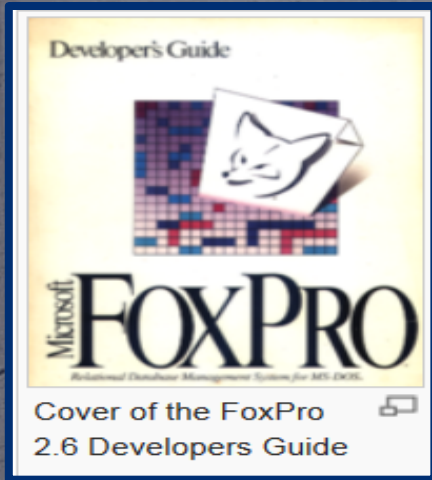


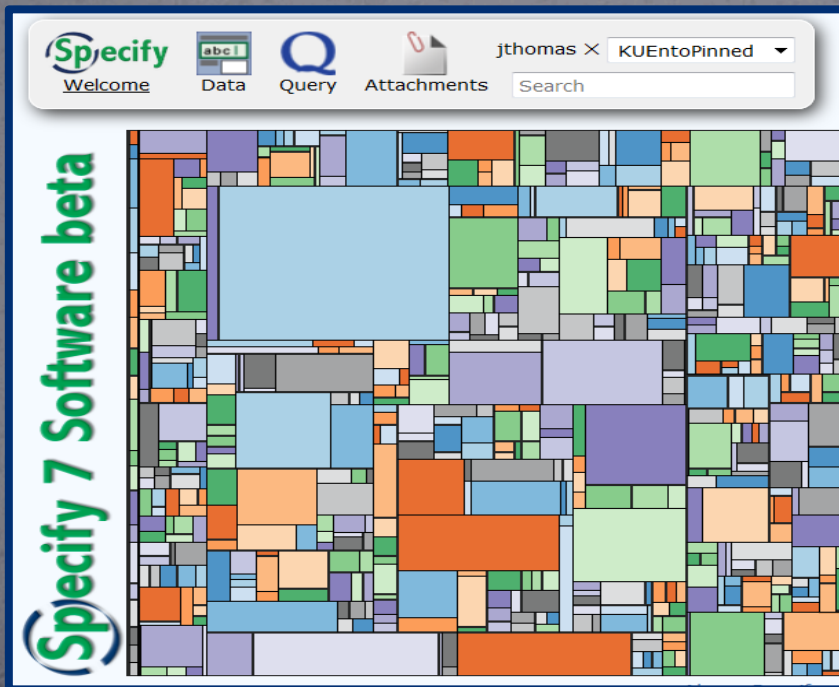
An Introduction to Image Workflows and Associated Digitization Standards at SEMC

Jennifer Thomas
Division of Entomology
University of Kansas

From ancient times to the present



- ❖ Migrated from FoxPro to Specify 2.0 – ca. 1999
- ❖ Converted through all major updates from 2.0 – 5.0 without intervention
- ❖ Major cleanup effort before converting from Sp. 5 to Sp. 6
- ❖ Now simultaneously using Sp. 6 and Sp. 7 web browser version

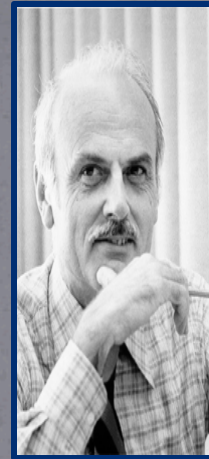


Fits and Starts

- ❖ First major NSF funded project: North American and Mexican Bees at University of Kansas: ~250,000 specimens, georeferenced localities.
- ❖ Several small retroactive capture projects and continuous proactive capture over the next several years....
- ❖ Second major NSF funded retroactive capture project:
NSF DBI – 1057366: A specimen-level database of the world's bees (Apoidea) at the University of Kansas. PI – Dr. Michael Engel

The rest of our Apoidea collection including two non-integrated large donations.

