



GBIF

Global Biodiversity
Information Facility



Emmelinea monodactyla (Linnaeus, 1758), Hellerup, Denmark, 4 May 2013

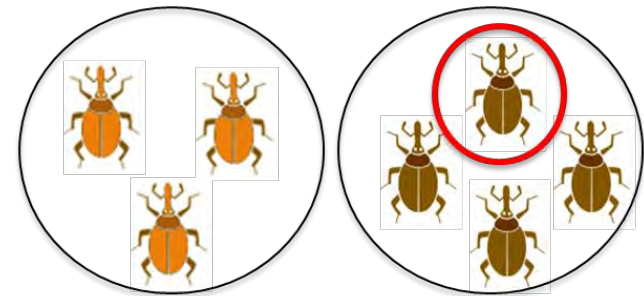
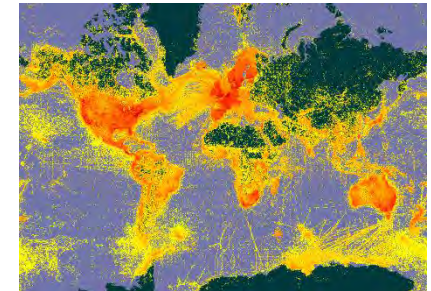
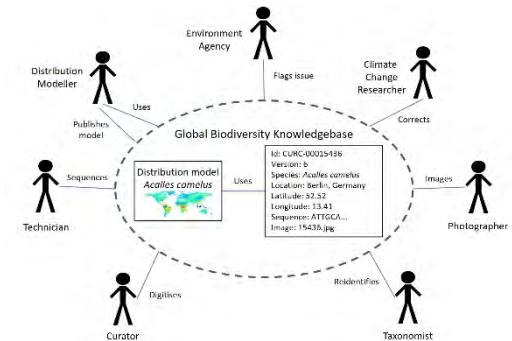
Global Biodiversity Information Facility

