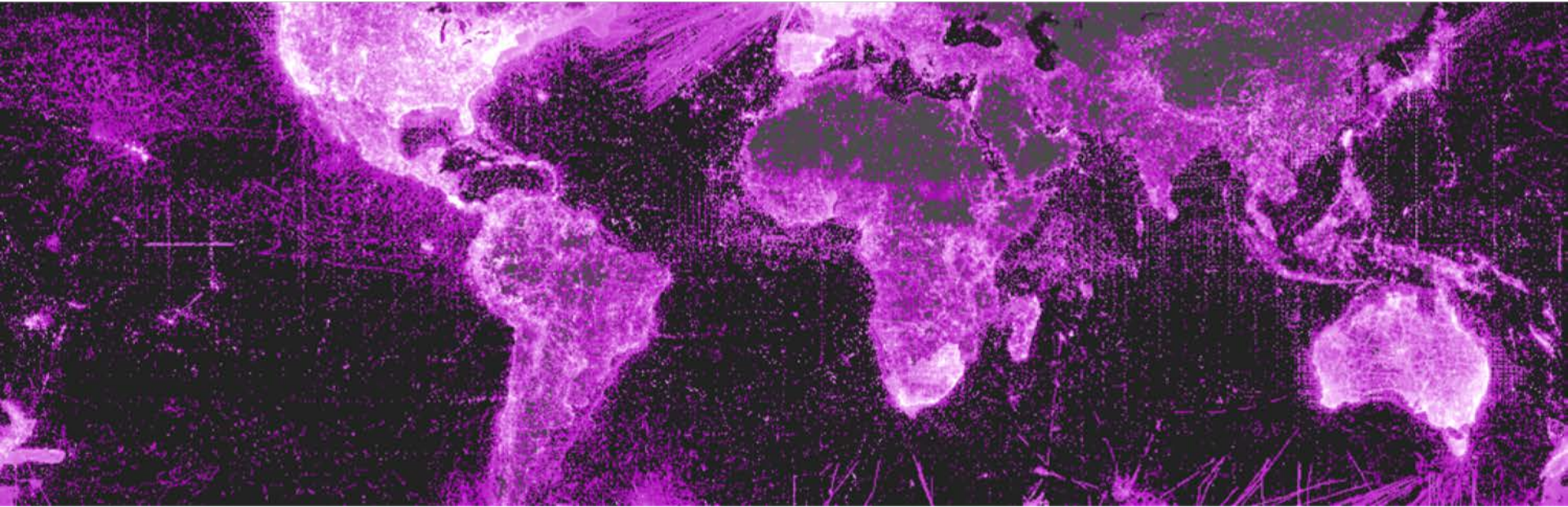




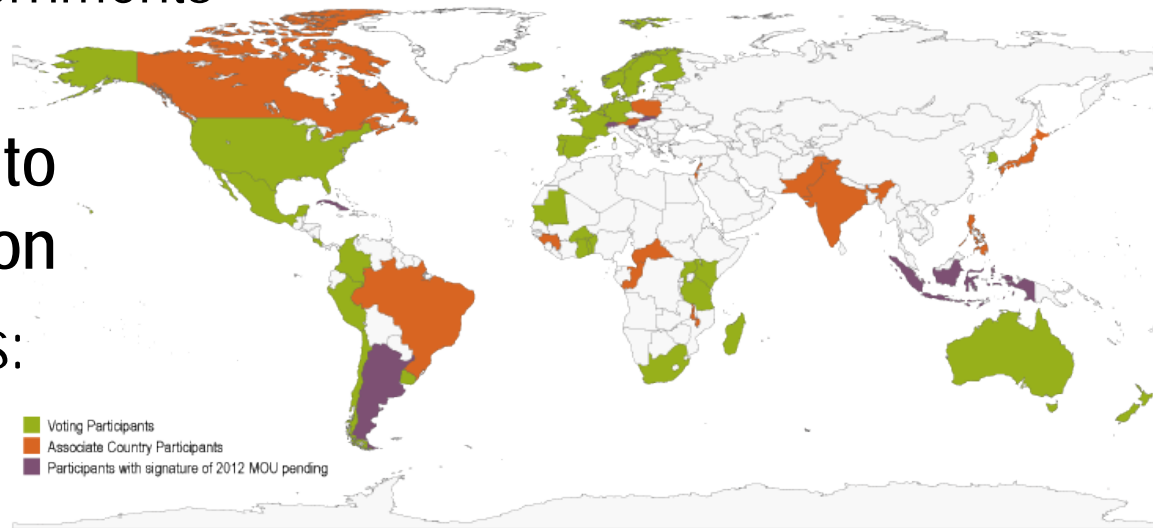
Dmitry Schigel



# Global Biodiversity Information Facility and agrobiodiversity data

*International Workshop on Crop Agrobiodiversity Monitoring*  
25 March 2015

- International open data research and policy infrastructure
- Funded by world's governments
- Network providing free and open access to biodiversity information
- 93 Participant members: 55 countries and 38 institutions
- 656 institutions sharing data through [GBIF.org](http://GBIF.org)



# WHAT DOES GBIF DO?

- Provides common standards and free open-source tools for biodiversity data management and exchange
- Promotes free and open access to biodiversity data for scientific research and policy
- Maintains global open access and web services to species datasets through GBIF.org
- Offers guidance on setting up national biodiversity information facilities
- Supports and maintains collaborative human, institutional and technical networks at global and regional levels

# PARTNERSHIPS + AFFILIATIONS



Convention on  
Biological Diversity



**GEO** GROUP ON  
EARTH OBSERVATIONS



**bip** Biodiversity  
Indicators  
Partnership

**DataONE**  
Data Observation Network for Earth



**United Nations**  
Framework Convention on  
Climate Change



# GBIF BY THE NUMBERS

**529,348,428**  
species occurrence records

**14,040**  
datasets

**656**  
data-publishing institutions





# Global Biodiversity Information Facility

Free and Open Access to Biodiversity Data

529,348,428  
OCCURRENCES

1,605,262  
SPECIES

14,040  
DATASETS

656  
DATA PUBLISHERS

Sharing biodiversity data for re-use

- Learn about GBIF
- Publish your data through GBIF
- Technical infrastructure

Providing evidence for research and decisions

- Using data through GBIF
- Enabling biodiversity science
- Supporting global targets

Collaborating as a global community

- Current Participants
- How GBIF is funded
- Enhancing capacity

Search news items and information pages...

Search

## Latest GBIF news

[Go to GBIF Newsroom](#)

### FEATURED STORY

**GBIF and EU to improve biodiversity information for developing countries**



The European Union and GBIF have launched a four-year, €3.9 million project

### LATEST NEWS

February 10th, 2015  
[GBIF and EU to improve biodiversity information for developing countries](#)

February 26th, 2015  
[Swiss non-profit Plazi becomes a GBIF Participant](#)

February 25th, 2015  
[Togo becomes the GBIF network's newest Voting Participant](#)

February 11th, 2015  
[2015 GBIF Capacity Enhancement](#)

