, etc.

Citation guidelines

These guidelines provide the most common examples of citation by GBIF users.

Chicory (*Cichorium intybus*) by Donald Hobern. Photo licensed under CC BY 4.0.

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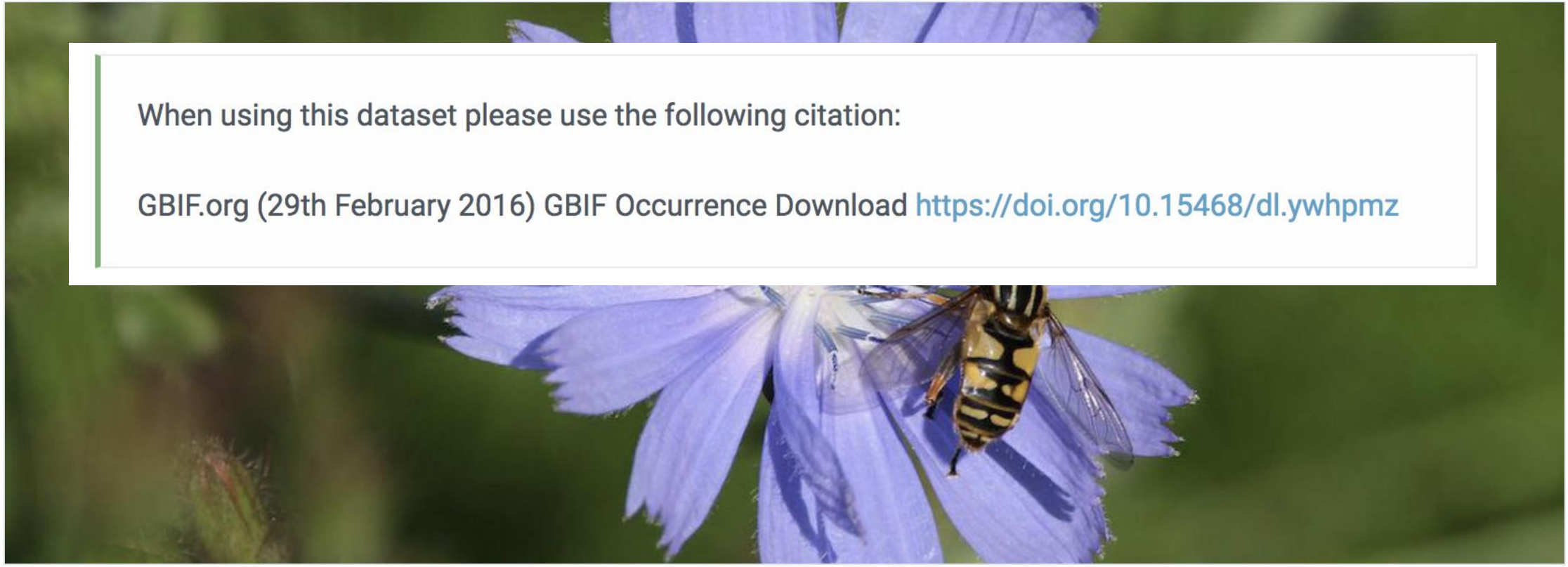
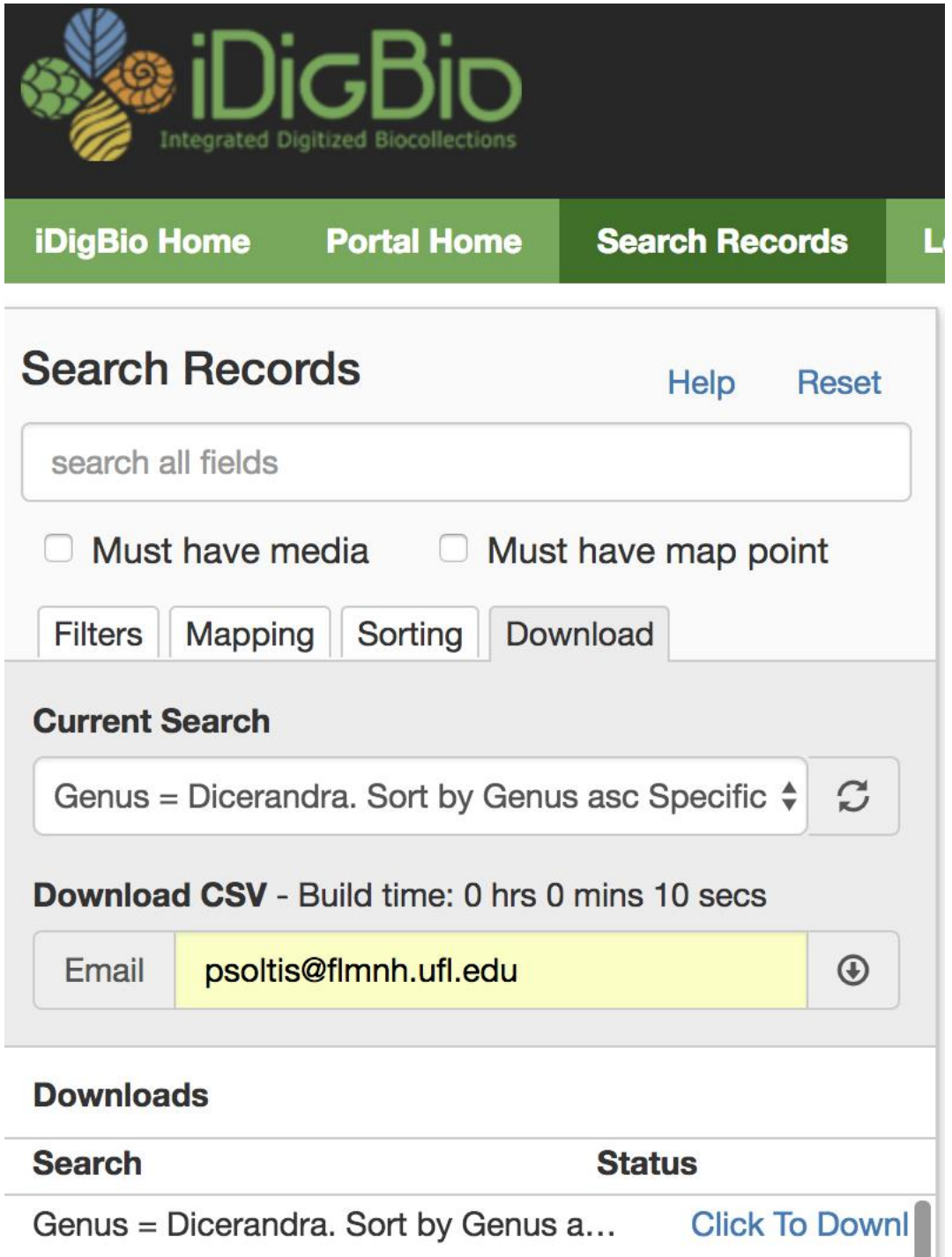
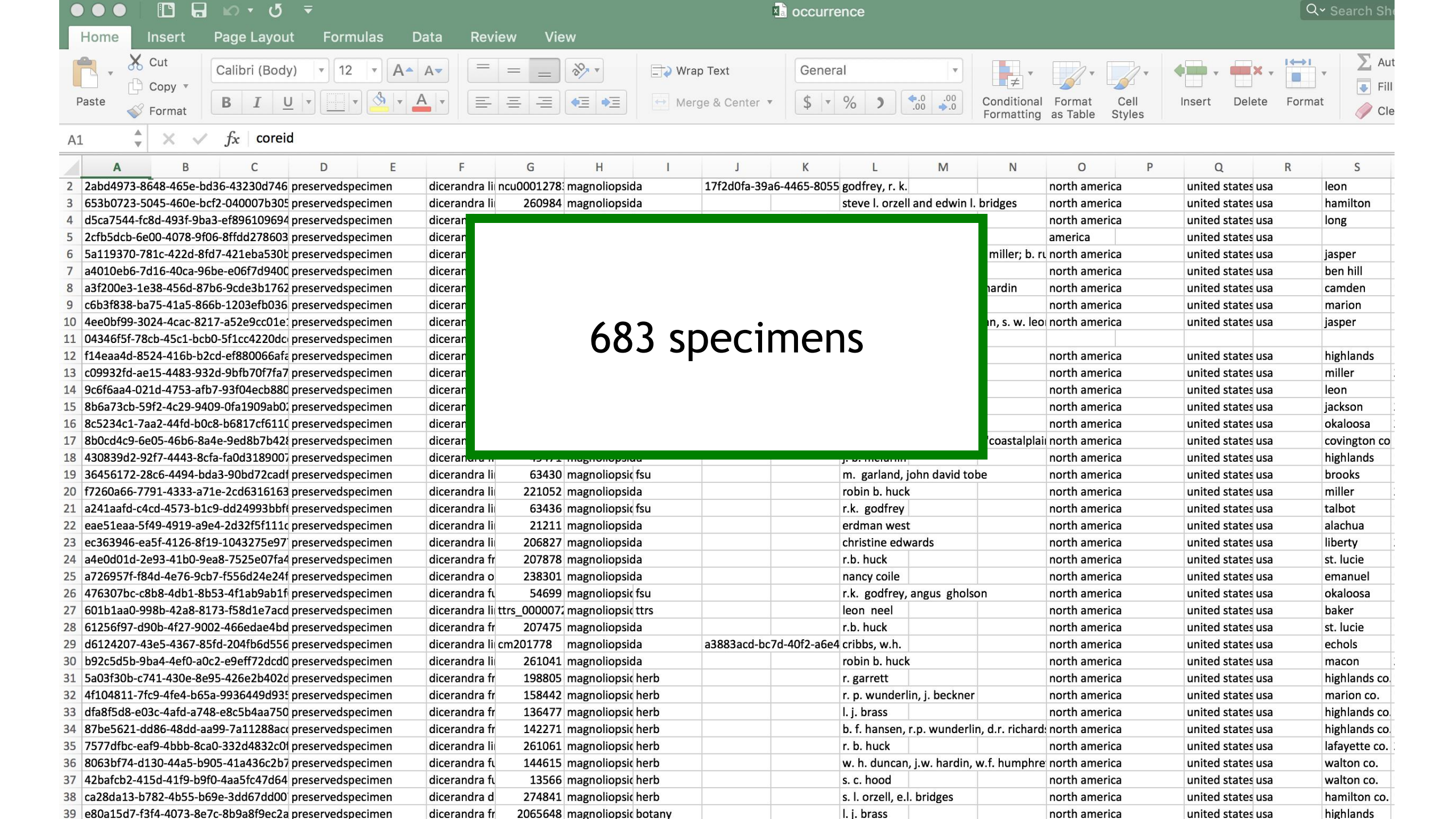