Challenges



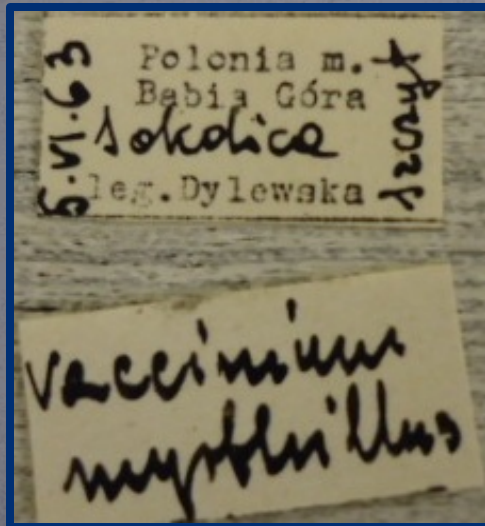
Relational Database Model

12 Rules

by

Edgar Frank Ted Codd

© 87android



It takes a village to raise a collection?



A visual solution with a standard twist...

Edinburgh
Mar. 22, '32
C. M. Danforth
Cur.

Innsbruck
21.8.1896
Friese*

Liwaassl
V. 35

AUSTRALIA: WA; NW Coastal Hwy
~20 km NNE Eurardy Station
27°24'47"S; 114°39'57"E; 209m
Almeida, Danforth & Packer
05.x.2006, on *Melaleuca* aff. *euystoma*

Tampin
W. W. Froggatt
W. W. Froggatt
Collection

AUSTRIA
Neusiedler See
20 August 1960
(C. D. Michener)

ATMORE
KING'S LYNN
Aug 1903

CSSR-23.7.1959
Gombasek
gt Dr. Z. Pádr

EGYPT
Min. Agric. (Egypt)
Coll. R. MABROUK
WANSOURIAH
8630

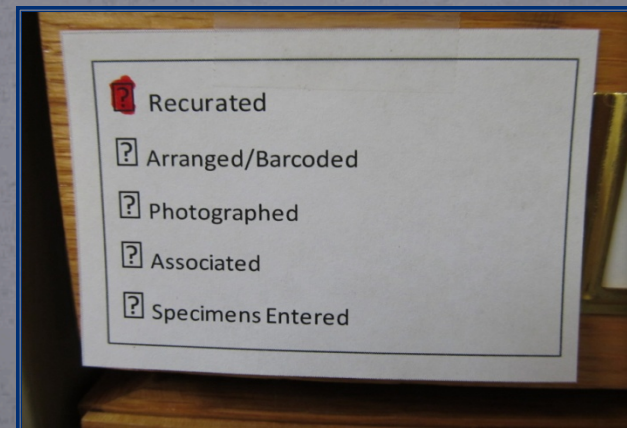
四川峨嵋山护國寺
550—750 公尺
中國科学院
极春靴(田)
1964.V.21
采集者: 吴燕如

SK.PadrZ1959.07.23 001

Biareolina
neglecta
o Duf (Dow)
+ Alger.
Gribodo
Dec. 1883

6.11.63
Polonia m.
Babia Góra
okodice
leg. Dylewska
Vaccinium
myrtillus

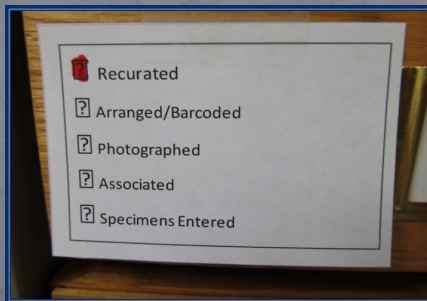
Phase 1 - Recuration



Phase 2 - arrange/barcode

❖ Within each species, specimens are arranged by collecting event:

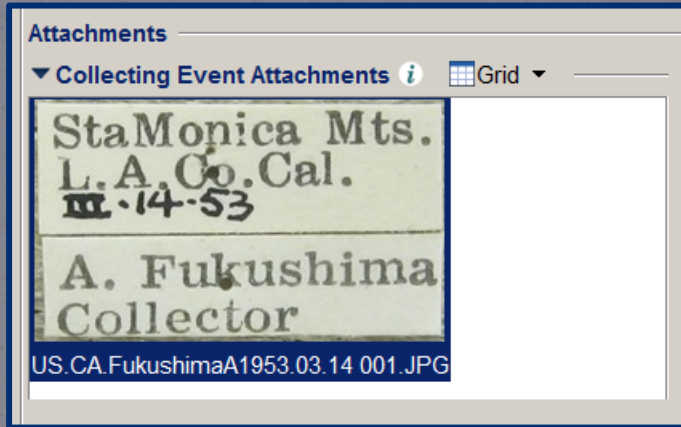
- ❖ Collector
- ❖ Date
- ❖ Locality
- ❖ Elevation, host plant, habitat data...
- ❖ Then barcodes are attached in that order.



Spreadsheet creation

Computer > Divisions (R:) > Entomology > General Division Folders > Project folders > SpecifyWBbeeprojectfiles >

Sp6Queries	2/1/2012 9:11 AM
Sp6WBAnthophora34withoutCEs	9/25/2014 10:36 A...
Sp6WBAnthophorini16withsomeCEs	8/13/2014 12:44 PM
Sp6WBAnthophorini23withoutCEs	9/25/2014 9:53 AM
Sp6WBAnthophorini24DONE	9/24/2014 4:33 PM
Sp6WBAnthophorini25withsomeCEs	9/24/2014 5:40 PM
Sp6WBAnthophorini26withoutCEs	9/24/2014 3:32 PM
Sp6WBAnthophorini27withoutspecimens	9/17/2014 2:42 PM
Sp6WBAnthophorini28withoutCEs	9/24/2014 6:09 PM
Sp6WBAnthophorini29withoutCEs	9/15/2014 5:20 PM
Sp6WBAnthophorini30withoutCE	9/19/2014 5:56 PM



1	Catalog Num	Collecting Event Number	Genus1	subgenus	species1	subspeci	Author	Date	determiner	determined da	sex	stage	prep typ	count1	collect type	Remarks
55	1333918	US.TX.EvansH1963.04.29 001	Anthophora	Melea	occidentalis				Brooks	1979/00/00	m	adult	Pinned	1	SEMC	
56	1333919	US.WA.Unknown1882.07.04 001	Anthophora	Melea	occidentalis				Brooks	1979/00/00	m	adult	Pinned	1	SEMC	
57	1333920	CAN.SaltR1940.03.17 001	Anthophora	Melea	occidentalis				Brooks	1979/00/00	m	adult	Pinned	1	SEMC	
58	1333921	US.UT.Unknown0000.07.23 001	Anthophora	Melea	occidentalis				Brooks	1979/00/00	m	adult	Pinned	1	SEMC	
59	1333922	US.UT.KnowltonWood1949.07.27	Anthophora	Melea	occidentalis				Brooks	1979/00/00	f	adult	Pinned	1	SEMC	
60	1333923	US.CA.FukushimaA1953.03.14 001	Anthophora	Melea	occidentalis				Brooks	1979/00/00	f	adult	Pinned	1	SEMC	LACM
61	1333924	US.UT.Unknown1932.05.02 001	Anthophora	Melea	occidentalis				Brooks	1979/00/00	f	adult	Pinned	1	SEMC	
62	1333925	US.CA.Baker0000.00.00 001	Anthophora	Melea	occidentalis				Brooks	1979/00/00	f	adult	Pinned	1	SEMC	
63	1333926		Anthophora	Melea	occidentalis				Brooks	1979/00/00	f	adult	Pinned	1	SEMC	
64	1333927	US.CA.McDonaldW1954.02.07 001	Anthophora	Melea	occidentalis				Brooks	1979/00/00	f	adult	Pinned	1	SEMC	
65	1333928		Anthophora	Melea	occidentalis				Brooks	1979/00/00	f	adult	Pinned	1	SEMC	
66	1333929		Anthophora	Melea	occidentalis				Brooks	1979/00/00	f	adult	Pinned	1	SEMC	
67	1333930		Anthophora	Melea	occidentalis				Brooks	1979/00/00	m	adult	Pinned	1	SEMC	
68	1333931		Anthophora	Melea	occidentalis							adult	Pinned	1	SEMC	
69	1333932		Anthophora	Melea	occidentalis				Brooks	1979/00/00	m	adult	Pinned	1	SEMC	
70	1333933	US.AZ.JohnsonC1967.03.12 001	Anthophora	Melea	occidentalis							adult	Pinned	1	SEMC	
71	1333934	US.AZ.duBoisJ1938.03.17 001	Anthophora	Melea	occidentalis							adult	Pinned	1	SEMC	