Open access to biodiversity data

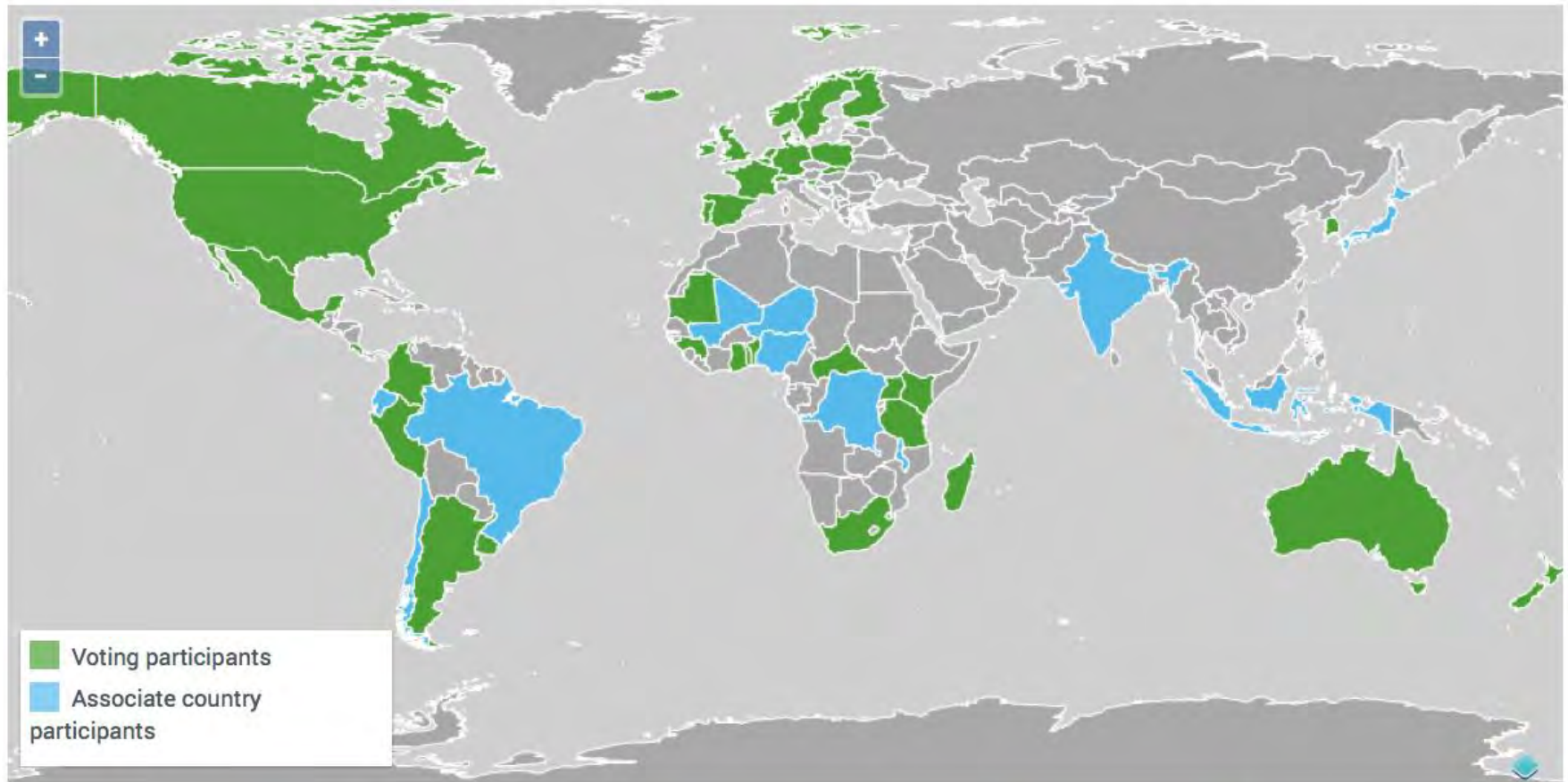
Madrid, 7 November 2017

GBIF'S ROLE

1. Remove obstacles to collaboration in sharing and use of biodiversity data
2. Organise evidence of recorded occurrence of any species in time and space
3. Support development of a global virtual natural history collection



CURRENT NETWORK



41 VOTING PARTICIPANTS 13 ASSOCIATE COUNTRY PARTICIPANTS 40 OTHER ASSOCIATE PARTICIPANTS 1,222 PUBLISHERS



BY THE NUMBERS

17 Nov 2017

Species occurrence records

874,480,804

Datasets

36,957

(Occurrence, Checklists, Sampling-event data, metadata)

*Country
Participants*

54

*Organizational
Participants*

40

Publishers

1,426

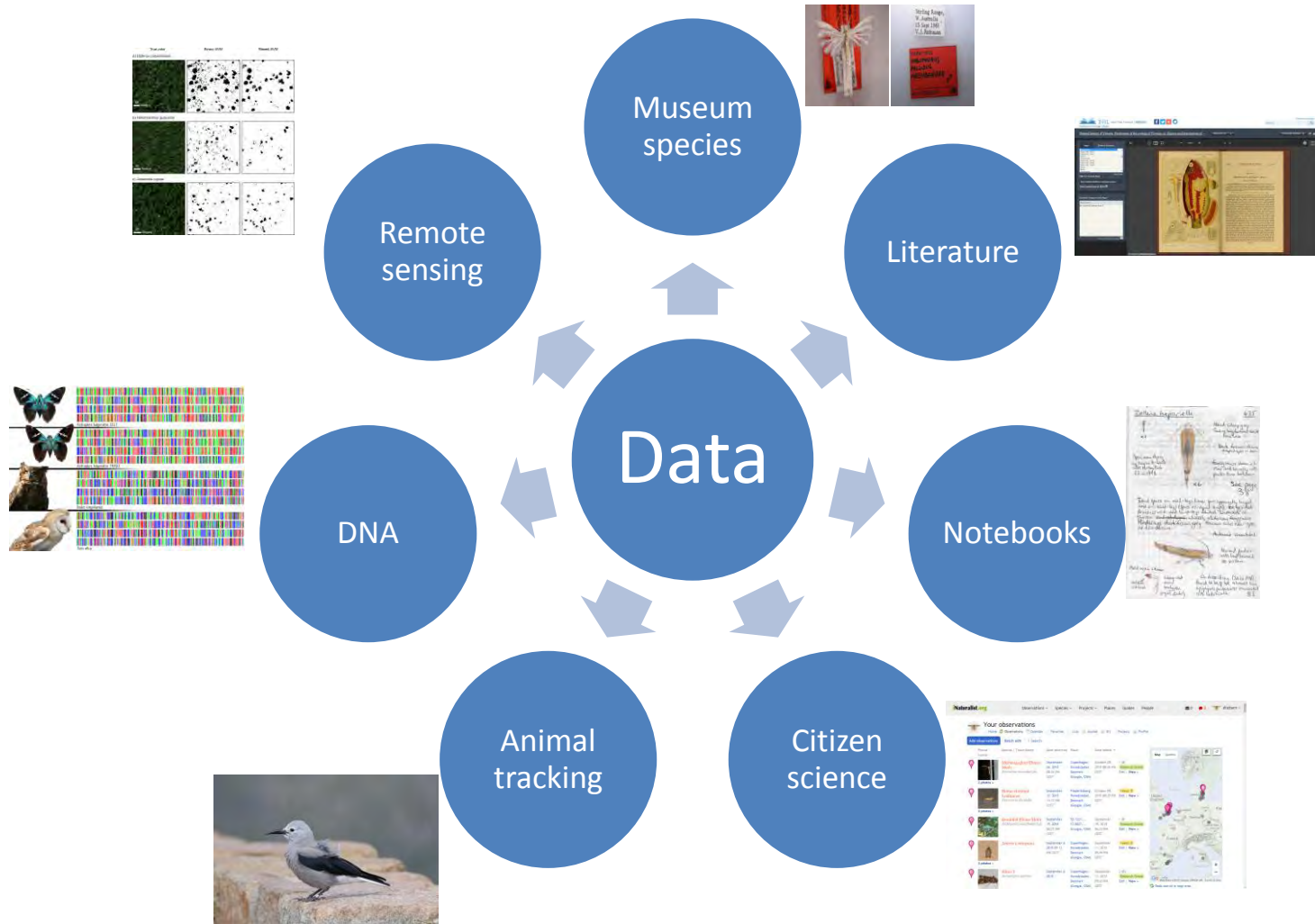
Records downloaded per month (avg Jan-Aug 2017)