Chicory (*Cichorium intybus*) by Donald Hobern. Photo licensed under CC BY 4.0.

Dicerandra

Andre Naranjo





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Must have map point…

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Search Records

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search all fields

Must have media Must have map point

Filters | Mapping | Sorting | Download

Current Search

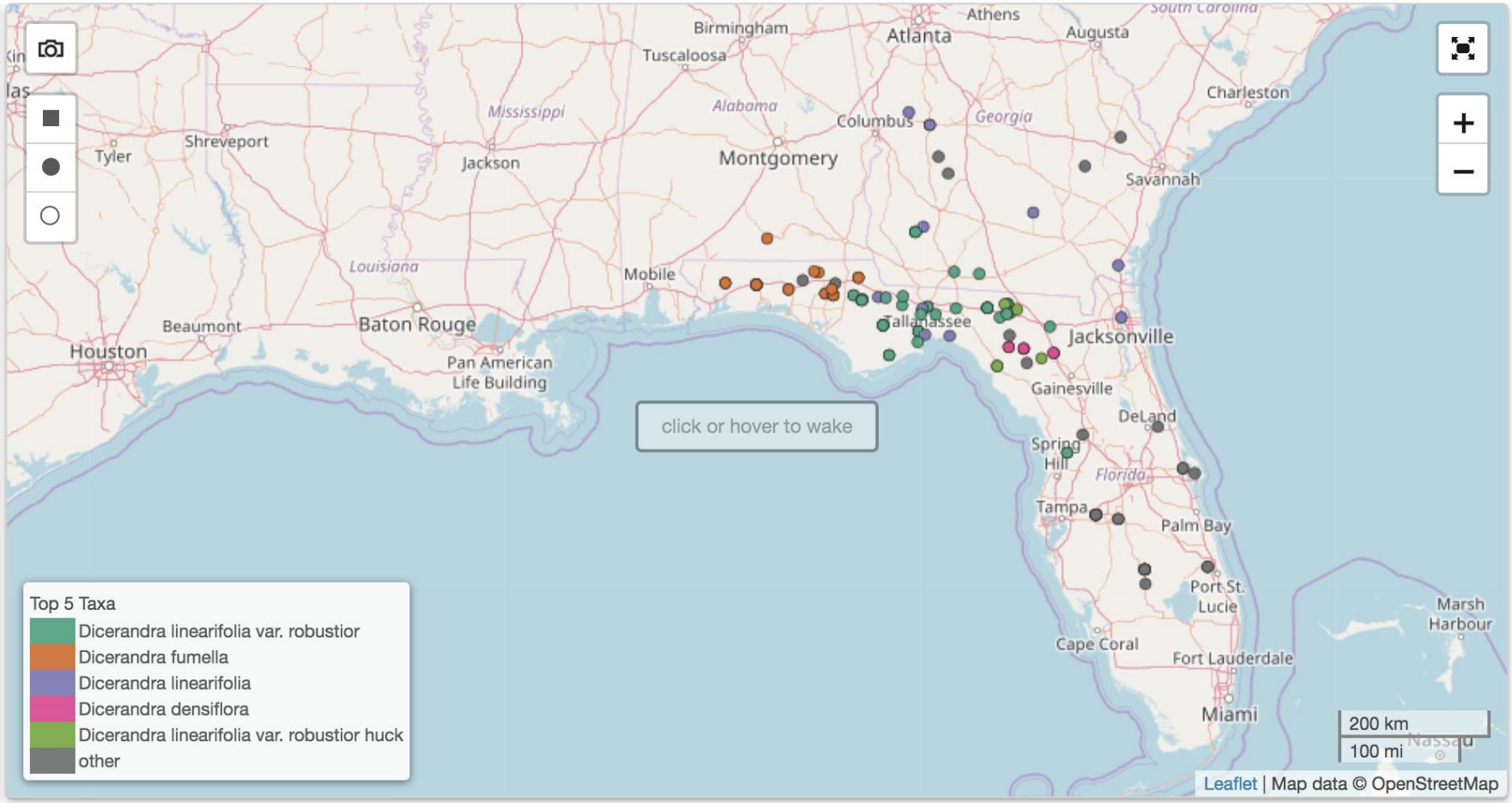
Genus = dicerandra. Sort by Genus asc Specific

Download CSV - Build time: 0 hrs 0 mins 10 secs

Email psoltis@flmnh.ufl.edu

Downloads

Search	Status
Genus = dicerandra. Sort by Genus a…	Click To Downl
Family = (anisophyllaceae or apodant…	Click To Downl



List | Labels | Media | Recordsets

Total: 683

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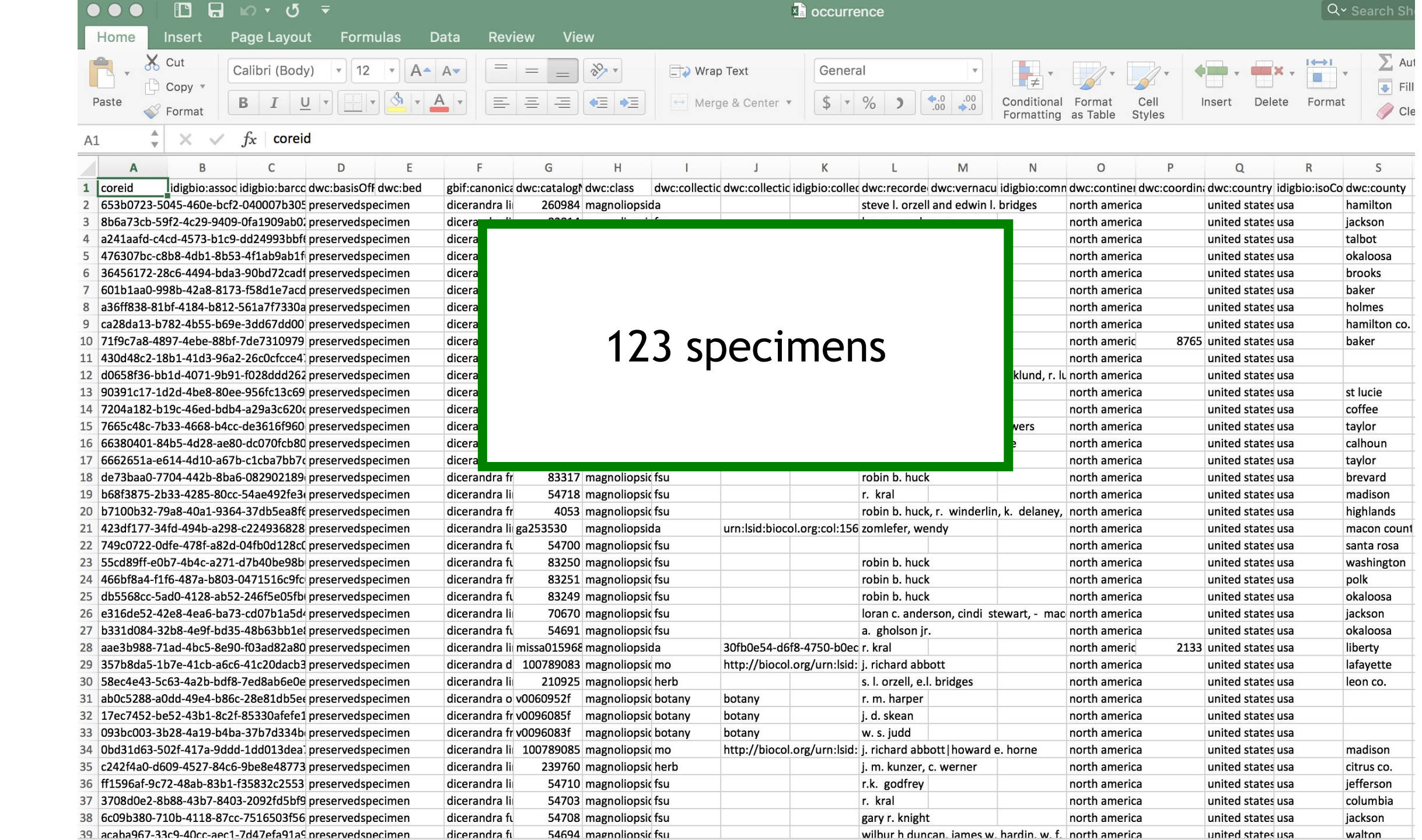

