iDigBio
Integrated Digitized Biocollections

CYWG (CyberInfrastructure Working Group)
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iDigBio Data Ingestion

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Over 300 Data Providers...

... and many more.

Data Ingestion Progress

November 2013 -

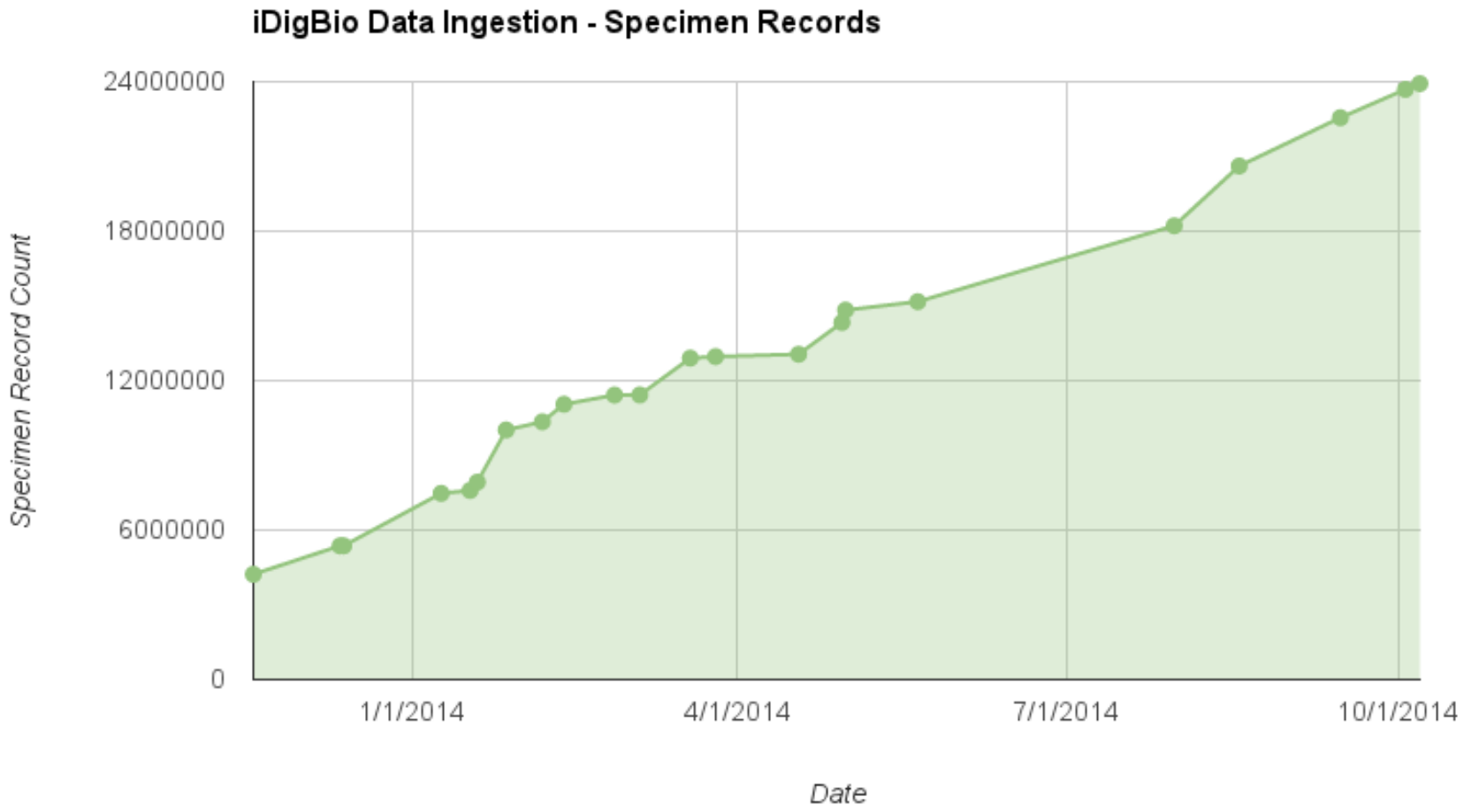
4.2 million specimen records

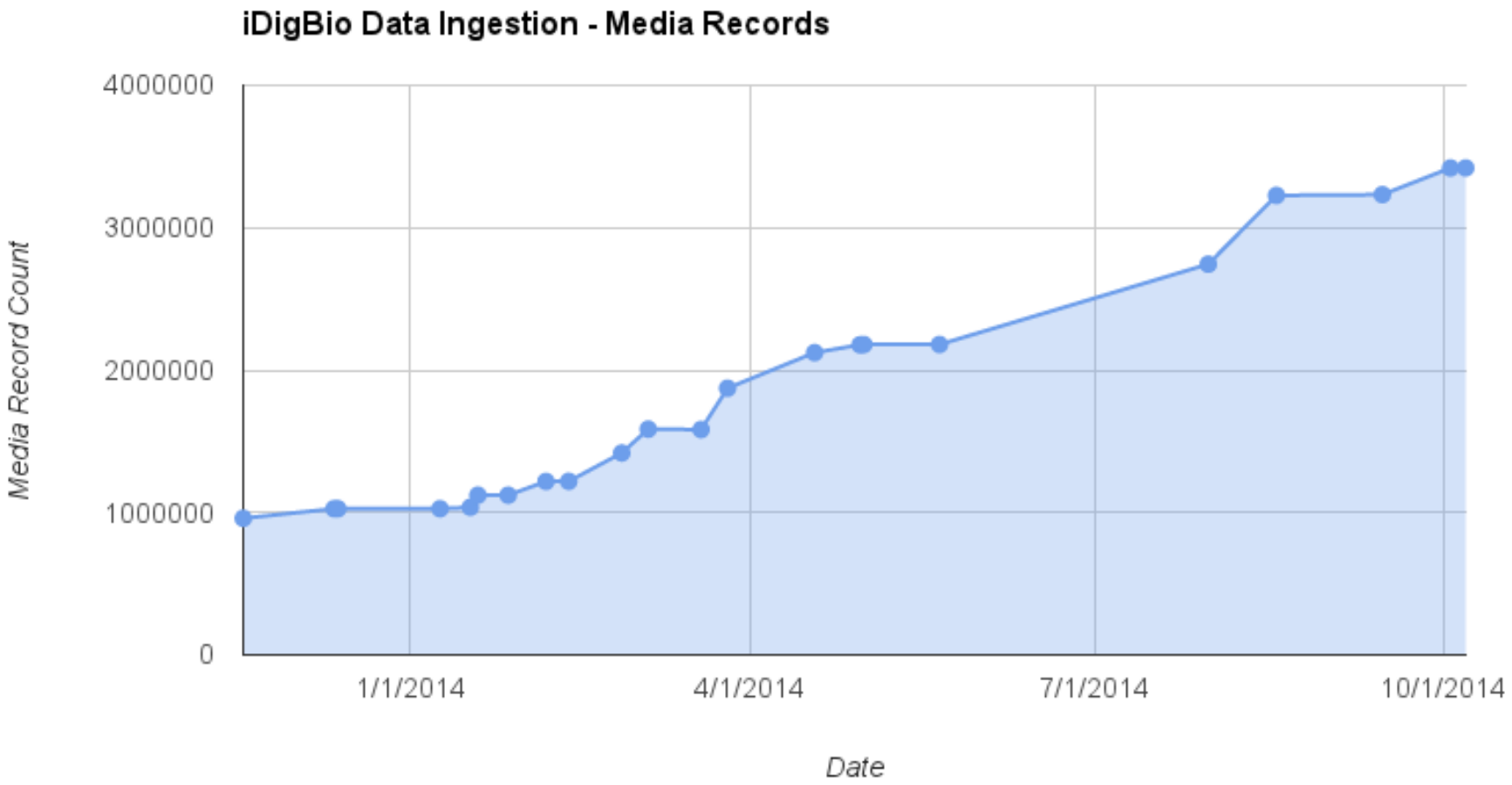
0.9 million media records

October 2014 -

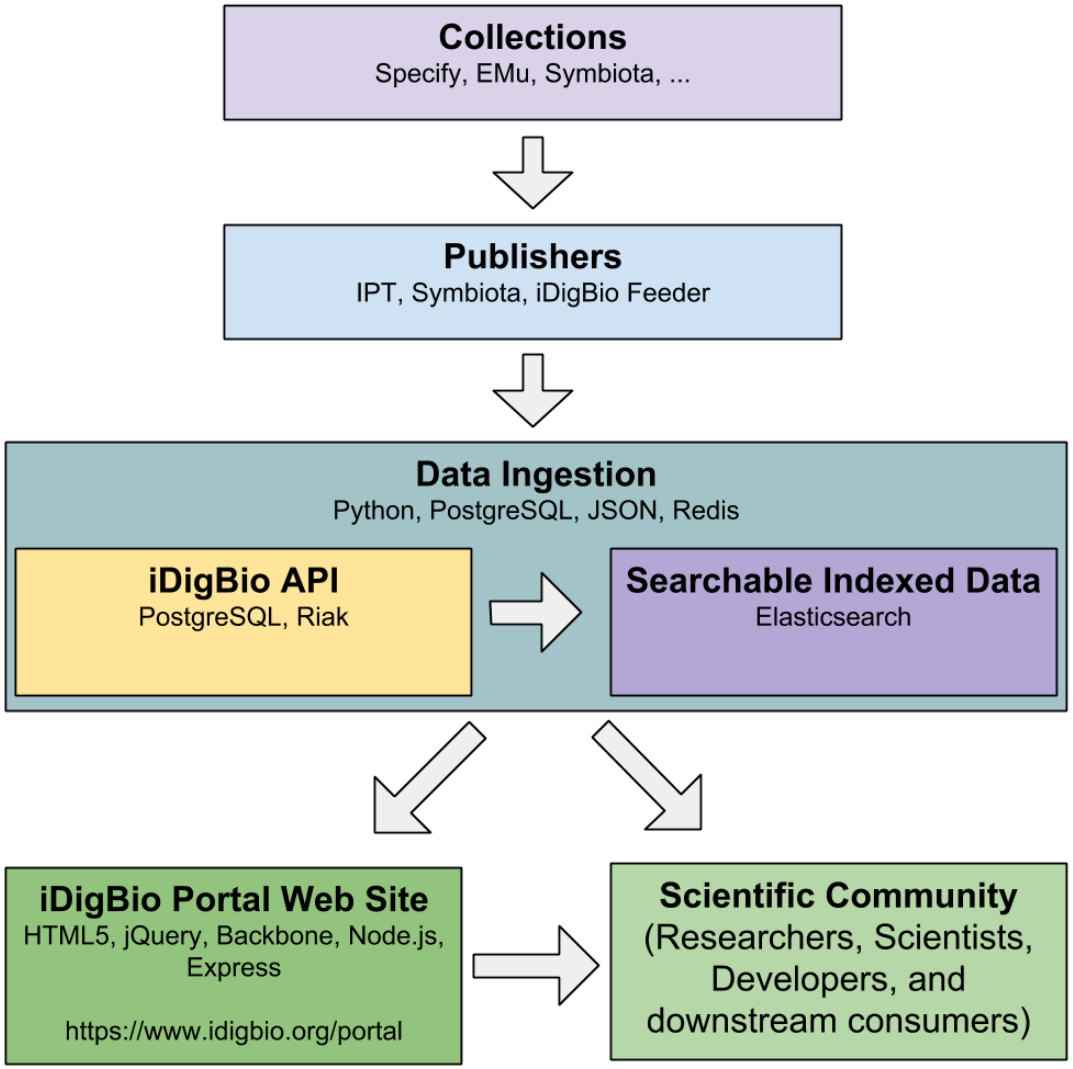
23.9 million specimen records

3.4 million media records


iDigBio Data Ingestion - Specimen Records
24000000
18000000
12000000
6000000
0
Specimen Record Count
1/1/2014
4/1/2014
7/1/2014
10/1/2014
Date


iDigBio Data Ingestion - Media Records
Media Record Count
4000000
3000000
2000000
1000000
0
1/1/2014
4/1/2014
7/1/2014
10/1/2014
Date

iDigBio Data Flow Diagram



Three types of data publishing technologies currently being consumed by iDigBio:

- **GBIF Integrated Publishing Toolkit (IPT)** - a Java tool used to publish and share biodiversity datasets http://www.gbif.org/ipt/
- **Symbiota** – web-based collection management software http://symbiota.org/
- **iDigBio RSS Feeder** – data sharing service for providers who do not run infrastructure

Dataset Formats Consumable by iDigBio

- IPT – DwC-A
- Symbiota portals – DwC-A
- iDigBio Feeder – DwC-A, CSV, …

If you can export specimen data from your system / database / spreadsheet into DwC-A (or even CSV), then you can share data with iDigBio.

iDigBio RSS Feeder facilitates the sharing of over 1.5 million specimen records and 200 thousand media records from providers who do not need to run “servers”.

Data Source Types Providing Data to iDigBio

The following collection systems, databases, applications are known to have a capability to be a data source for iDigBio.

- Specify Software Project
- EMu Museum Management System
- Symbiota
- Arctos
- Excel
- …

The iDigBio Mobilization Team (data@idigbio.org) assist with the preparation of data sets prior to Data Ingestion and are available to answer questions about sharing data with iDigBio.

See Also:

https://www.idigbio.org/wiki/index.php/Digitization_Resources

Darwin Core Archive / DwC-A
http://rs.tdwg.org/dwc/terms/guides/text/

A Darwin Core Archive is a zip file that includes metadata about the dataset, the data itself, and any optional extension data.