43.4 billion

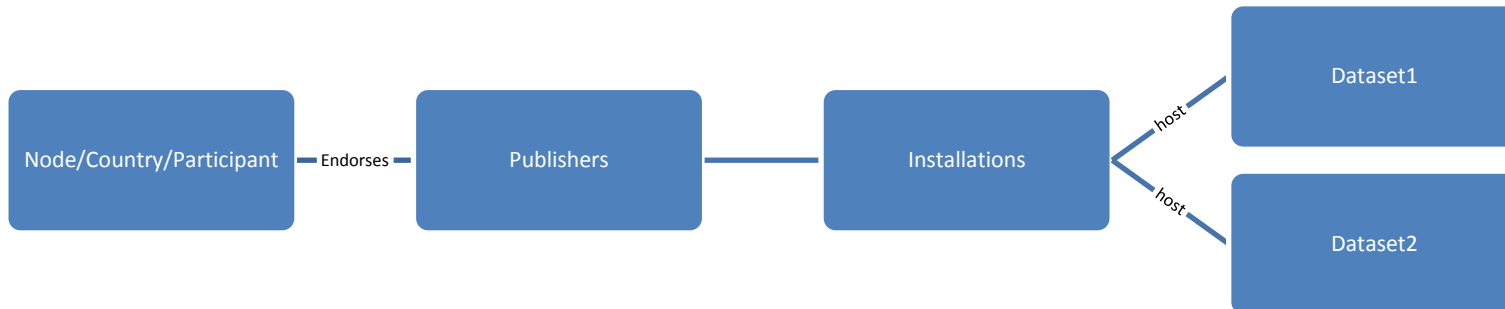
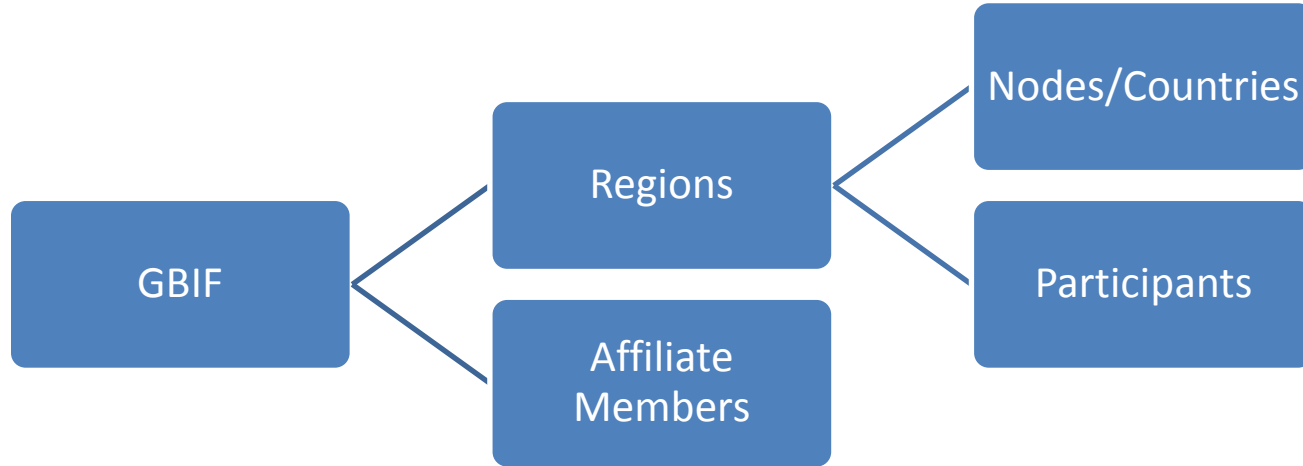
Total page views (Aug)

97,053

DATA SOURCES

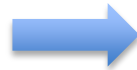
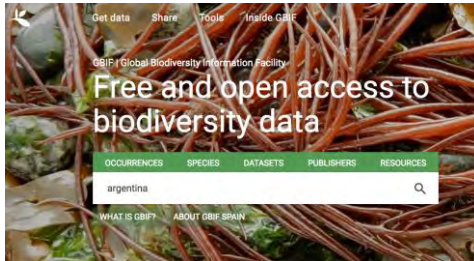