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34	0bd31d63-502f-417a-9ddd-1dd013dea			preservedspecimen		dicerandra li	100789085	magnoliopsic	mo	http://biocol.org/urn:lsid:		j. richard abbott|howard e. horne			north america		united states	usa	madison
35	c242f4a0-d609-4527-84c6-9be8e48773			preservedspecimen		dicerandra li	239760	magnoliopsic	herb			j. m. kunzer, c. werner			north america		united states	usa	citrus co.
36	ff1596af-9c72-48ab-83b1-f35832c2553			preservedspecimen		dicerandra li	54710	magnoliopsic	fsu			r.k. godfrey			north america		united states	usa	jefferson
37	3708d0e2-8b88-43b7-8403-2092fd5bf9			preservedspecimen		dicerandra li	54703	magnoliopsic	fsu			r. kral			north america		united states	usa	columbia
38	6c09b380-710b-4118-87cc-7516503f56			preservedspecimen		dicerandra fu	54708	magnoliopsic	fsu			gary r. knight			north america		united states	usa	jackson
39	acaba967-33c9-40cc-aec1-7d47efa91a9			preservedspecimen		dicerandra fu	54694	magnoliopsic	fsu			wilbur h duncan, james w. hardin, w. f.			north america		united states	usa	walton

Must have map point… & be in Florida

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Genus dicerandra Add EOL Synonyms ☐ Present ☐ Missing