### UPCOMING EVENTS

**MAR 17** [EU BON | CETAF Joint Informatics Meeting](#)  
Joensuu, Finland

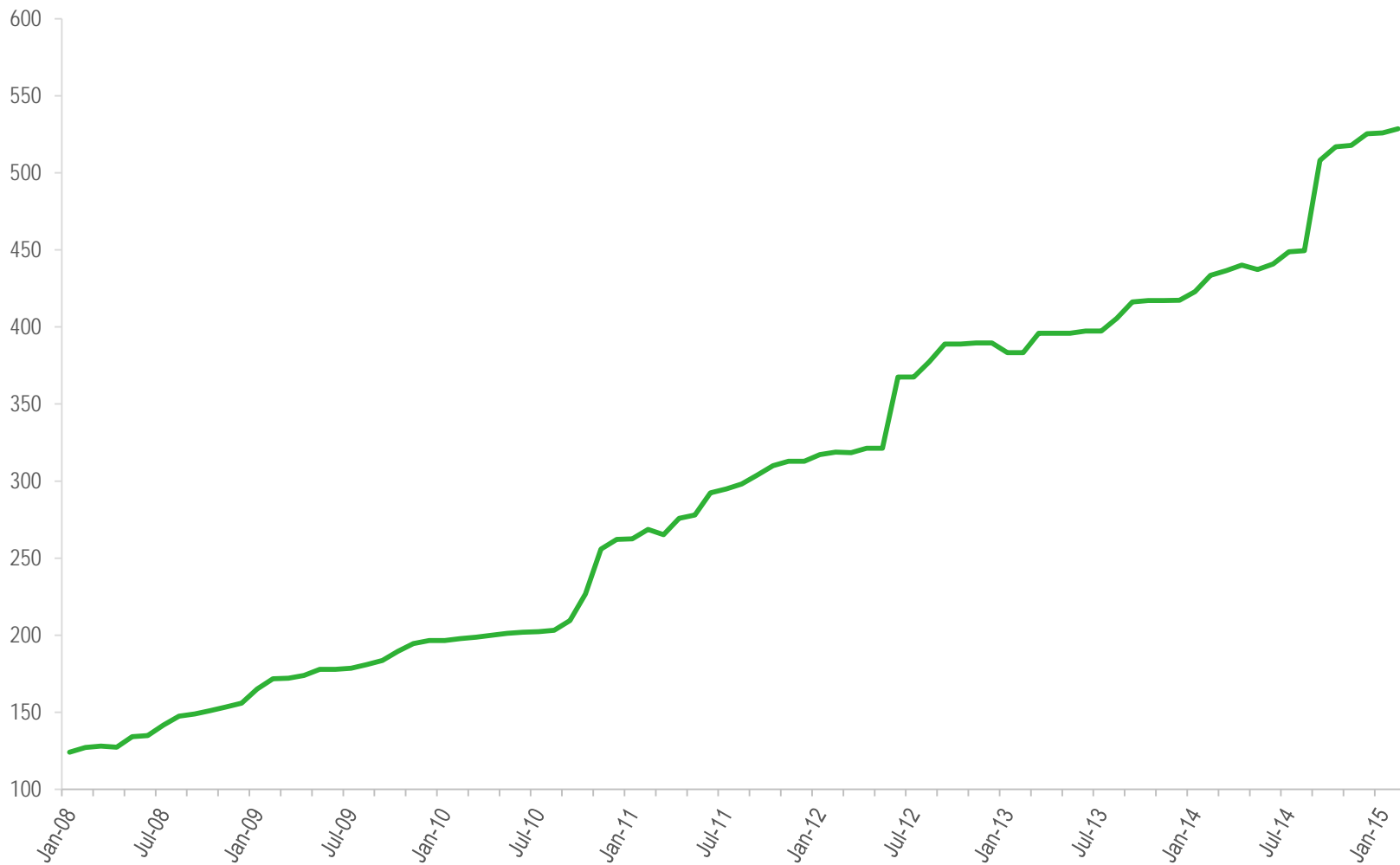
**APR 08** [ICLEI World Congress 2015](#)  
Seoul, Korea, Republic of

**MAY 05** [7th European Nodes Meeting](#)  
Paris, France

**MAY 10** [Africa Rising: Mobilising Biodiversity Data for](#)

# DATA PUBLISHED THROUGH GBIF.ORG

*Trend in primary biodiversity records (millions)*



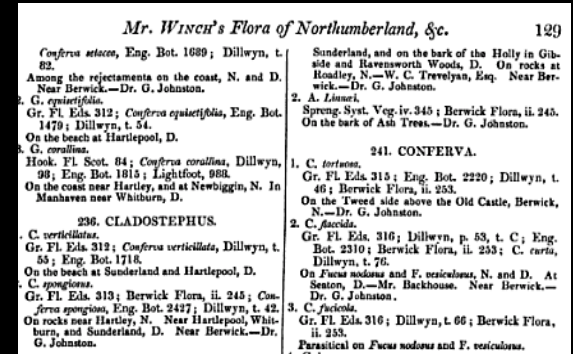
# TYPES OF DATA SHARED THROUGH GBIF



Specimens from  
museum and  
herbarium  
collections



Observations from  
field surveys,  
inventories and  
citizen scientists



Records extracted  
from literature



## SOURCES OF GBIF-MEDIATED DATA

# OBSERVATION DATA

Record of the presence (or absence) of an organism through a data collection event

Fundamental for uses like:

- Scientific inventory
- Conservation planning
- Habitat management
- Invasive species assessments
- Species modeling
- Monitoring



## SOURCES OF GBIF-MEDIATED DATA

# SPECIMEN RECORDS

- Physical artifacts from museum and natural history collections
- Meaningful and relevant data that contributes to present-day science, conservation and policy by connecting to earlier generations' research



# SOURCES OF GBIF-MEDIATED DATA

## CROWD-SOURCED DIGITIZATION

### Australian Volunteer Portal (Atlas of Living Australia)

- Invites users to engage in 'expeditions'
- Volunteers transcribe labels from images themed around particular collections