Collecting Information

Coll Event #: AT.PittioniE1924.06.22 002

Start Date: 06/22/1924

End Date: 06/22/1924

Verbatim Da...

Locality: Bisamberg, Austria, Lower Austria (Niederosterreich), Korneuberg



Default Rem...



Method:

Verbatim Locality:

Label Image:

Collecting Event Attribute

Host Taxon: Convolvulus

Habitat Type:

Verbatim Hab...

Water Quality

Water Temp:

Collectors

Last Name

Pittioni

Collection Objects

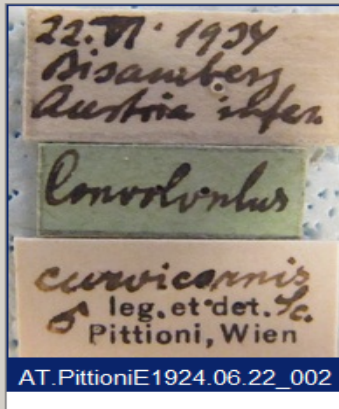
Specimen #	Full Name
950336	Systropha curvicornis

Form

Attachments

Collecting Event Attachments

Grid



Creation of new collecting event records with image attachments.

Collecting Information

Coll Event #: AT.PittoniE1924.06.22.002

Start Date: 06/22/1924 End Date: 06/22/1924 Verbatim Da...

Locality: Bisamberg, Austria, Lower Austria (Niederosterreich), Korneuberg

Default Rem...

Method: Verbatim Locality:

Label Image:

▼ Collecting Event Attribute

Host Taxon: Convolvulus Habitat Type:

Verbatim Hab...