Family dwc:family Add EOL Synonyms ☐ Present ☐ Missing

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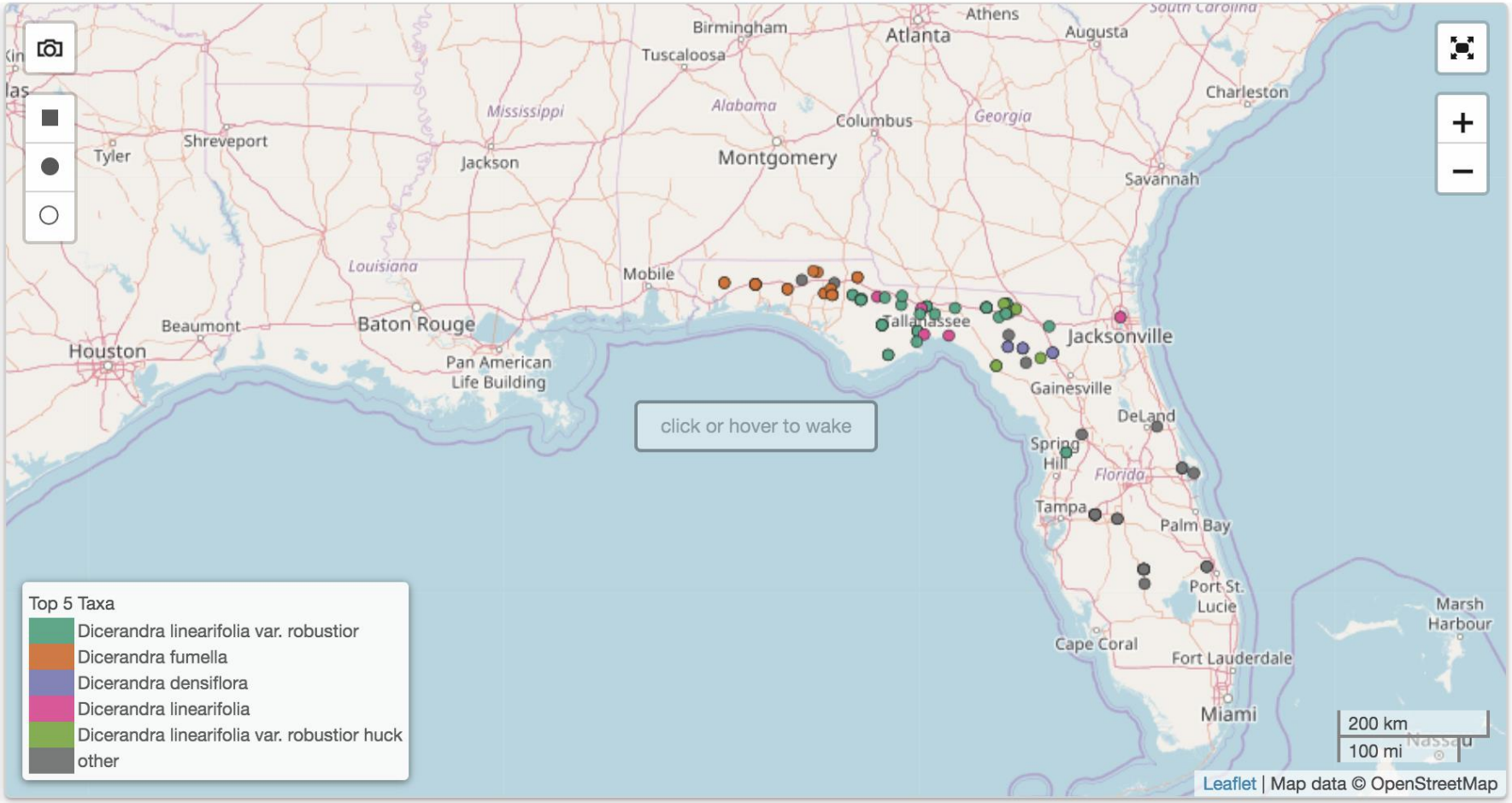
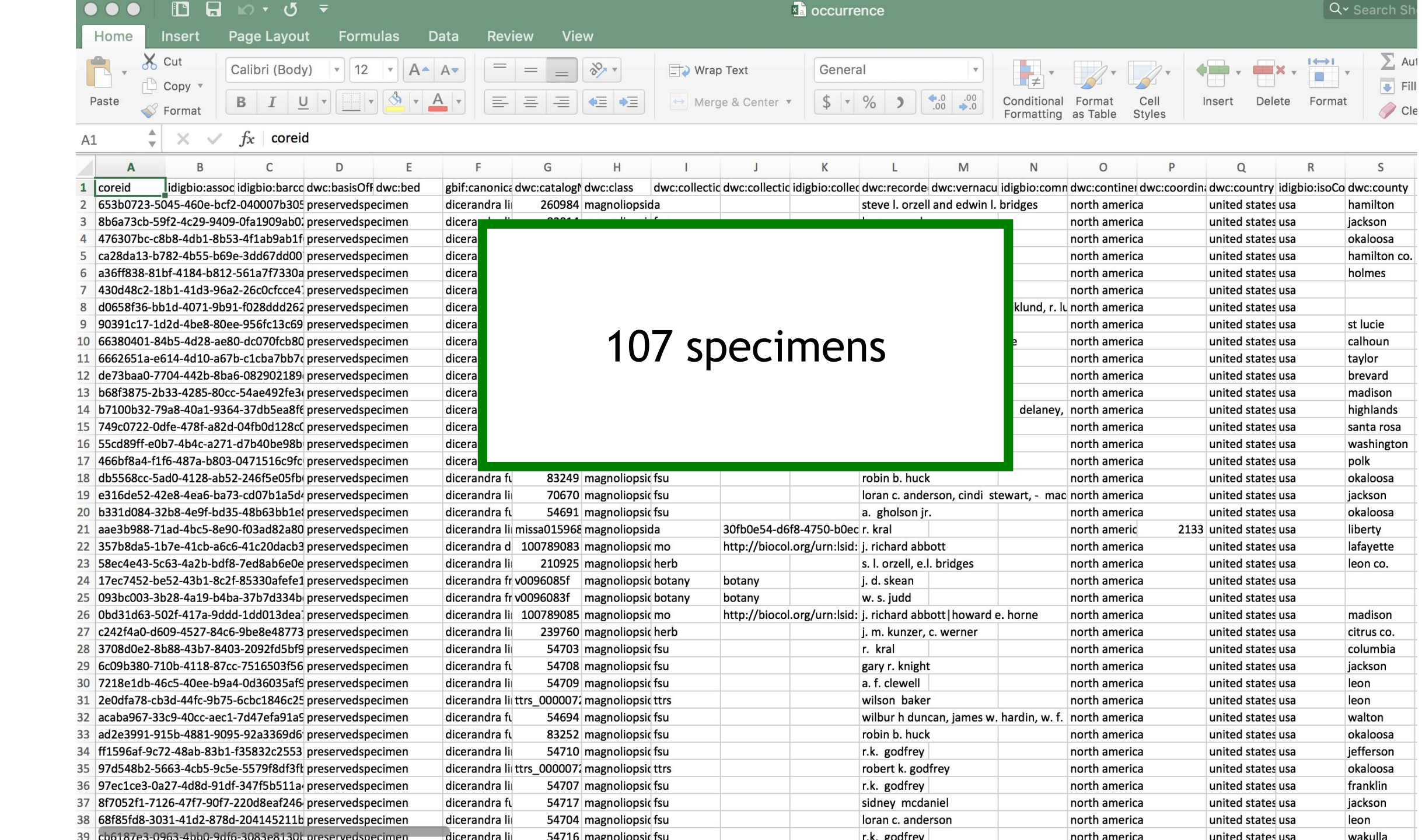


