



**GBIF**

Global Biodiversity  
Information Facility



*Emmelina monodactyla* (Linnaeus, 1758), Hellerup, Denmark, 4 May 2013

# Biodiversity informatics - a Global Perspective

*Donald Hobern, GBIF Executive Secretary  
GB24, Helsinki, September 2017*

# GBIF: ORIGINS AND PRINCIPLES

Established in 2001

Response to OECD recommendation

Open to all countries

Voluntary memorandum of understanding (MoU)

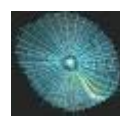
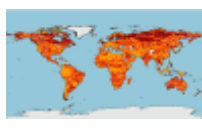


Vision - a world in which:

**Biodiversity information is freely and universally available for science, society and a sustainable future**



# BIODIVERSITY DATA AND USERS



## Users

Biosecurity, land-use, climate change, crop development, resource management, materials, forensics, taxonomy, ...

Information Sharing For  
Common Reuse

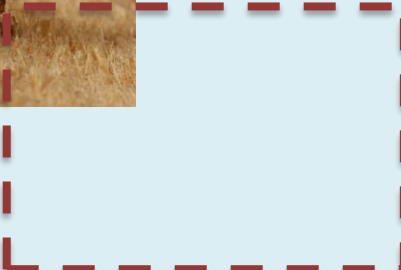
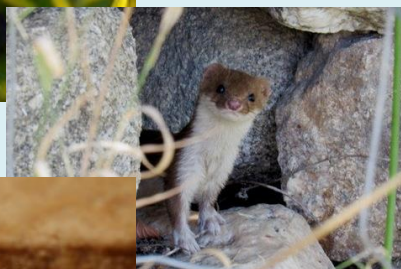
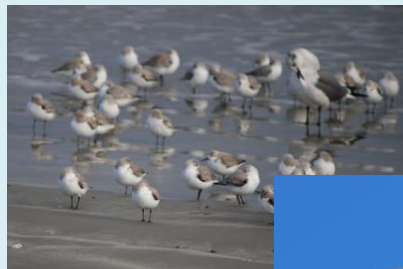
## Data

Collections, field observations, literature, molecular, images, remote sensing, genomics, expert knowledge, ...

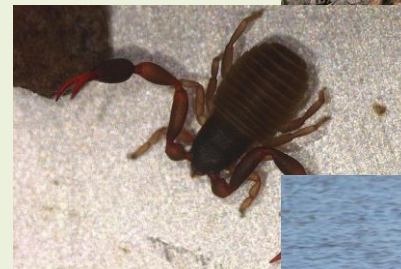
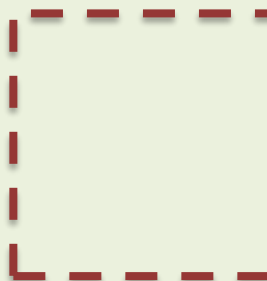