### Les Herbonautes (France)

- Francophone network encourages public transcription of herbarium sheets
- Digitization of National Herbarium's 8 million specimens from all continents dating to 1635 and age of exploration

### Lichens of Africa (GBIF Norway)

- GBIF Norway crowdsourcing effort launched to mark 200th anniversary of Natural History Museum botanical garden in Oslo
- Volunteers assist in transcribing thousands of records for African lichen specimens



# SOURCES OF GBIF-MEDIATED DATA

## CITIZEN SCIENCE NETWORKS

### eBird

- >150 million high-quality observations worldwide
- Collected by professional ornithologists, recreational birders and citizen scientists

### iNaturalist

- Publish subset of verified 'research-grade' observations

### anymals+plants

- German-based initiative includes mobile app to encourage uploading of public sightings
- Displays existing GBIF-mediated records in locations where people are looking

### Diveboard

- Amateur dive network initiative that enables divers to record sightings in 'electronic log books'
- Partners linked to GBIF Belgium and GBIF France converted observations into extensive GBIF dataset

### Scandinavian networks

- Recorders in Sweden, Norway and Finland conduct rapid (and strict) peer review



# SOURCES OF GBIF-MEDIATED DATA

## CITIZEN SCIENCE

### NATIONAL NODE EXAMPLES

#### National Biodiversity Data Centre (Ireland)

- Hosts annual bioblitz competition across four locations in the Republic and Northern Ireland
- Attracts national media coverage and provides datasets in GBIF

#### DanBIF (Denmark)

- 2013 & 2014 events linked to World Biodiversity Day
- Inventory in two parks in greater Copenhagen
- Datasets published: <http://doi.org/10.15468/4entqy> & <http://doi.org/10.15468/gkcp4x>