List | Labels | Media | Recordsets

Total: 107

Family	Scientific Name	Date Collected	Country	Institution Code	Basis of Record	Columns
Lamiaceae	Dicerandra linearifolia	*no data*	United States	TTRS	PreservedSpecimen	view



	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S
1	coreid	idigbio:assoc	idigbio:barco	dwc:basisOff	dwc:bed	gbif:canonica	dwc:catalogN	dwc:class	dwc:collectic	dwc:collectic	idigbio:collec	dwc:recorde	dwc:vernacu	idigbio:comn	dwc:continer	dwc:coordina	dwc:country	idigbio:isoCo	dwc:county
2	653b0723-5045-460e-bcf2-040007b305			preservedspecimen		dicerandra li	260984	magnoliopsida				steve l. orzell and edwin l. bridges			north america		united states	usa	hamilton
3	8b6a73cb-59f2-4c29-9409-0fa1909ab0			preservedspecimen		dicera									north america		united states	usa	jackson
4	476307bc-c8b8-4db1-8b53-4f1ab9ab1f			preservedspecimen		dicera									north america		united states	usa	okaloosa
5	ca28da13-b782-4b55-b69e-3dd67dd00			preservedspecimen		dicera									north america		united states	usa	hamilton co.
6	a36ff838-81bf-4184-b812-561a7f7330a			preservedspecimen		dicera									north america		united states	usa	holmes
7	430d48c2-18b1-41d3-96a2-26c0cfcce4			preservedspecimen		dicera									north america		united states	usa	
8	d0658f36-bb1d-4071-9b91-f028ddd262			preservedspecimen		dicera								klund, r. lu	north america		united states	usa	
9	90391c17-1d2d-4be8-80ee-956fc13c69			preservedspecimen		dicera									north america		united states	usa	st lucie
10	66380401-84b5-4d28-ae80-dc070fcb80			preservedspecimen		dicera								e	north america		united states	usa	calhoun
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17	466bf8a4-f1f6-487a-b803-0471516c9f			preservedspecimen		dicera									north america		united states	usa	polk
18	db5568cc-5ad0-4128-ab52-246f5e05fb			preservedspecimen		dicerandra fu	83249	magnoliopsic	fsu			robin b. huck			north america		united states	usa	okaloosa
19	e316de52-42e8-4ea6-ba73-cd07b1a5d			preservedspecimen		dicerandra li	70670	magnoliopsic	fsu			loran c. anderson, cindi stewart, - mac			north america		united states	usa	jackson
20	b331d084-32b8-4e9f-bd35-48b63bb1e			preservedspecimen		dicerandra fu	54691	magnoliopsic	fsu			a. gholson jr.			north america		united states	usa	okaloosa
21	aae3b988-71ad-4bc5-8e90-f03ad82a80			preservedspecimen		dicerandra li	missa015968	magnoliopsida		30fb0e54-d6f8-4750-b0ec		r. kral			north americ	2133	united states	usa	liberty
22	357b8da5-1b7e-41cb-a6c6-41c20dacb3			preservedspecimen		dicerandra d	100789083	magnoliopsic	mo	http://biocol.org/urn:lsid:		j. richard abbott			north america		united states	usa	lafayette
23	58ec4e43-5c63-4a2b-bdf8-7ed8ab6e0e			preservedspecimen		dicerandra li	210925	magnoliopsic	herb			s. l. orzell, e.l. bridges			north america		united states	usa	leon co.
24	17ec7452-be52-43b1-8c2f-85330afefe1			preservedspecimen		dicerandra fr	v0096085f	magnoliopsic	botany	botany		j. d. skean			north america		united states	usa	
25	093bc003-3b28-4a19-b4ba-37b7d334b			preservedspecimen		dicerandra fr	v0096083f	magnoliopsic	botany	botany		w. s. judd			north america		united states	usa	
26	0bd31d63-502f-417a-9ddd-1dd013dea			preservedspecimen		dicerandra li	100789085	magnoliopsic	mo	http://biocol.org/urn:lsid:		j. richard abbott|howard e. horne			north america		united states	usa	madison
27	c242f4a0-d609-4527-84c6-9be8e48773			preservedspecimen		dicerandra li	239760	magnoliopsic	herb			j. m. kunzer, c. werner			north america		united states	usa	citrus co.
28	3708d0e2-8b88-43b7-8403-2092fd5bf9			preservedspecimen		dicerandra li	54703	magnoliopsic	fsu			r. kral			north america		united states	usa	columbia
29	6c09b380-710b-4118-87cc-7516503f56			preservedspecimen		dicerandra fu	54708	magnoliopsic	fsu			gary r. knight			north america		united states	usa	jackson
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31	2e0dfa78-cb3d-44fc-9b75-6cbc1846c25			preservedspecimen		dicerandra li	ttrs_000007	magnoliopsic	ttrs			wilson baker			north america		united states	usa	leon
32	acaba967-33c9-40cc-aec1-7d47efa91a9			preservedspecimen		dicerandra fu	54694	magnoliopsic	fsu			wilbur h duncan, james w. hardin, w. f.			north america		united states	usa	walton
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37	8f7052f1-7126-47f7-90f7-220d8eaf246			preservedspecimen		dicerandra fu	54717	magnoliopsic	fsu			sidney mcdaniel			north america		united states	usa	jackson
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39	cb6187e3-0963-4bb0-9df6-3083e8130b			preservedspecimen		dicerandra li	54716	magnoliopsic	fsu			r.k. godfrey			north america		united states	usa	wakulla

Dicerandra

Andre Naranjo

If data sets were all published…

- Clear record of data used & how
- Annotated specimen records
- Reproducible analysis
- Data could be integrated with other data, augmentation of records
  - Genetics
  - Functional traits
  - Env. data, e.g. NEON
- Attribution
  - Institutions can search for their data
  - All institutions, collections that contributed value get credit

Why don’t we track and publish data sets?

- No consensus
  - What to track
  - How to track
  - Where to publish
- Technical challenges: how to cite, and where to publish?
  - GUIDs
  - GBIF doi model
  - Dryad, others
- Social
  - Submit to publishers that will accommodate data sets
  - Need to convince ‘journals’ that data should be published
    - ‘we’ are the journals: reviewers, editors, editorial boards, etc.

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