# BIODIVERSITY

1977



2017



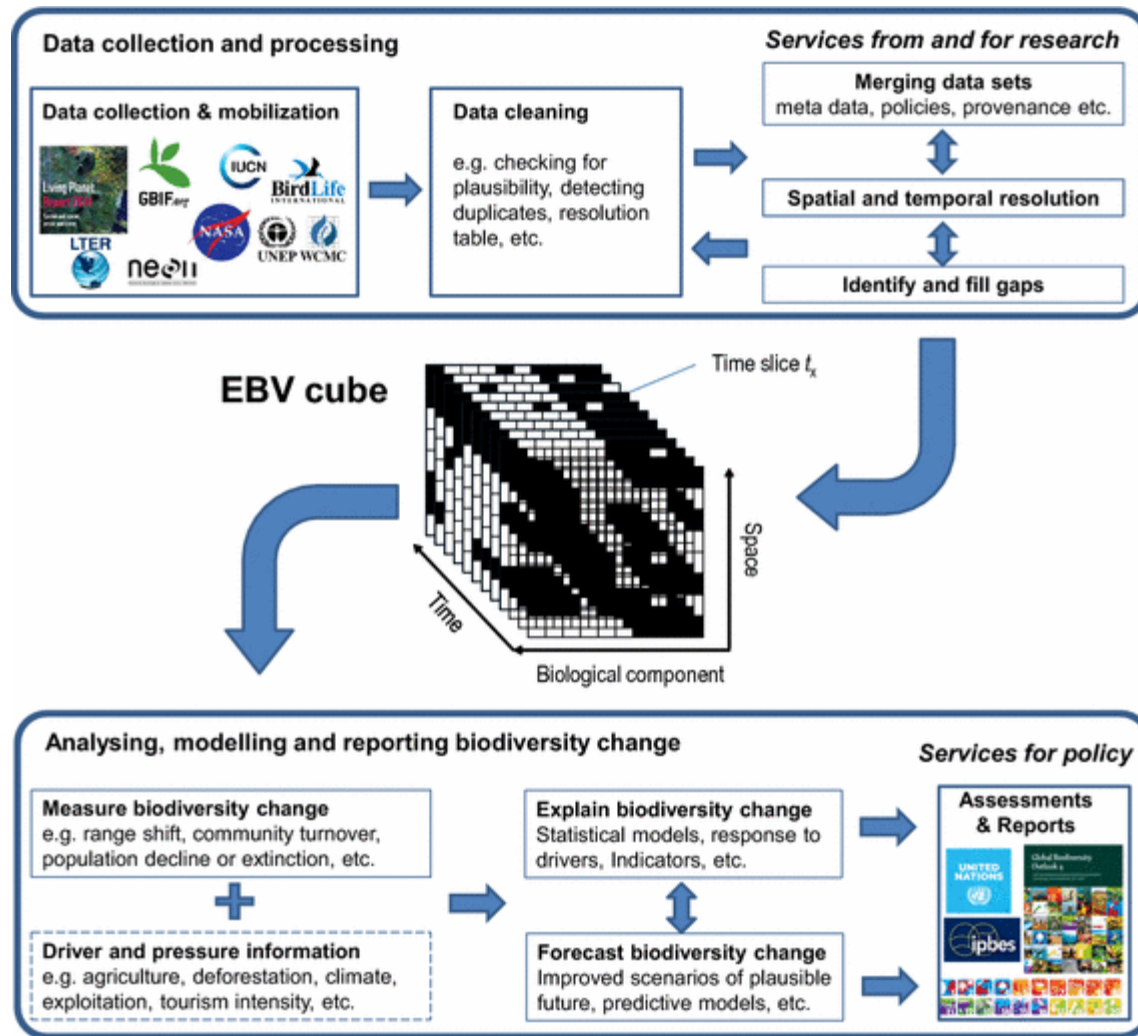
# ESSENTIAL BIODIVERSITY VARIABLES

EBV class	EBV candidate
Genetic composition	Co-ancestry
	Allelic diversity
	Population genetic differentiation
	Breed and variety diversity
Species populations	Species distribution
	Population abundance
	Population structure by age/size class
Species traits	Phenology
	Body mass
	Natal dispersion distance
	Migratory behavior
	Demographic traits
	Physiological traits
Community composition	Taxonomic diversity
	Species interactions
Ecosystem function	Net primary productivity
	Secondary productivity
	Nutrient retention
	Disturbance regime
Ecosystem structure	Habitat structure
	Ecosystem extent and fragmentation
	Ecosystem composition by functional type

Species populations	Species distribution
	Population abundance

Community composition	Taxonomic diversity
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# ESSENTIAL BIODIVERSITY VARIABLES

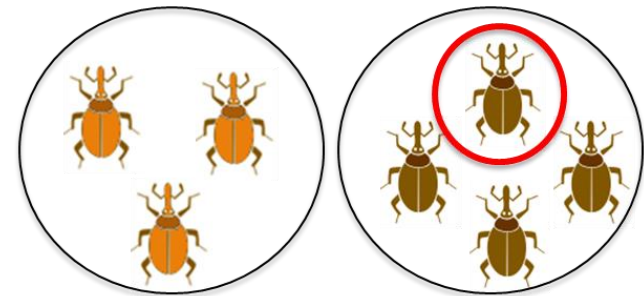
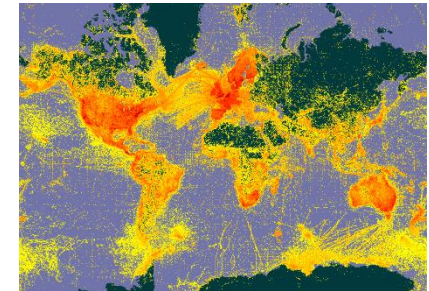
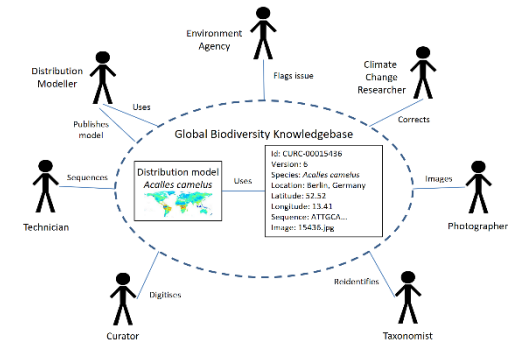