#### InBIO (Costa Rica)

- 2014 bioblitz in research park

#### SANBI (South Africa)

- 2012 bioblitz in Stellenbosch with iSpot



# Mapping the zoonotic niche of Ebola virus disease in Africa

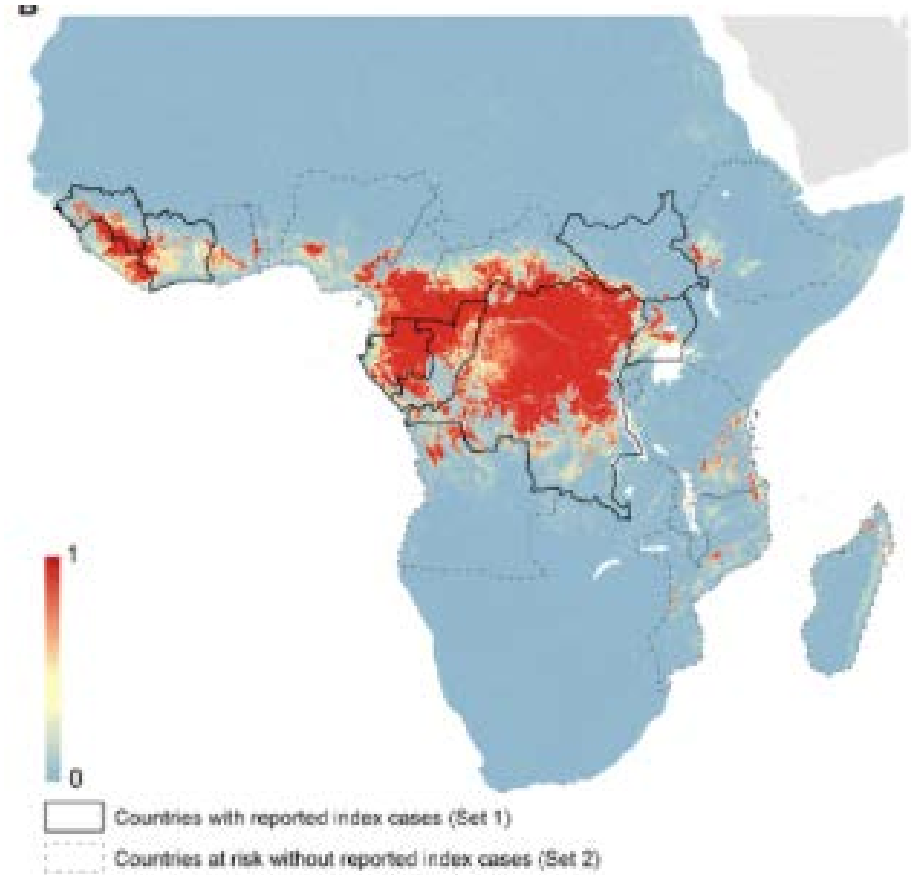


eLIFE

David M Pigott, Nick Golding, Adrian Mylne, Zhi Huang, Andrew J Henry, Daniel J Weiss, Oliver J Brady, Moritz UG Kraemer, David L Smith, Catherine L Moyes, Samir Bhatt, Peter W Gething, Peter W Horby, Isaac I Bogoch, John S Brownstein, Sumiko R Mearu, Andrew J Tatem, Kamran Khan, Simon I Hay ✉



- Modelled environmental niches of three bat species associated with Ebola transmission
- Occurrence records accessed via GBIF
- At-risk areas cover 22 countries, population of 22 million
- Helps to prioritize surveillance and diagnostic capacity in at-risk areas



# A simple, rapid methodology for developing invasive species watch lists



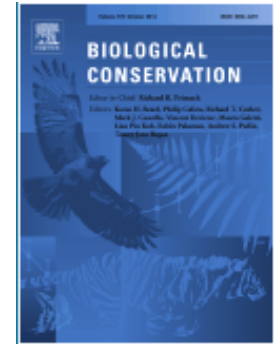
Katelyn T. Faulkner <sup>a,b,\*</sup>, Mark P. Robertson <sup>b</sup>, Mathieu Rouget <sup>c</sup>, John R.U. Wilson <sup>a,d</sup>

<sup>a</sup> Invasive Species Programme, South African National Biodiversity Institute, Private Bag X7, Claremont 7735, South Africa

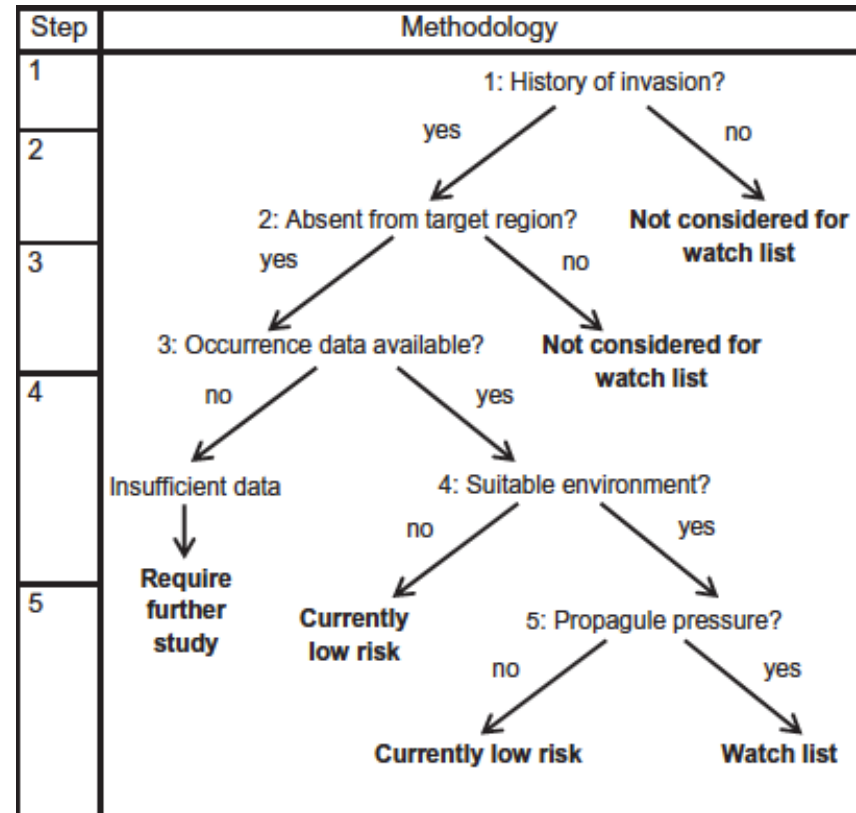
<sup>b</sup> Centre for Invasion Biology, Department of Zoology and Entomology, University of Pretoria, Hatfield 0028, South Africa

<sup>c</sup> Centre for Invasion Biology, School of Agricultural, Earth and Environmental Sciences, University of KwaZulu-Natal, Private Bag X01, Scottsville 3209, South Africa