Water Quality

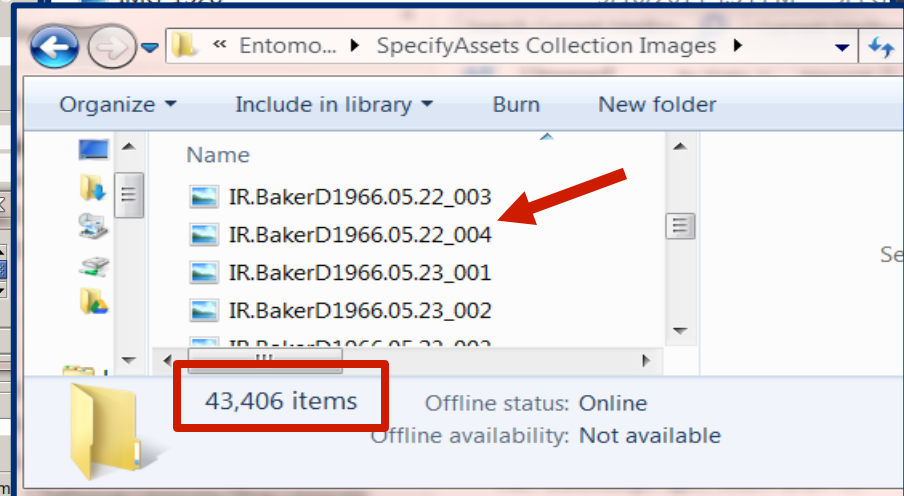
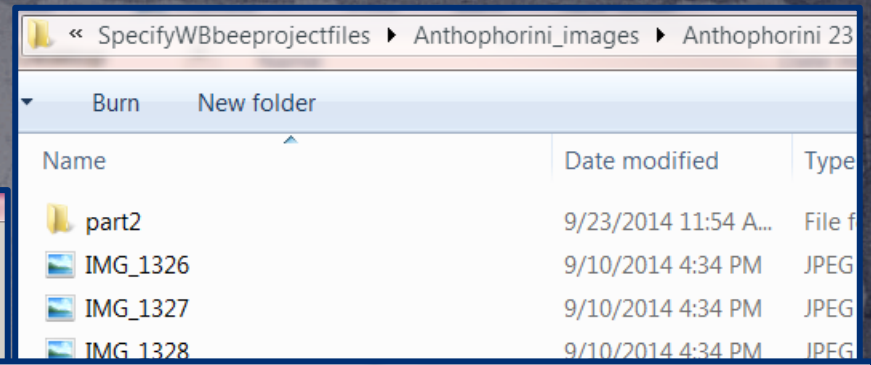
Water Temp:

▼ Collectors

Last Name: Pittoni

▼ Collection Objects

Specimen #	Full Name
950336	Systropha curvicornis



	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	Catalog Num	Collecting Event Number	Genus1	subgenus1 (in parentheses)	species1	Author	Date	determiner last name	determined date	sex	stage	prep type	count1	collection	Identifier
149	1334233	US.CA.SpiraT1976.07.21.001	Anthophora	(Mystacanthophora)	urbana	Cresson	1878	Thorp			adult	Pinned	1	SEMC	
150	1334234	US.CA.SpiraT1976.07.21.001	Anthophora	(Mystacanthophora)	urbana	Cresson	1878	Thorp			adult	Pinned	1	SEMC	
151	1334235	US.CA.SpiraT1976.07.21.002	Anthophora	(Mystacanthophora)	urbana	Cresson	1878	Thorp			adult	Pinned	1	SEMC	
152	1334236	US.CA.SpriaT1976.08.29.001	Anthophora	(Mystacanthophora)	urbana	Cresson	1878	Thorp			adult	Pinned	1	SEMC	
153	1334237	US.CA.SpriaT1976.07.12.001	Anthophora	(Mystacanthophora)	urbana	Cresson	1878				adult	Pinned	1	SEMC	
154	1334238	US.CA.SpriaT1976.08.23.001	Anthophora	(Mystacanthophora)	urbana	Cresson	1878	Thorp			adult	Pinned	1	SEMC	
155	1334239	US.CA.SpiraT1976.09.04.001	Anthophora	(Mystacanthophora)	urbana	Cresson	1878	Thorp			adult	Pinned	1	SEMC	
156	1334240		Anthophora	(Mystacanthophora)	urbana	Cresson	1878	Thorp			adult	Pinned	1	SEMC	
157	1334241		Anthophora	(Mystacanthophora)	urbana	Cresson	1878				adult	Pinned	1	SEMC	

Specify 7 Web Browser - looking for a new way forward...

- ❖ Can upload bulk images of labels to be transcribed later
- ❖ Crowd sourcing possibilities here?
- ❖ People would have to contact us for access to online DB....
- ❖ But direct transcription is possible...
- ❖ Ok to put blank records with images only on GBIF?
Then wait for folks to contact us?