# BIODIVERSITY AS A VARIABLE

LATITUDE	Species 1 ***** Species 2 **** Species 3 ** Species 4 ** Species 5 *	LATITUDE	Species 1 **** Species 2 ****	Species 1 *** Species 2 *****	Species 1 * Species 2 ****				
	Species 1 ** Species 2 ** Species 3 ** Species 4 ** Species 6 *		Species 1 ***** Species 2 **** Species 3 ** Species 4 ** Species 5 *	Species 1 *** Species 2 **** Species 3 ** Species 4 *** Species 5 *	Species 1 **** Species 2 ****	Species 1 * Species 2 ***			
	Species 1 * Species 4 ** Species 5 ** Species 6 ** Species 7 *		Species 1 ** Species 2 ** Species 3 ** Species 4 ** Species 6 *	Species 1 ** Species 2 ** Species 3 ** Species 4 ** Species 6 *	Species 1 *** Species 2 **** Species 3 ** Species 4 *** Species 5 *	Species 1 ** Species 2 **** Species 3 ** Species 4 *** Species 5 *** Species 6 *	Species 1 **** Species 2 ****	Species 1 * Species 2 ***	Species 1 * Species 2 *** Species 3 * Species 4 **** Species 5 ** Species 6 * Species 7 **
	Species 1 * Species 2 ** Species 3 ** Species 4 **		Species 1 * Species 2 ** Species 3 ** Species 4 ** Species 7 *	Species 1 * Species 2 ** Species 3 ** Species 4 ** Species 7 *	Species 1 ***** Species 2 ** Species 3 ** Species 4 *****	Species 1 ** Species 4 **** Species 5 **** Species 6 * Species 7 *	Species 1 * Species 2 * Species 3 * Species 4 *** Species 5 ***** Species 6 **** Species 7 *	Species 1 * Species 2 ** Species 3 ** Species 4 *** Species 5 **** Species 6 *****	Species 1 * Species 3 ** Species 4 ** Species 5 ***** Species 6 *** Species 7 **
	Species 6 ** Species 7 **		Species 4 ** Species 5 ** Species 6 ** Species 7 *	Species 4 ** Species 5 ** Species 6 ** Species 7 *	Species 1 * Species 3 ** Species 4 ***** Species 5 ** Species 6 ** Species 7 *	Species 1 * Species 3 * Species 4 *** Species 5 *** Species 6 **** Species 7 **	Species 1 * Species 2 ** Species 3 *** Species 4 *** Species 5 **** Species 6 *****	Species 2 ** Species 3 *** Species 4 *** Species 5 **** Species 6 *****	Species 3 *** Species 4 *** Species 5 **** Species 6 **** Species 7 *
	t <sup>0</sup>		Species 6 ** Species 7 **	Species 6 ** Species 7 **	Species 1 * Species 2 ** Species 3 **** Species 4 ***	Species 2 **** Species 3 **** Species 4 *	Species 2 ** Species 3 **** Species 4 *** Species 5 ** Species 6 **	Species 1 ** Species 2 **** Species 3 **** Species 4 *** Species 5 **** Species 6 *	
			t <sup>1</sup>		Species 6 ** Species 7 *****	Species 7 ***			
				t <sup>2</sup>	LONGITUDE				