GBIF GOVERNANCE MODEL



GBIF PORTAL – MAIN FUNCTIONALITIES

Cross content search

A screenshot of the GBIF search results page for 'argentina'. The search bar at the top contains 'argentina'. Below the search bar are tabs for 'EVERYTHING', 'OCCURRENCES', 'SPECIES', 'DATASETS', 'PUBLISHER', and 'RESOURCES'. The results are organized into sections:

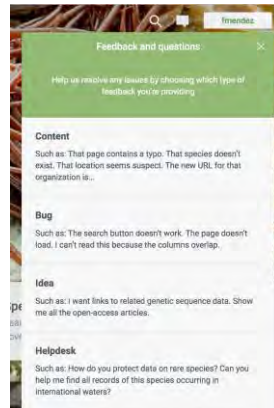
- Argentina** (Voting participant): Member since: 2002-03, 2,645,974 occurrences about 1,301,326 published occurrences. Includes the Argentine flag.
- Argentina Hill.** (genus): Taxonomy: Plantae > Tracheophyta > Magnoliopsida > Rosales > Rosaceae. accepted genus 261,467 occurrences. Includes a world map showing distribution.
- Argentina Linnaeus, 1758** (genus): Taxonomy: Animalia > Chordata > Actinopterygii > Osmeriformes > Argentinidae. accepted genus 18,670 occurrences. Includes a world map showing distribution.
- Argentina Lam.** (genus): Taxonomy: Plantae > Tracheophyta > Magnoliopsida > Rosales > Rosaceae. doubtful genus 0 occurrences.

At the bottom, it says 'DATASETS' and '503 RESULTS'.

Integrated feedback

- [iNaturalist](#)
- [Symbiota](#)
- [Annosys](#)

Exercise 1!



Extensive collection of Images

- [Flabelina](#)
- [Herbarium](#)
- [Amber](#)
- [Road Kills!](#)

GBIF PORTAL – MAIN FUNCTIONALITIES

Species names search

“The [GBIF Backbone Taxonomy](#), often called the Nub taxonomy, is a single synthetic management classification with the goal of covering all names GBIF is dealing with.”

Demo: Panthera

Exercise 2!

GBIF PORTAL – MAIN FUNCTIONALITIES

Occurrence records search, filtering and download

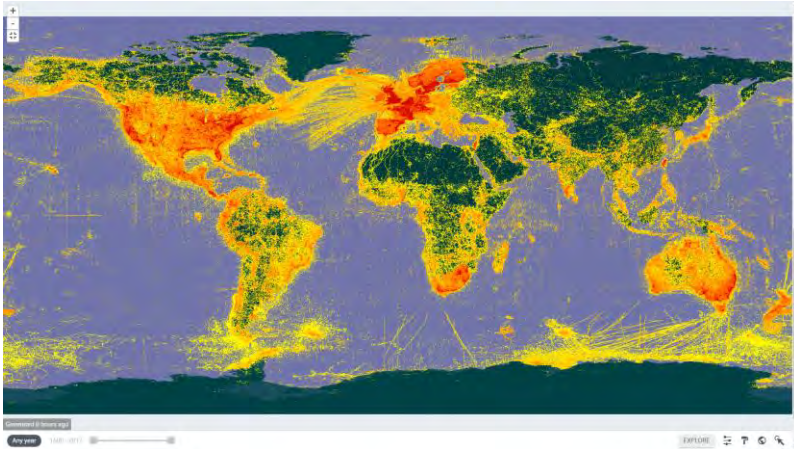
The screenshot shows the GBIF Occurrences search results page. The top navigation bar includes 'Get data', 'Share', 'Tools', and 'Inside GBIF'. The main header displays 'SEARCH OCCURRENCES | 307,799 RESULTS'. On the left, there is a search sidebar with 'Simple' and 'Advanced' tabs, and various filters such as 'Record License', 'Scientific Name', 'Basis Of Record', 'Location', 'Year', 'Month', 'Dataset', 'Country', 'Issue', 'Media Type', 'Publisher', 'Institution Code', 'Collection Code', 'Catalogue Number', and 'Type Status'. The main content area shows a summary of 307,799 results, including a license (CC BY-NC 4.0), year range (1710-2017), and coordinates match (100%). There are buttons for 'CSV' and 'OPEN USFV ARCHIVE'. Below the summary, there are sections for 'Known issues' and 'Fossils'.

The screenshot shows the GBIF download confirmation page. The top navigation bar includes 'Get data', 'Share', 'Tools', and 'Inside GBIF'. The main header displays 'DOWNLOAD | 15 SEPTEMBER 2017' and '307,814 occurrences downloaded'. Below this, there is a 'DOWNLOAD' button and a 'FILTER APPLIED' section showing the filter '15 SEPTEMBER 2017'. The 'Citation' section provides details about the download, including the file name and size. The 'Involved Datasets' section shows a list of datasets with a 'Filter' button. The 'Includes records from 97 datasets' section shows a list of datasets with a 'Filter' button.