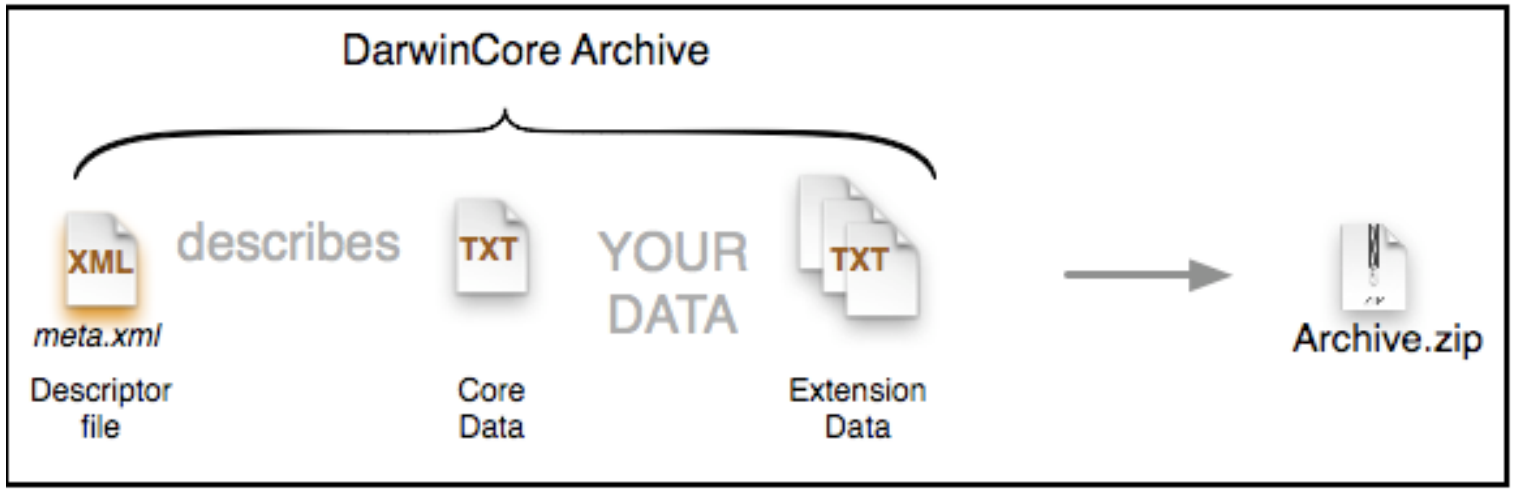


Image source: http://tools.gbif.org/dwca-assistant/

Specimen Data – Darwin Core Standard
http://rs.tdwg.org/dwc/terms/

Field	Records With This Field	(%) Percent Used
Institution Code (dwc:institutionCode)	41,262	100
Catalog Number (dwc:catalogNumber)	41,262	100
Collection Code (dwc:collectionCode)	41,262	100
Occurence ID (dwc:occurrenceID)	41,262	100
Basis of Record (dwc:basisOfRecord)	41,262	100
Kingdom (dwc:kingdom)	41,261	99.998
Phylum (dwc:phylum)	41,261	99.998
Class (dwc:class)	41,261	99.998
Order (dwc:order)	41,261	99.998
Family (dwc:family)	41,261	99.998
Scientific Name (dwc:scientificName)	41,261	99.998
Locality (dwc:locality)	41,248	99.966
Specific Epithet (dwc:specificEpithet)	41,157	99.746
Genus (dwc:genus)	41,124	99.666
Continent (dwc:continent)	40,963	99.275

Recommended minimum fields for iDigBio Ingestion:

Record ID (recordId) - unique identifier for the digital record

Occurrence ID (occurenceID) - unique identifier for the physical object or establishment of an Occurrence

Scientific Name (scientificName) - the full scientific name

Event Date (eventDate) - date-time, preferably in ISO 8601

Collector (recordedBy) - collector name, number, or field number

Locality Data (...) - verbatim and decimal locality fields, continent, country, water body, state/province, ….

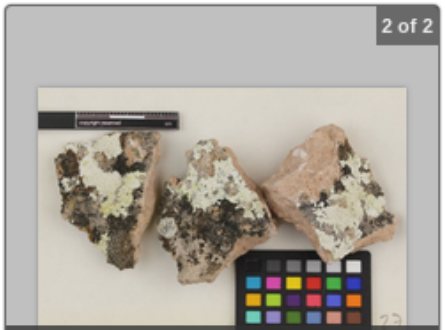
Catalog Number (catalogNumber) - Barcode, catalog number, accession id or collection number

Institution Code (institutionID) - institution identifier

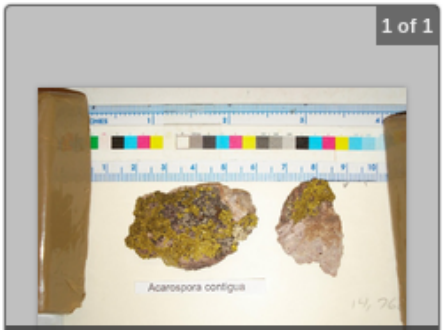
Collection Code (collectionID) - collection identifier

Paleo specimens should also include Geological Context fields.

Media Data – Audubon Core / AC
http://terms.tdwg.org/wiki/Audubon_Core_Term_List

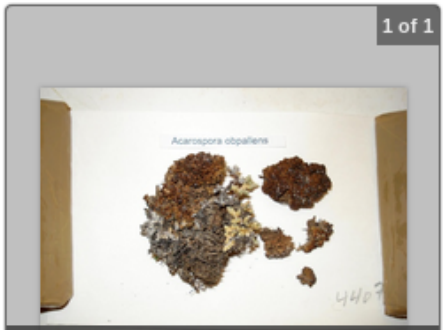


Acarospora calcarea, K. Knudsen, 1997-04-05



Acarospora contigua, H. Magn., 1977-11-12

Acarospora interspersa, H. Magn., 1976-06-18



Acarospora obpallens, H. Magn., 2003-10-25

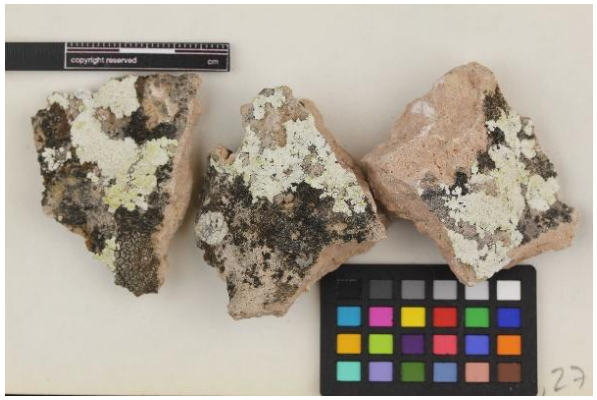
Images Source: Arizona State University Lichen Herbarium (Accessed through iDigBio Specimen Data Portal, https://www.idigbio.org/portal, 2014-09-18)