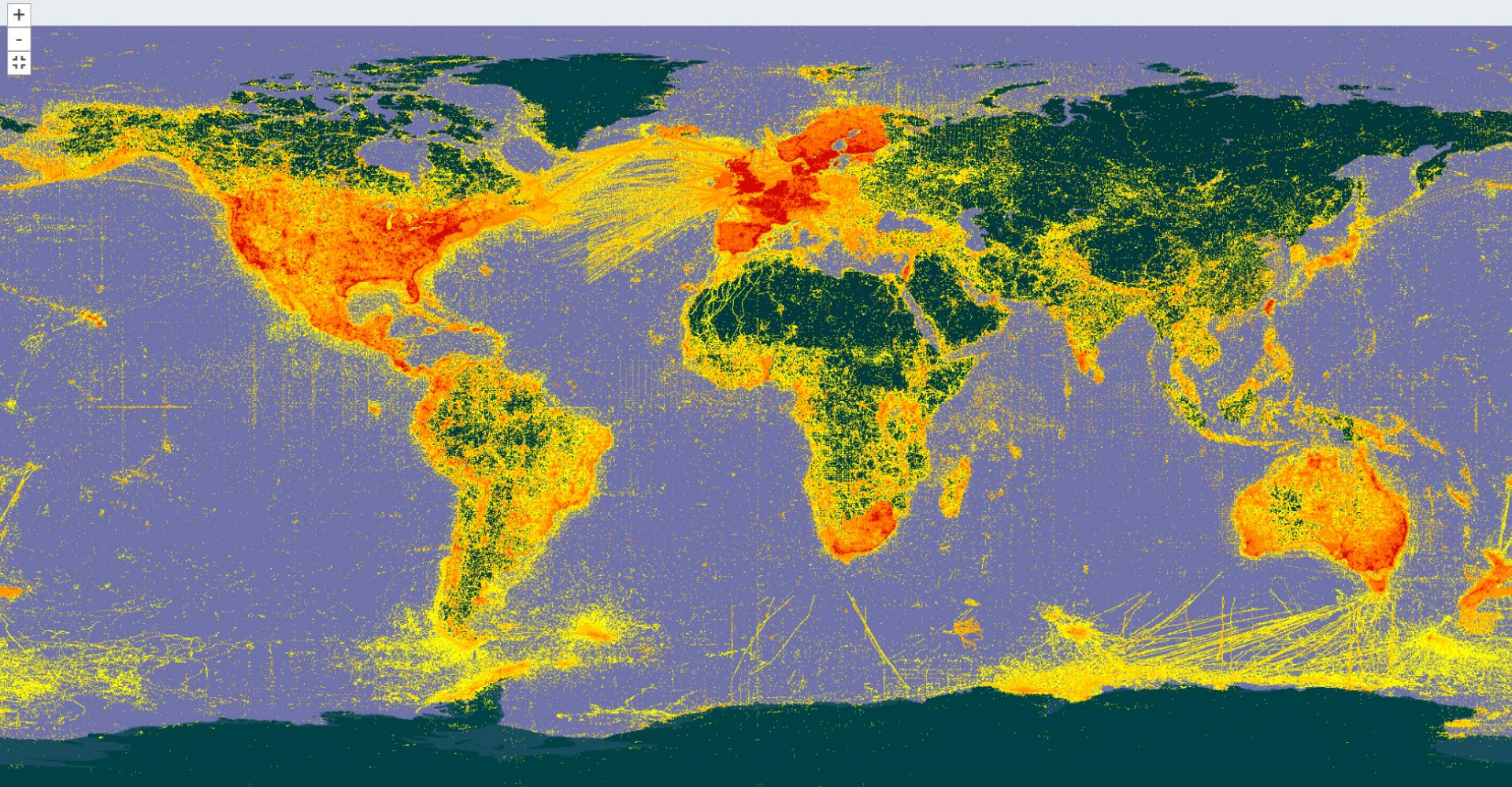
# GBIF'S ROLE

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





# GLOBAL DATA VIEW – ALL SPECIES

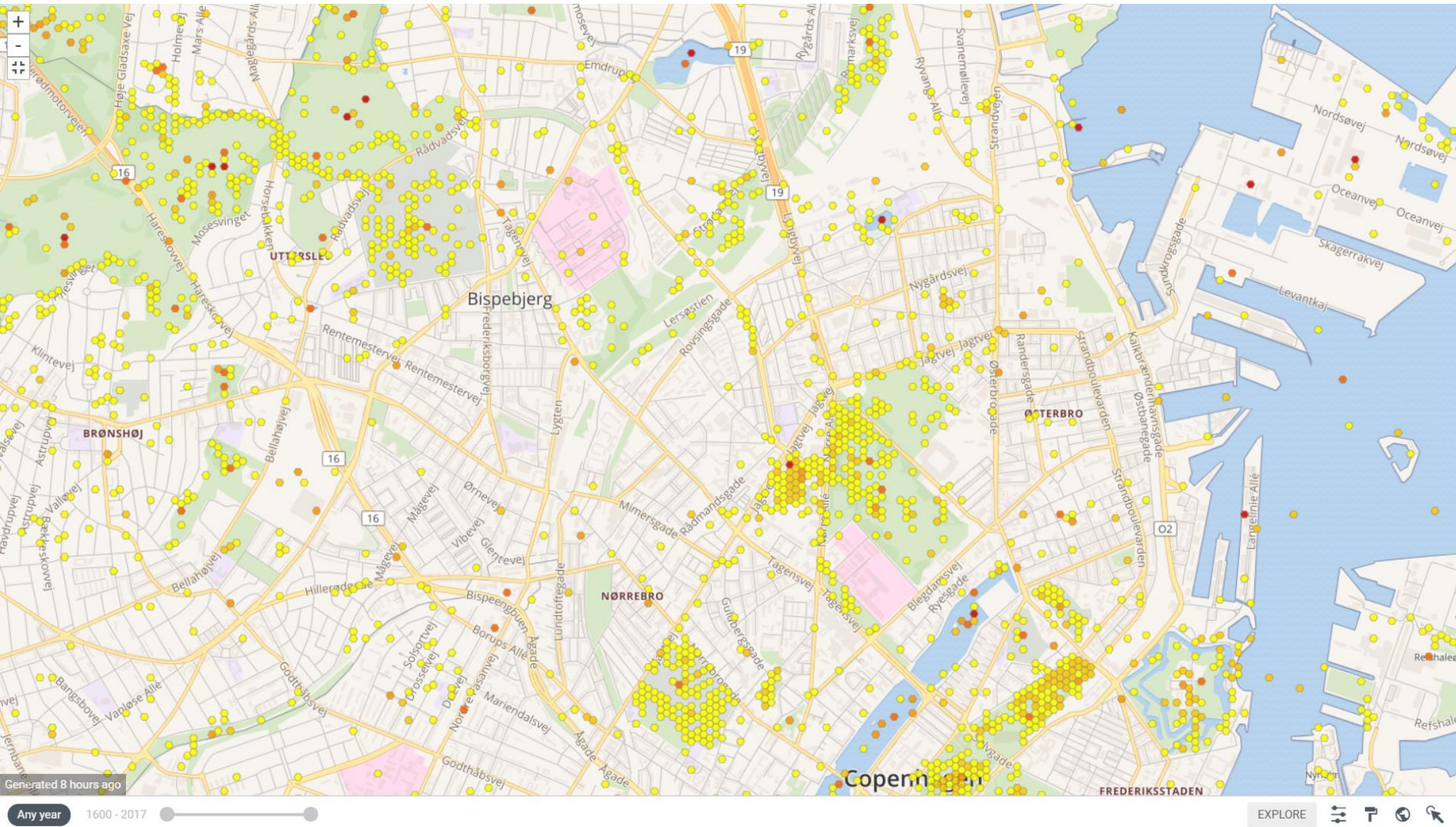


Generated 8 hours ago

Any year 1600 - 2017

EXPLORE    

# ACCESS TO LOCAL DATA



# DATA DOWNLOAD

Occurrences 2

Search all fields

**Simple** Advanced

Record License

Scientific Name

Basis Of Record

Location

Including coordinates

POLYGON((12.49 55.66,12.49 55.73,12.62 55.7...