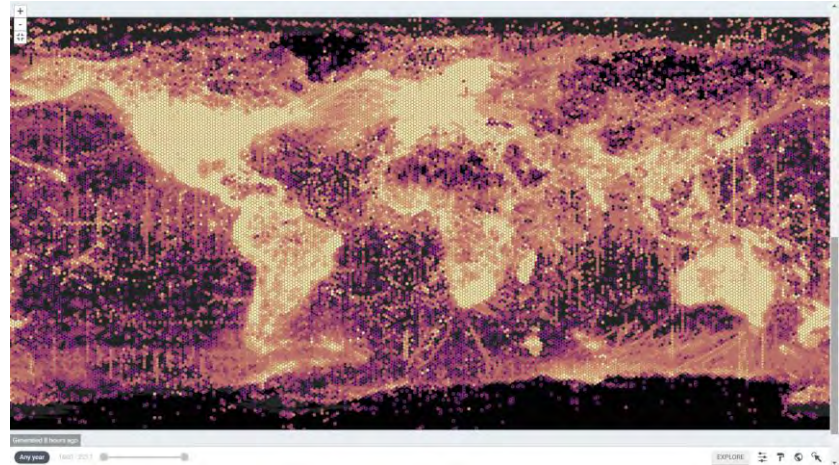
Demo occurrence search, detail and diagnostics!

GBIF PORTAL – FLEXIBLE GEOSPATIAL TOOLS

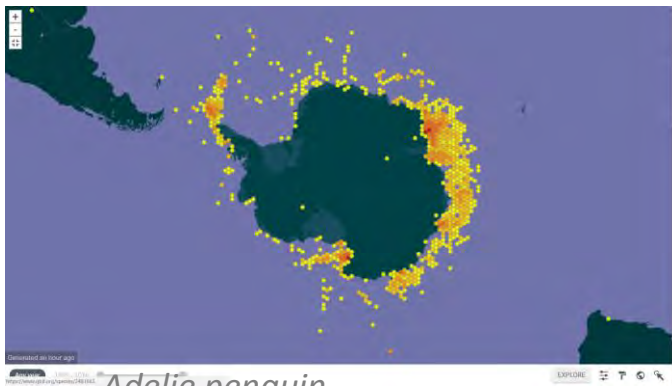
Projections: Plate Carrée, Mercator, Artic, Antartica



Clustered hexagons



Artic Projection



Adelie penguin

Exercise 3!

GBIF PORTAL– DOWNLOAD RESULTS

0007889-170826194755519.txt - Excel

File Home Insert Page Layout Formulas Data Review View Tell me what you want to do... Donald Hoberm Share


AA36

	A	B	D	L	M	N	O	P	Q	R	S	T	U	V	X	Y	Z
	gbifid	datasetkey	kingdom	taxonrank	taxonkey	specieskey	scientificname	count	eventdate	day	month	year	basisofrecord	locality	decimallat	decimallon	coordinate
2	1438049789	84d26682	Fungi	SPECIES	9137419	2548633	Hapalopilus rutilans (Pers.) P. Karst., 1881	DK	2017-03-05T01:00Z	5	3	2017	HUMAN_OBSERVATION	SÅndermarken	55.66901	12.52423	2500
3	1438617871	8f7e3c45	Fungi	SPECIES	2609145	2609145	Phaeophyscia orbicularis (Neck.) Moberg	DK	2016-09-07T02:00Z	7	9	2016	PRESERVED_SPECIMEN	SÅlvgade, "Hundeparken"	55.67149	12.4941	
4	278315340	4fa7b334	Animalia	SPECIES	5230791	5230791	Hirundo rustica Linnaeus, 1758	DK	2010-07-01T02:00Z	1	7	2010	HUMAN_OBSERVATION	Copenhagen - Nyhavn	55.67681	12.5893	
5	278327117	4fa7b334	Animalia	SPECIES	5230791	5230791	Hirundo rustica Linnaeus, 1758	DK	2008-06-14T02:00Z	14	6	2008	HUMAN_OBSERVATION	Utterslev Mose	55.67149	12.4941	
6	278716812	4fa7b334	Animalia	SPECIES											55.67149	12.4941	
7	278928363	4fa7b334	Animalia	SPECIES										Nyhavn	55.67681	12.5893	
8	991794249	e6c97f6e	Animalia	SPECIES											55.66765	12.5449	23
9	1160384356	4fa7b334	Animalia	SPECIES										Have	55.67594	12.52639	
10	1160384369	4fa7b334	Animalia	SPECIES										Have	55.67594	12.52639	
11	1160384382	4fa7b334	Animalia	SPECIES										Have	55.67594	12.52639	
12	1160384386	4fa7b334	Animalia	SPECIES										Have	55.67594	12.52639	
13	1160384397	4fa7b334	Animalia	SPECIES										Have	55.67594	12.52639	
14	1160384399	4fa7b334	Animalia	SPECIES										Have	55.67594	12.52639	
15	1160384407	4fa7b334	Animalia	SPECIES										Have	55.67594	12.52639	
16	1160384414	4fa7b334	Animalia	SPECIES										Have	55.67594	12.52639	
17	1160384417	4fa7b334	Animalia	SPECIES										Have	55.67594	12.52639	
18	1160384421	4fa7b334	Animalia	SPECIES										Have	55.67594	12.52639	
19	1160384424	4fa7b334	Animalia	SPECIES										Have	55.67594	12.52639	
20	1160384425	4fa7b334	Animalia	SPECIES										Have	55.67594	12.52639	
21	1160384426	4fa7b334	Animalia	SPECIES										Have	55.67594	12.52639	
22	1160384434	4fa7b334	Animalia	SPECIES										Have	55.67594	12.52639	
23	1160384466	4fa7b334	Animalia	SPECIES										Have	55.67594	12.52639	
24	1161073631	4fa7b334	Animalia	GENUS										Mermaid Harbou	55.69292	12.59912	
25	1161073641	4fa7b334	Animalia	SPECIES										Mermaid Harbou	55.69292	12.59912	
26	1161073652	4fa7b334	Animalia	SPECIES										Mermaid Harbou	55.69292	12.59912	
27	1161073656	4fa7b334	Animalia	SPECIES										Mermaid Harbou	55.69292	12.59912	
28	1161073657	4fa7b334	Animalia	SPECIES										Mermaid Harbou	55.69292	12.59912	
29	1161073667	4fa7b334	Animalia	SPECIES										Mermaid Harbou	55.69292	12.59912	
30	1161073678	4fa7b334	Animalia	SPECIES										Mermaid Harbou	55.69292	12.59912	
31	1161073688	4fa7b334	Animalia	SPECIES										Mermaid Harbou	55.69292	12.59912	
32	1161073704	4fa7b334	Animalia	SPECIES	2498036	2498036	Anser anser (Linnaeus, 1758)	DK	2014-03-24T01:00Z	24	3	2014	HUMAN_OBSERVATION	Copenhagen Mermaid Harbou	55.69292	12.59912	
33	1161073723	4fa7b334	Animalia	SPECIES	2490719	2490719	Turdus merula Linnaeus, 1758	DK	2014-03-24T01:00Z	24	3	2014	HUMAN_OBSERVATION	Copenhagen Mermaid Harbou	55.69292	12.59912	
34	1161073740	4fa7b334	Animalia	SPECIES	5231190	5231190	Passer domesticus (Linnaeus, 1758)	DK	2014-03-24T01:00Z	24	3	2014	HUMAN_OBSERVATION	Copenhagen Mermaid Harbou	55.69292	12.59912	