<sup>d</sup> Centre for Invasion Biology, Department of Botany and Zoology, Stellenbosch University, Private Bag X1, Matieland 7602, South Africa



- Used more than 20m records via GBIF for 884 species on Global Invasive Species Database (GISD)
- Modelled likely invasion success for South Africa based on environmental suitability, propagule pressure
- Identified watch list of 400 potential invaders
- Methodology applicable to any region



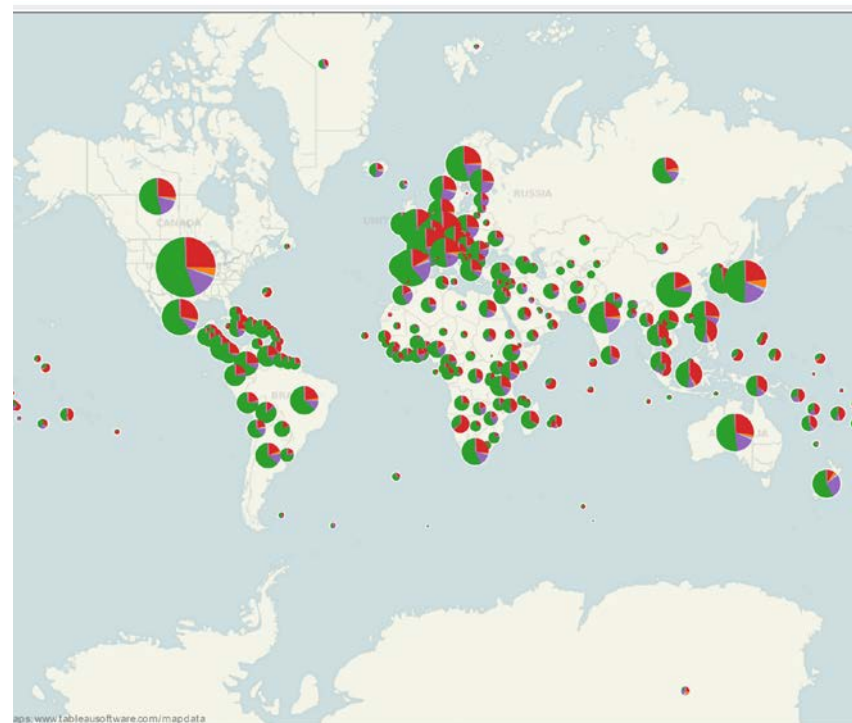
# Biological Diversity in the Patent System

Paul Oldham , Stephen Hall, Oscar Forero

Published: November 12, 2013 • DOI: 10.1371/journal.pone.0078737 • Featured in PLOS Collections



- Mined 11MM patent documents for 6MM scientific species names from the GBIF and EOL's Global Names Index
- Identified 76,274 species names from 23,882 genera in 767,955 patent documents
- Patent system focuses on ~4% of taxonomically described species <1% of predicted global species
- Human innovation and ownership of genetic resources requires consideration of broader, more equitable spectrum of biodiversity

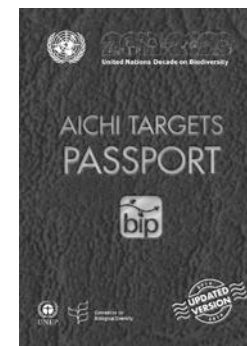


GBIF data showing global distribution of species in patents by kingdom (Oldham et al. 2014)