Year

Month

Dataset

Country

Issue

Media Type

Publisher

Institution Code

Collection Code

Catalogue Number

Type Status

SEARCH OCCURRENCES | 307,799 RESULTS

TABLE GALLERY MAP SPECIES DATASETS **DOWNLOAD**

**Total:** 307,799  
**License:** CC BY-NC 4.0  
**Year Range:** 1710 - 2017  
**With Year:** 99.6 %  
**With Coordinates:** 100 %  
**With Taxon Match:** 99.9 %

**↓ CSV**

Tab delimited CSV. Only contains the data after GBIF interpretation. [learn more](#)  
Estimated size **21 MB**

**↓ DARWIN CORE ARCHIVE**

The Darwin Core Archive contains both the original data as publisher provided it and the GBIF interpretation. [learn more](#)  
Estimated size **52 MB**

### Known issues

A part of the GBIF processing is to flag occurrences that have suspicious fields

- 26 Basis of record invalid
- 9 Taxon match none
- 251,465 Geodetic datum assumed wgs84
- 156,772 Coordinate uncertainty meters invalid
- 44,529 Recorded date mismatch
- 3,426 Country derived from coordinates
- 1,398 Taxon match higherrank
- 1,390 Coordinate precision invalid
- 737 Taxon match fuzzy
- 284 Individual count invalid
- 221 Recorded date invalid
- 12 Presumed swapped coordinate
- 7 Identified date unlikely
- 4 Recorded date unlikely
- 3 References uri invalid
- 2 Coordinate reprojection suspicious
- 2 Depth min/max swapped
- 1 Presumed negated longitude

### Fossils

There are fossils among your results. That can mean species occurrences at unexpected locations

### Living specimens

Your search includes living specimens such as occurrences in botanical and zoological gardens.