GBIF has a nice write-up on the benefits of AC over dwc:associatedMedia:

http://gbif.blogspot.com/2014/05/multimedia-in-gbif.html

Audubon Core vocabularies address such concerns as:

- the management of the media and collections
- descriptions of their content
- their taxonomic, geographic, and temporal coverage
- appropriate ways to retrieve, attribute and reproduce them



Media Metadata

Associated Specimen Reference	http://lichenportal.org/portal/collections/individual/index.php?occid=1374628
Type of Resource	StillImage
Subtype	Photograph
Metadata Date	2013-04-24 02:00:19
Provider-managed ID	urn:uuid:9a77ed32-7fa4-4831-938e-a499078058a8
Credit	Arizona State University Lichen Herbarium (ASU)
License Terms	CC BY-NC-SA (Attribution-NonCommercial-ShareAlike)
License URL	http://creativecommons.org/licenses/by-nc-sa/3.0/
Access URI	http://storage.idigbio.org/asu/lichens/ASU0068/ASU0068021a_lg.jpg
Format	image/jpeg

Audubon Core can support “new” media types

Specimen Data

dwc:catalogNumber: UF 105199

dwc:scientificName:

Carcharocles megalodon

dwc:stateProvince: Florida

dwc:county: Duval

dwc:latestPeriodOrHighestSystem:

Late Miocene

dwc:decimalLatitude: 30.39211

Media Data

dwc:scientificName:

Carcharocles megalodon

dc:type: image

ac:subtype: http://www.fabbers.com/StL.asp

ac:subtypeLiteral: 3dModel

ac:tag: tooth

Image source: Aaron Wood, Florida Museum of Natural History

Darwin Core Archive - Extension to link data between the Occurrence and Audubon Core record

Specimen Data

dwc:occurrenceID: **3bca767a-5a25-42c0-12...**

dwc:scientificName: Carcharocles megalodon

dwc:catalogNumber: UF 105199

dwc:stateProvince: Florida

dwc:county: Duval

dwc:latestPeriodOrHighestSystem: Miocene

dwc:decimalLatitude: 30.39211

...

Media Data

dcterms:identifier: 9a3025b1-f686-4e43-915f-...

coreid: **3bca767a-5a25-42c0-12...**

dwc:scientificName: Carcharocles megalodon

ac:associatedSpecimenReference: http://museum...

dc:type: image

ac:subtype: http://www.fabbers.com/StL.asp

ac:subtypeLiteral: 3dModel

ac:tag: tooth

...

In the wild, ac:associatedSpecimenReference tends NOT to provide the bare occurrence id of the related specimen, so instead we use the implicit relationship via coreid in the DwC-A.

Image source: http://commons.wikimedia.org/wiki/File:Carcharocles_megalodon_tooth.JPG

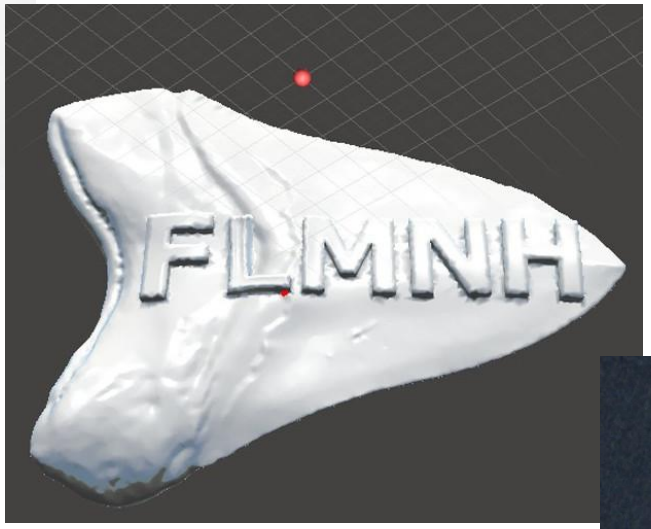


Image source: Aaron Wood

Image source: Aaron Wood
3D Model printing by Robert Burns

Recommended minimum Audubon Core fields for iDigBio Data Ingestion:

Access URI
Rights
Provider
Scientific name
Title
Description
Tags

Practical Details

- Data Formats
  - ISO 8601 Dates
  - WGS84 Decimal Lat/Long
- Controlled Vocabularies
  - ISO Country Names and Codes
  - State/Province names
- Identifier Formats (UUID, ARK, URN, DOI, URI, URL, LSID, ...)
- Copyright and Standard Licenses
- Apple Core guidelines for herbaria
  - http://code.google.com/p/applecore/wiki/Introduction

Ingestion Process Changes Over the Past Year

- New Staff (Dan Stoner… that's me!)
- Improved parallelization of ingestion tasks
- Incremental Indexing
- Database Tuning
- Ingestion Reporting

Ingestion Reporting
https://www.idigbio.org/portal/publishers

Publisher Summary

	Record Count			Media Record Count		
Publisher Name	**Digest**	**API**	**Index**	**Digest**	**API**	**Index**
Berkeley Natural History Museums IPT	1,860,584	1,859,985	1,859,985	0	0	0
Florida Museum of Natural History IPT Service	1,047,587	1,047,587	1,047,587	0	0	0
MyCoPortal Darwin Core Archive rss feed	1,679,459	1,679,458	1,679,458	371,346	371,346	371,346
Northern Great Plains Herbaria Darwin Core Archive rss feed	43,012	43,012	43,012	0	0	0
KU Biodiversity Institute IPT	2,010,071	2,011,170	2,011,170	0	0	0
The University of Connecticut Biological Collections	172,098	172,102	172,102	166,689	166,707	166,707
xBioD IPT in the Museum of Biological Diversity at the Ohio State University	521,710	521,782	521,782	2,593	2,593	2,593
CMC_specify	9,131	9,131	9,131	0	0	0
Consortium of North American Bryophyte Herbaria Darwin Core Archive rss feed	1,690,014	1,690,014	1,690,014	816,932	816,932	816,932
Museum of Comparative Zoology, Harvard University	1,736,357	1,736,471	1,736,471	0	0	0
CNALH Darwin Core Archive rss feed	1,232,891	1,232,891	1,232,891	649,241	649,241	649,241
SCAN Darwin Core Archive rss feed	873,024	873,160	873,160	68,696	68,718	68,718
iDigBio Feeder RSS Feed	1,316,574	1,316,574	1,316,574	19,024	19,024	19,024
Consortium of Intermountain Herbaria Darwin Core Archive rss feed	204,129	204,131	204,131	74,014	74,015	74,015
CAS-IPT	1,875,928	1,875,979	1,875,979	0	0	0
Macroalgal Herbarium Portal Darwin Core Archive rss feed	2,145	2,145	2,145	1,937	1,937	1,937
CNH portal Darwin Core Archive rss feed	89,199	89,199	89,199	56,557	56,557	56,557
IPT - Hosted by VertNet	5,070,222	5,070,222	5,070,222	479,440	479,440	479,440
North American Network of Small Herbaria Darwin Core Archive rss feed	4,162	4,162	4,162	4,273	4,273	4,273
Harvard University Herbaria IPT installation	412,331	412,331	412,331	295,055	295,055	295,055
SNOMNH IPT	310,328	310,328	310,328	0	0	0
Morphbank IPT Feed	48,567	97,127	97,127	0	65,167	65,167
SEINet Darwin Core Archive rss feed	347,210	347,216	347,216	161,533	161,627	161,627

Planned Future Changes

- Parallelize more parts of Ingestion process (such as media processing)
- Support for additional publisher types (beyond IPT, Symbiota, iDigBio RSS Feeder)
- Improved Ingestion logging and error detection
- Support for additional media types (audio, 3D scans, …)
- Data Quality

iDigBio
Integrated Digitized Biocollections

Thank You!

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webcal://www.idigbio.org/events-calendar/export.ics

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FLORIDA STATE UNIVERSITY 1851

FLORIDA MUSEUM OF NATURAL HISTORY

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