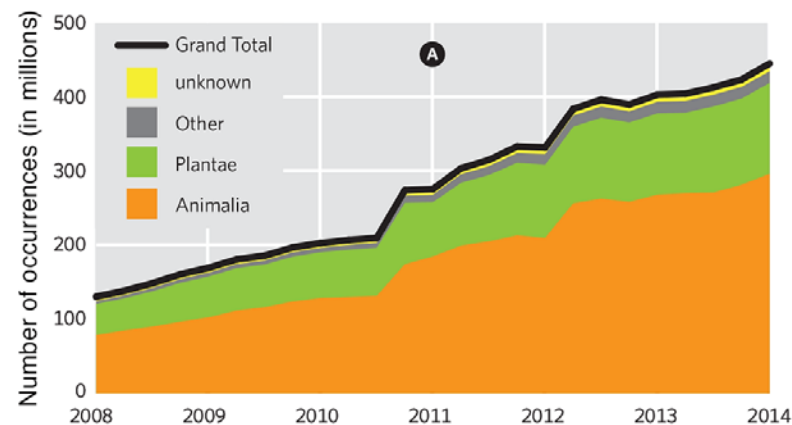


# Global Biodiversity Outlook 4

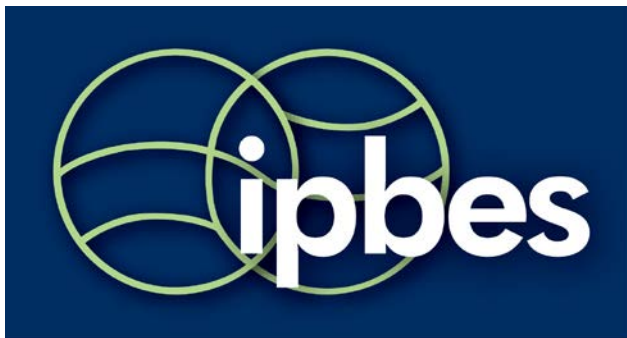
*A mid-term assessment of progress towards the implementation of the Strategic Plan for Biodiversity 2011–2020*



- Records published through GBIF over time now serves as a CBD indicator for Target 19 on sharing knowledge
- ‘With the advances made in building systems to share data, information and knowledge on biodiversity, a significant part of this target is judged to be on track.
- “However, to meet all components of the target, further efforts are needed on investment in data mobilization and the coordination of models and technologies that can be readily applied to decision making.”