# COMMONEST HERONS IN UNITED STATES

1900-1949



*Ardea herodias* 71%



*Ardea alba* 8%



*Nycticorax nycticorax* 7%



*Butorides virescens* 6%



*Botaurus lentiginosus* 6%

2000-2017

*Ardea herodias* 36%



*Ardea alba* 21%



*Egretta thula* 11%



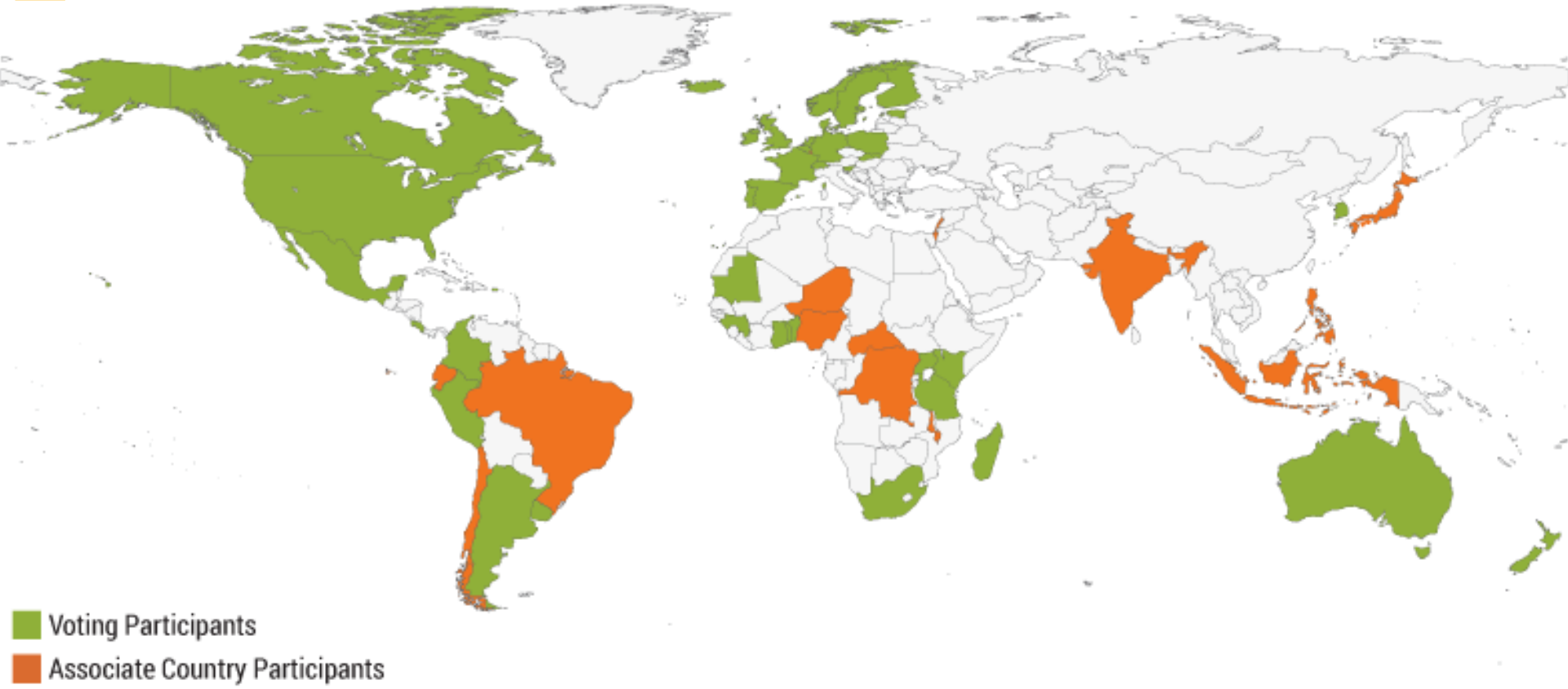
*Nycticorax nycticorax* 5%



*Egretta caerulea* 5%



# CURRENT NATIONAL PARTICIPANTS MANY REMAINING GAPS

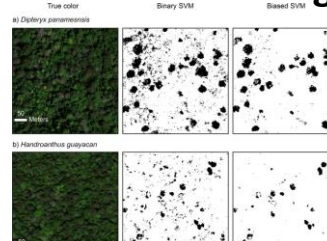


# EXPANDING DATA STREAMS

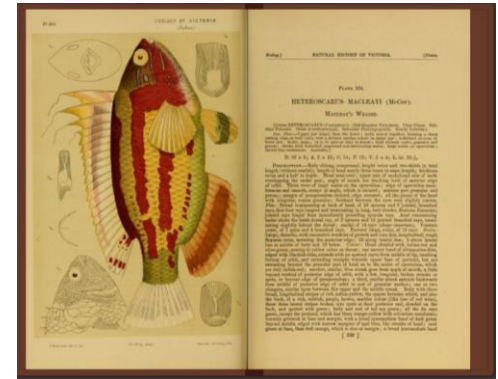
## Sequences



## Remote-sensing



## Literature



What species?  
 Where was it found?  
 When was it found?  
 What is the evidence?  
 Other information

- Specimen data
- Sampling event information
- Sequences, images, etc.

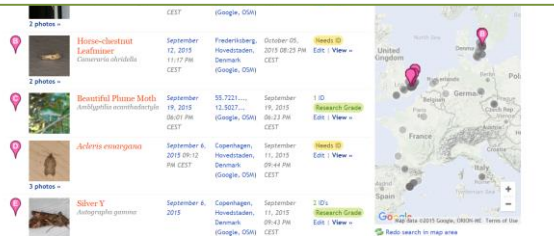


ScientificName: *Imboporus pallidus*  
 Family: Pterophoridae  
 Locality: Stirling Range  
 Country: Australia  
 State: WA  
 Latitude: -34.3  
 Longitude: 118.0  
 CoordinatePrecision: 10000m  
 CoordinateMethod: Google Earth  
 DateCollected: 1963-09-15  
 BasisOfRecord: Preserved specimen  
 TypeStatus: Paratype

What species?  
 Where was it found?  
 When was it found?  
 What is the evidence?  
 Other information

- Specimen data
- Sampling event information
- Sequences, images, etc.