0007889-170826194755519

Ready

Exercise 4!



GBIF PORTAL

- Country pages: show summary information about data published from and about a country
- Global Analytics: shows a summary of data trends in the GBIF network, it can be used as high level data quality exploration tool

Demo Global Trends and Country Pages!

Exercise 5!

GBIF PORTAL – MAIN FUNCTIONALITIES

- Additional tools:
 - Species matching
 - Data Validator

Exercise 6!

HTTPS://WWW.GBIF.ORG/DEVELOPER/SUMMARY

Get data Share Tools Inside GBIF

dhobern

DEVELOPER | API DOCS

API Summary

<http://api.gbif.org/v1/>

API Sections

The API is split into logical sections to ease understanding:

Registry: Provides means to create, edit, update and search for information about the datasets, organizations (e.g. data publishers), networks and the means to access them (technical endpoints). The registered content controls what is crawled and indexed in the GBIF data portal, but as a shared API may also be used for other initiatives

Species: Provides services to discover and access information about species and higher taxa, and utility services for interpreting names and looking up the identifiers and complete scientific names used for species in the GBIF portal.

Occurrence: Provides access to occurrence information crawled and indexed by GBIF and search services to do real time paged search and asynchronous download services to do large batch downloads.

Maps: Provides simple services to show the maps of GBIF mobilized content on other sites.

News: Provides services to stream useful information such as papers published using GBIF mobilized content for various themes.

You can sign up to the [GBIF API users mailing list](#) to post your questions, and to keep informed about the API. We will announce new versions, and scheduled maintenance downtimes before they happen.

We welcome any example uses of the API to guest feature on the [GBIF developer blog](#).

GBIF APIS

GBIF website built on top of the GBIF API

Supports:

- Dataset / Organisation registration, search
- Occurrence record search and download
- Species search
- Services in support of name matching

GBIF APIS

Typical RESTful JSON based API

- Occurrences, species, datasets, organisations etc.