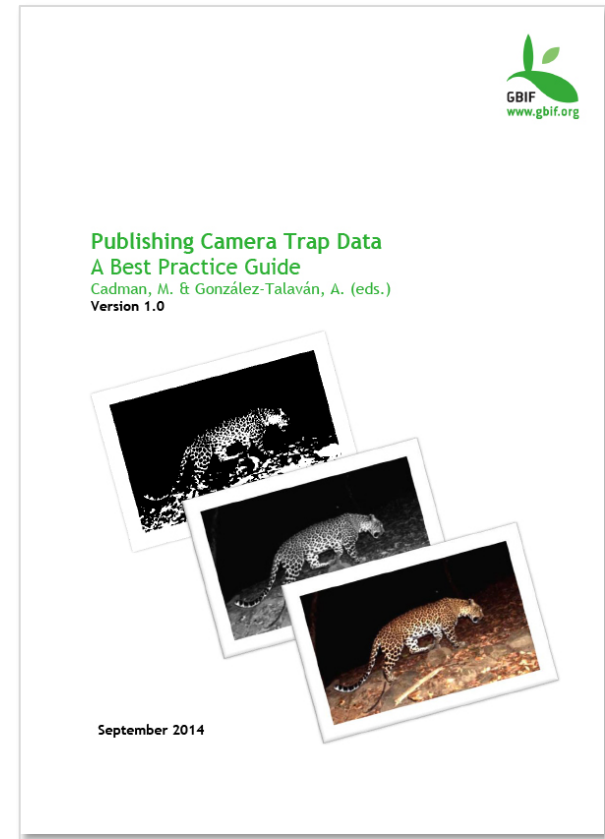


*Growth in species occurrence records<sup>1</sup> published through GBIF*



# Intergovernmental Platform on Biodiversity & Ecosystem Services

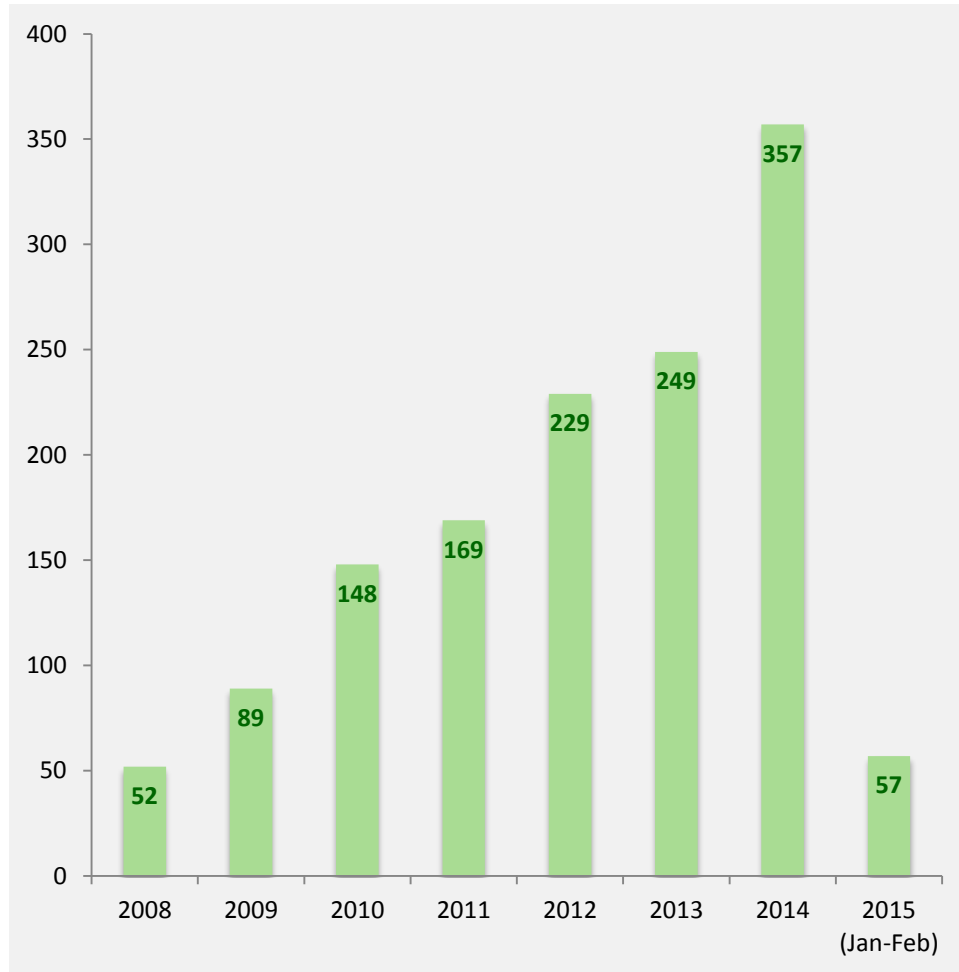
- Official observer to IPBES plenary
- Provides expert resource person to Task Force on Data and Knowledge
- Named as source of data in scoping documents for several IPBES assessments