## Specimens

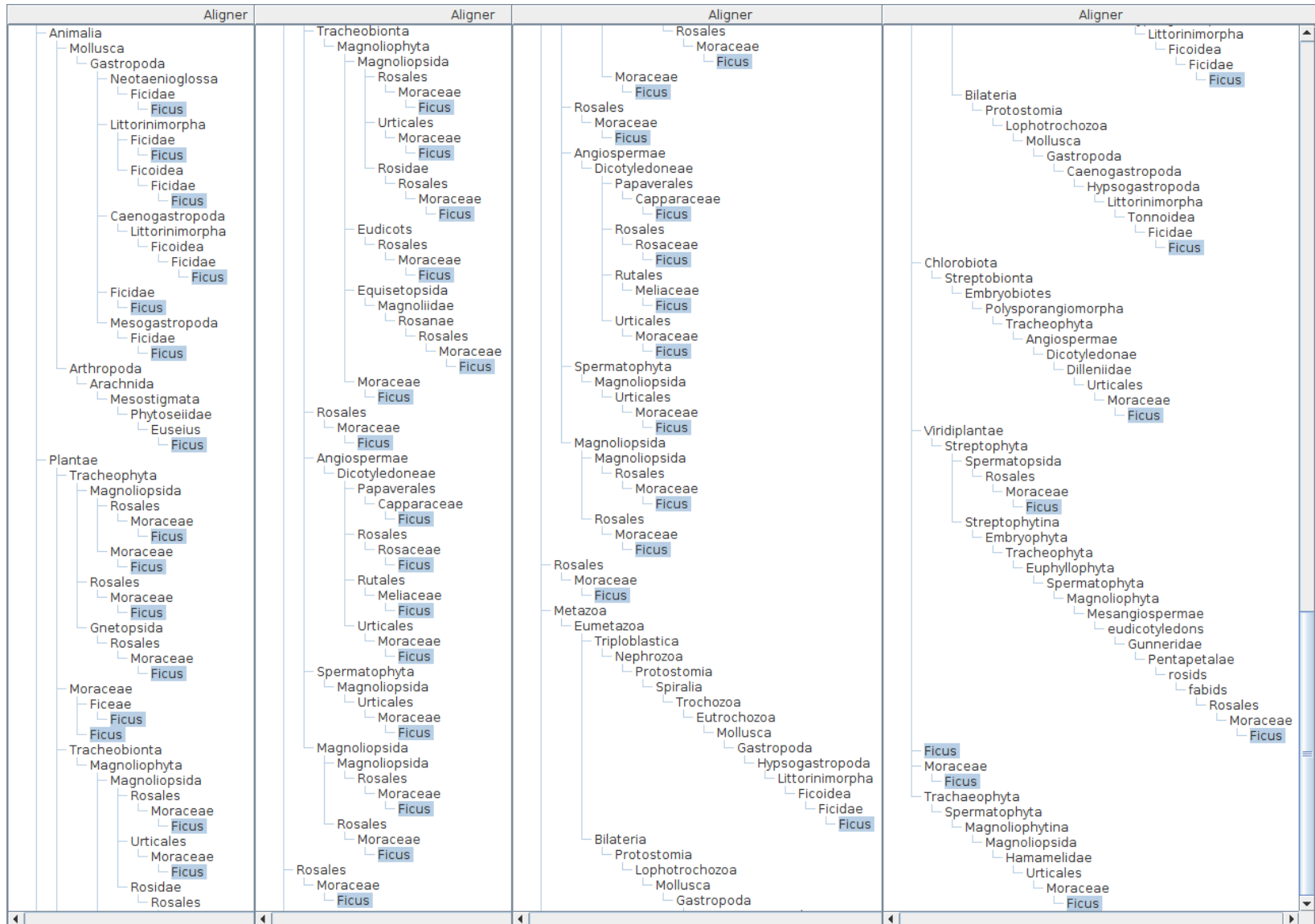


## Citizen science

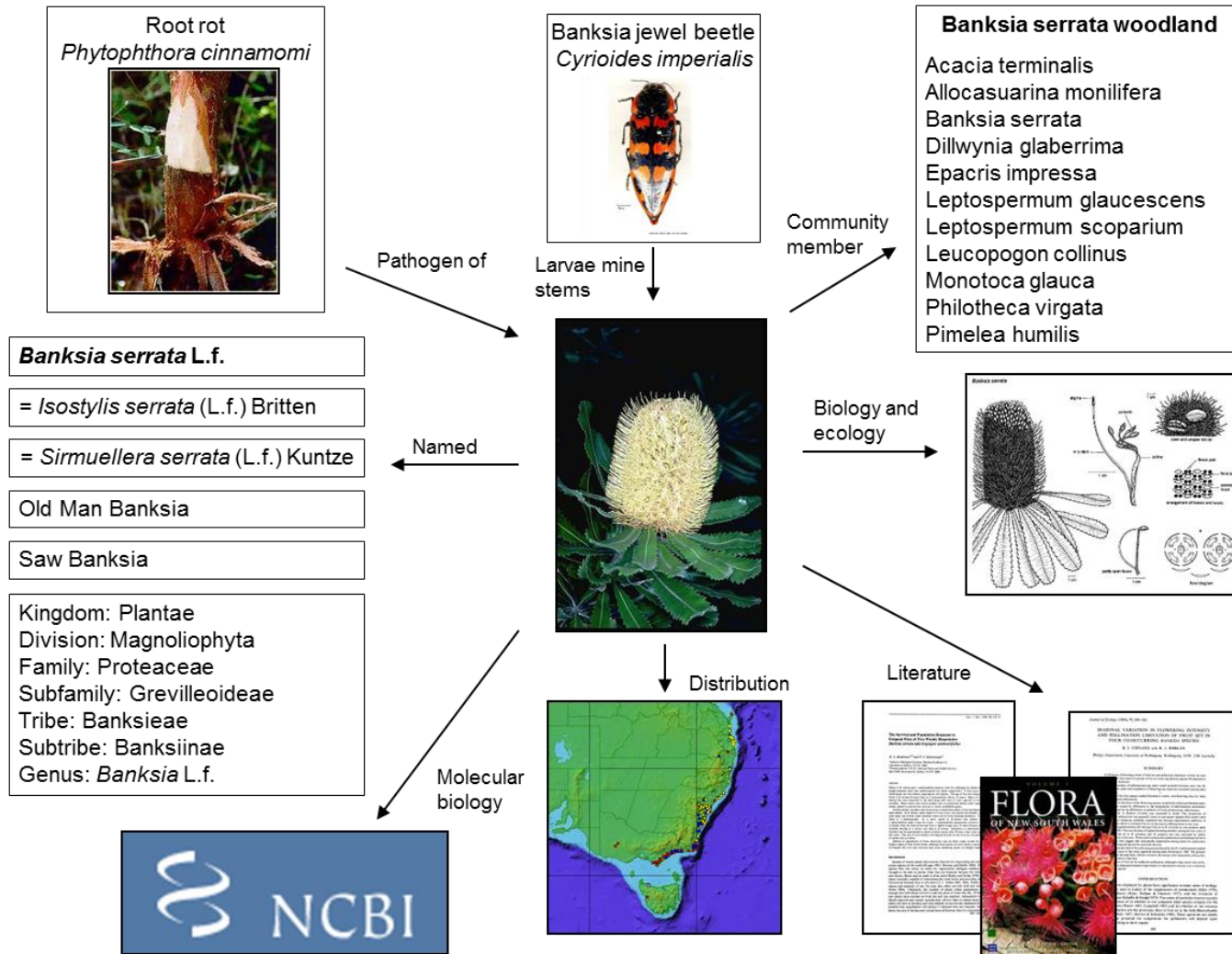


## Animal tracking

# RESOLVING SCIENTIFIC NAMES

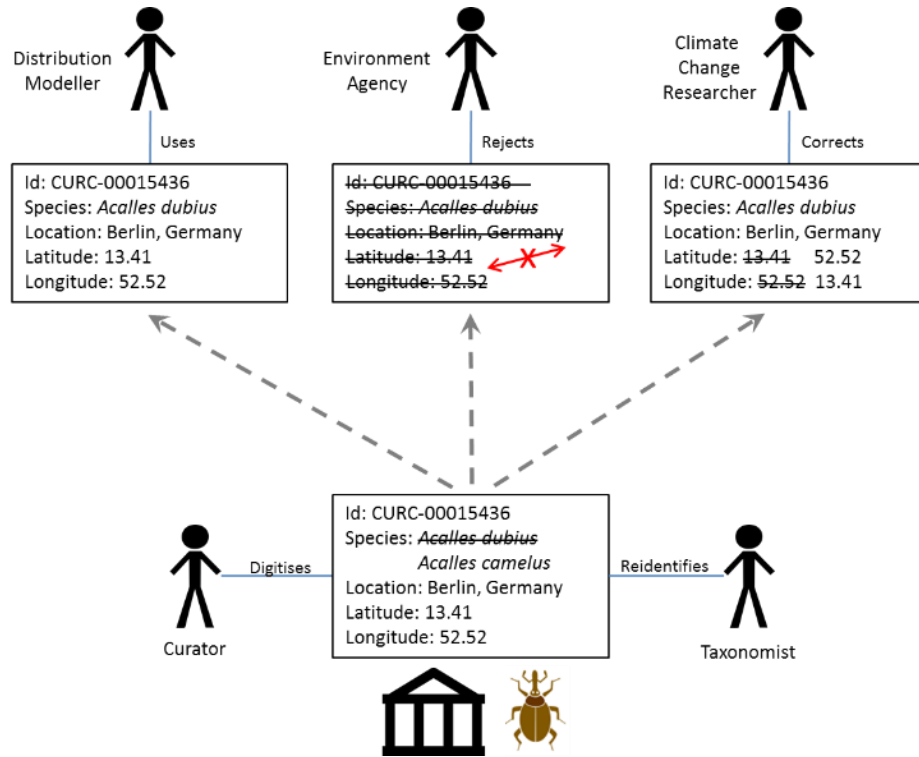


# LINKING ALL BIODIVERSITY INFORMATION



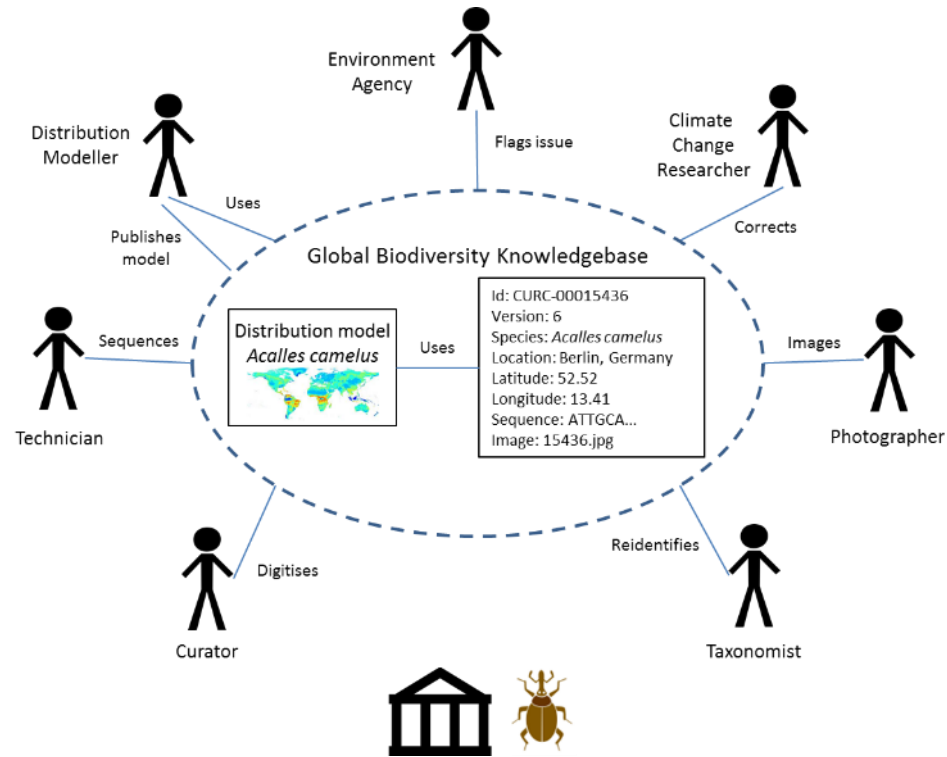


# COMMUNITY CURATION OF DATA



Today

- Disconnected publishing and use
- Limited feedback
- Poor ability to reference data



Future?

- Stable, connected data from all sources
- Collaborative management
- Continuous step-wise improvement



Thank you

Donald Hobern  
GBIF Executive Secretary  
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