Asynchronous download API

- CSV and Darwin Core Archives

Mapping API

- Mapbox Vector Tile format
- PNGs

OAI-PMH for integrations with generic catalogues

OCCURRENCE SEARCH API EXAMPLE

<http://api.gbif.org/v1/occurrence/search?decimalLatitude=55.67,55.68&decimalLongitude=12.56,12.57>

```
offset: 0
limit: 20
issues:
  0: "COORDINATE_ROUNDED"
  1: "GEODETTIC_DATUM_ASSUMED_WGS84"
modified: "2017-05-30T20:31:56.000+0000"
lastInterpreted: "2017-06-08T07:54:40.796+0000"
references: "https://www.inaturalist.org/observations/6433745"
license: "http://creativecommons.org/licenses/by-nc/4.0/legalcode"
identifiers:
media:
  0:
    type: "StillImage"
    format: "image/jpeg"
    identifier: "https://static.inaturalist.org/photos/8125353/original.jpeg?1496172207"
    references: "https://www.inaturalist.org/photos/8125353"
    created: "2017-05-30T19:21:37.000+0000"
    creator: "Ross"
    publisher: "iNaturalist"
    license: "http://creativecommons.org/licenses/by-nc/4.0/"
    rightsHolder: "Ross"
    taxonKey: 2380
    genusKey: 2498016
    speciesKey: 2498036
```

SPECIES SEARCH API EXAMPLE

<http://api.gbif.org/v1/species/match/?name=Felis+concolor>

```
usageKey: 2435104
scientificName: "Felis concolor Linnaeus, 1771"
canonicalName: "Felis concolor"
rank: "SPECIES"
status: "SYNONYM"
confidence: 98
matchType: "EXACT"
kingdom: "Animalia"
phylum: "Chordata"
order: "Carnivora"
family: "Felidae"
genus: "Puma"
species: "Puma concolor"
kingdomKey: 1
phylumKey: 44
classKey: 359
orderKey: 732
familyKey: 9703
genusKey: 2435098
speciesKey: 2435099
synonym: true
class: "Mammalia"
```

<http://api.gbif.org/v1/species/2435099>

```
key: 2435099
nubKey: 2435099
nameKey: 9541887
taxonID: "gbif:2435099"
sourceTaxonKey: 120316239
kingdom: "Animalia"
phylum: "Chordata"
order: "Carnivora"
family: "Felidae"
genus: "Puma"
species: "Puma concolor"
kingdomKey: 1
phylumKey: 44
classKey: 359
orderKey: 732
familyKey: 9703
genusKey: 2435098
speciesKey: 2435099
datasetKey: "d7dddbf4-2cf0-4f39-9b2a-bb099caae36c"
constituentKey: "7ddf754f-d193-4cc9-b351-99906754a03b"
parentKey: 2435098
parent: "Puma"
basionymKey: 2435104
basionym: "Felis concolor Linnaeus, 1771"
```

OCCURRENCE SEARCH FOR PUMA

<http://api.gbif.org/v1/occurrence/search/?speciesKey=2435099>

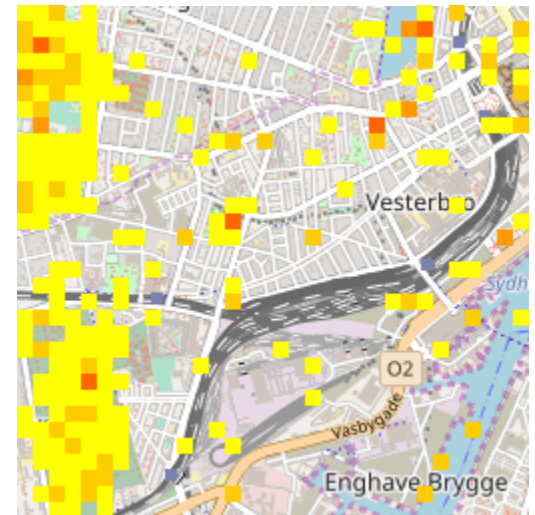
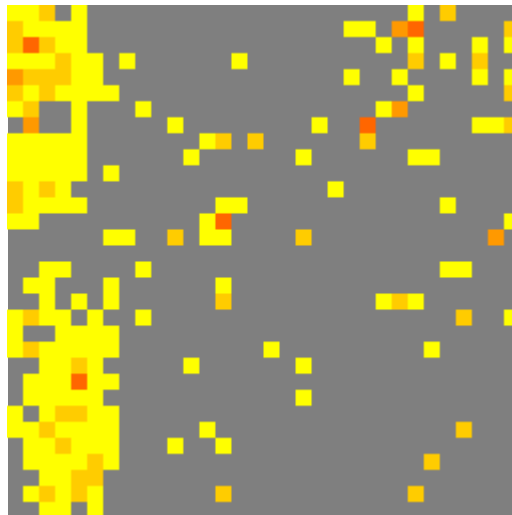
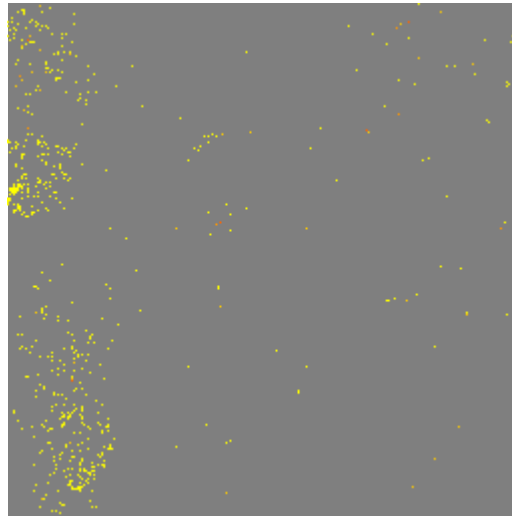
```
offset: 0
limit: 20
endOfRecords: false
count: 8582
▼ results:
  ▼ 0:
    key: 1453377710
    datasetKey: "50c9509d-22c7-4a22-a47d-8c48425ef4a7"
    publishingOrgKey: "28eb1a3f-1c15-4a95-931a-4af90ecb574d"
    publishingCountry: "US"
    protocol: "DWC_ARCHIVE"
    lastCrawled: "2017-09-08T08:17:04.867+0000"
    lastParsed: "2017-04-21T14:55:11.802+0000"
    crawlId: 82
    extensions:
    basisOfRecord: "HUMAN_OBSERVATION"
    taxonKey: 2435099
    kingdomKey: 1
    phylumKey: 44
    classKey: 359
    orderKey: 732
    familyKey: 9703
    genusKey: 2435098
    speciesKey: 2435099
    scientificName: "Puma concolor (Linnaeus, 1771)"
    kingdom: "Animalia"
    phylum: "Chordata"
    order: "Carnivora"
    family: "Felidae"
    genus: "Puma"
    species: "Puma concolor"
    genericName: "Puma"
    specificEpithet: "concolor"
    taxonRank: "SPECIES"
    dateIdentified: "2017-01-24T23:07:53.000+0000"
```