Bulk Image Uploads

Specify 6.5.05

File Edit Data System Tabs Help

Welcome Data Trees Reports Interactions Statistics Query Workbench SGR Plugins Lifemapper Atta

Actions

- Import Data
- Import Images
- New Data Set
- Export Data Set
- Export MS Excel Template
- Create Data Set from Record Set

Reports

- Basic Label
- Data Set Summary
- Chart
- Top 10

Data Sets

- Andrenidae55_56
- Augochlorini57ready
- BakerbeeAndrenidaeMelittidaeSpecifytaxonimp
- Coccinellidaedataimport1mar2014
- Coccinellidaedataimport2mar2014
- Coccinellidaedataimport3mar2014
- CollectingEventuploadtemplate2012

Choose Image Files

Look In: part2

- CAN.SaltR1940.03.17.001.JPG
- US.CA.CavagnaroD1961.03.20.001.JPG
- US.CA.FukushimaA1953.03.14.001.JPG
- US.CO.MaehlerK1937.07.04.001.JPG
- US.KS.KnausW0000.00.00.002.JPG
- US.KS.MarstonN1958.07.06.001.JPG
- US.KS.Popenoe0000.06.26.001.JPG
- US.NM.BarberC0000.00.00.001.JPG
- US.NM.BooneCazierCohn1950.07.14.002.JPG
- US.TX.EvansH1963.04.29.001.JPG
- US.UT.KnowltonWood1949.07.27.001.JPG
- US.UT.Unknown0000.07.23.001.JPG
- US.UT.Unknown1932.05.02.001.JPG
- US.WA.Unknown1882.07.04.001.JPG
- US.WY.Unknown1930.08.08.001.JPG

File Name:

Files of Type: Images

Open Cancel



Welcome



Data



Query



Attachments

jthomas X KUEntoPinned

Search

Collecting Information: US.KS.KnausW0000.00.00 002 [previous](#) [next](#)

Coll Event #

Start Date End Date Verbatim Date

Locality

Default Remarks

Method Verbatim Locality

Label Image

Collecting Event Attribute [Add](#)

none...

Collectors [Add](#)

Last Name	First Name	Remarks
<input type="text" value="Knaus"/>	<input type="text" value="Warren"/>	<input type="text"/>

Attachments

Attachments

Collecting Event Attachments (1) [Add](#) [Delete](#)



Last Edited By

High-Res Specimen Imaging Workflow

- ❖ High-resolution imaging of primary types.
- ❖ Vet/catalog/curate primary types first then grad students take over.
- ❖ Set out barcodes first then image, then combine z, then dump images into temp storage folder like previous workflow. Then barcode and enter specimen data into DB directly – no SS.
- ❖ Need pics of system, process, computers, etc.

Visionary Digital Imaging system



Andrena (Rhacandrena) coruscata






Jemez Spgs., N.
M. VII - 1 - 41
R. H. Beamer



♀ HOLOTYPE
Andrena
coruscata
La Berge

Database record

Collection Object

Specimen #: GUID: Accession: 
Cataloged D...: Cataloger:  Collect Identifi...:
Collecting Ev...: 

Determinations

Taxon:  Det by: 
Date: Type: Type #: Current
Original Combination:

1 of 1

Grid 

Col Obj Attribute

Sex: Stage:

Preparations

Prep Type: Count: Storage:  Is On L... 

Storage Loca...:
Remarks:

Attachments

Collection Object Attachments

File Name	Title
\\darwin2\SpecifyAssets\Ento...	Andrena(Rhacandrena)c...
\\darwin2\SpecifyAssets\Ento...	Andrena(Rhacandrena)c...
\\darwin2\SpecifyAssets\Ento...	Andrena(Rhacandrena)c...