MAP API EXAMPLE

<http://api.gbif.org/v1/map/density/tile?x=4381&y=2564&z=13>



<http://tile.openstreetmap.org/7/63/42.png>

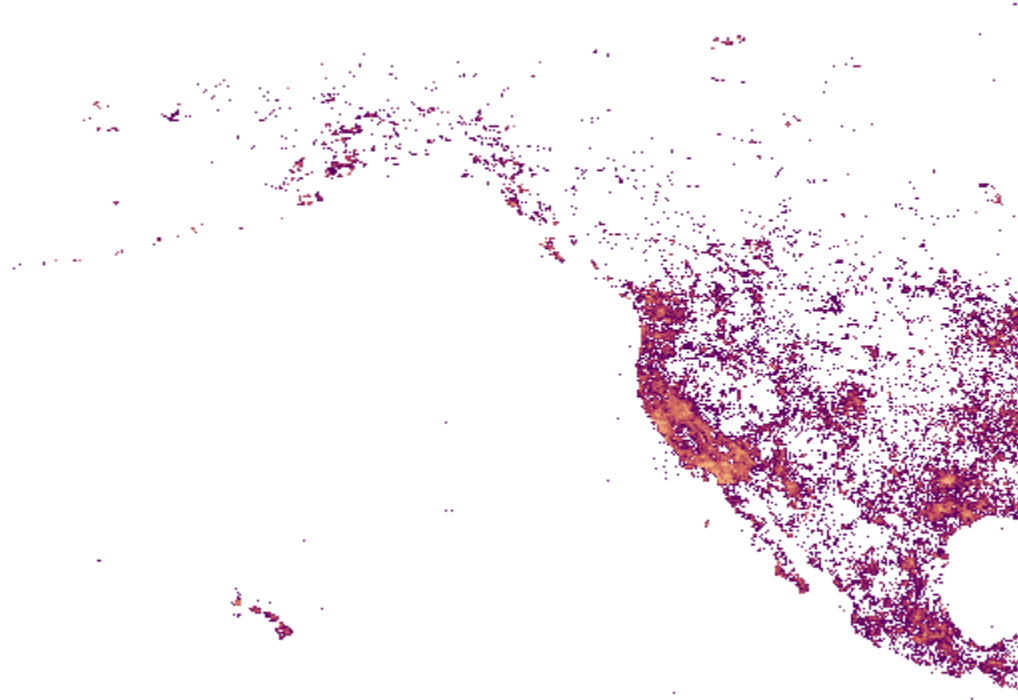


<http://api.gbif.org/v1/map/density/tile?x=4381&y=2564&z=13&resolution=8>

MAP API CURRENTLY BEING ENHANCED

[https://api.gbif.org/v2/map/occurrence/density/1/0/0@1x.png?srs=EPSG:4326
&style=purpleYellow.point&year=2010,2017&taxonKey=6](https://api.gbif.org/v2/map/occurrence/density/1/0/0@1x.png?srs=EPSG:4326&style=purpleYellow.point&year=2010,2017&taxonKey=6)

Plants in western portions of North America



API CLIENTS

Java Clients in GBIF GitHub repositories

- <https://github.com/gbif>

R Client run by ROpenScience

- <https://github.com/ropensci/rgbif/>

Python client by ROpenScience

- <https://pypi.python.org/pypi/pygbif>

Most integrators use HTTP natively

- Documentation on <https://www.gbif.org/developer>

Thank you