Specify 6.5.05

File Edit Data System Tabs Help



Welcome Data Trees Reports Interactions Statistics Query Workbench SGR Plugins

Actions

- Show All Attachments
- Show All Images
- Import Attachments
- Import Attachment Mapping File

Jemez Spgs., N.
M. VII - 1 - 41
R. H. Beamer

♀ HOLOTYPE
Andrena
coruscata
LaBerge



Fully recurated digitized primary type collection





GBIF.ORG

Free and open access to biodiversity data

Data ▾

News ▾

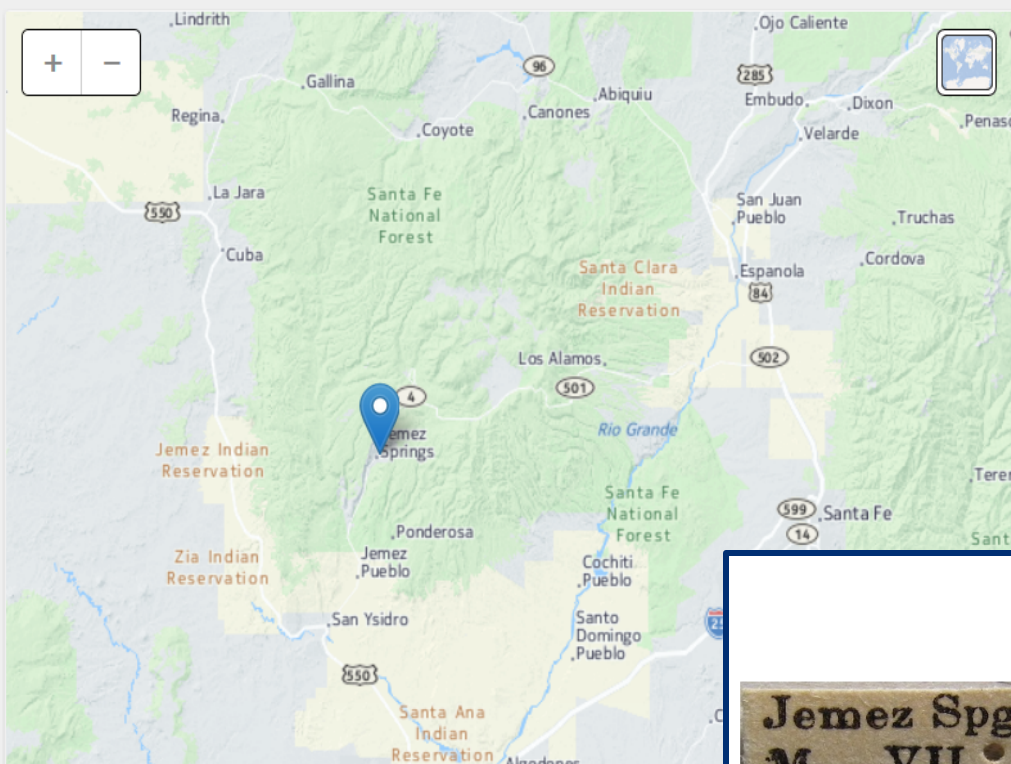
Community ▾

About ▾

485f0ac2-1ed6-11e3-bfac-90b11c41863e

Specimen of *Andrena coruscata* LaBerge, 1977 recorded on Jul 1, 1941

from Snow Entomological Museum Collection dataset



Location

LOCALITY

Jemez Springs, [United States](#)

-106.6917, 35.76861

GEOGRAPHIC CLASSIFICATION

United States > New Mexico > Sandoval



Andrena
(*Rhacandrena*)
coruscata

LICENSE

No license given

Acknowledgements

- ❖ Dr. Michael Engel, Dr. Zack Falin
- ❖ Our CA's - 5 total over the course of the grant project
- ❖ Our Undergrads – 25 total over the course of the grant project
- ❖ The Specify Team – Andy Bentley, Theresa Miller, Tim Noble, Rod Spears, & Jim Beach.
- ❖ Laura Russell – KU Informatics programmer, and GBIF extraordinaire
- ❖ NSF DBI – 1057366: A specimen-level database of the world's bees (Apoidea) at the University of Kansas
PI – Dr. Michael Engel