- Identified as 'potential strategic partner' for IPBES on provision and access to biodiversity data - partnerships to be formalised during 2015



<http://www.gbif.org/resource/80927>

# PEER-REVIEWED CITATIONS

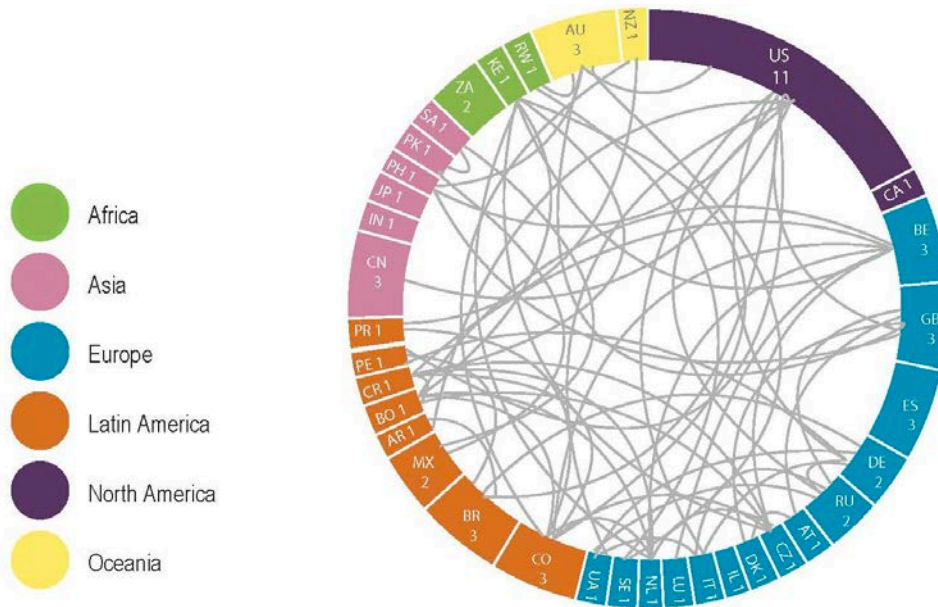
*Annual number of peer-reviewed publications using GBIF-mediated data*



# USE CITATIONS, BY COUNTRY OF AUTHORS

Feb 2015

Feb 2015



1. United States	11	2. United Kingdom	3
2. Colombia	3	2. Brazil	3
2. Belgium	3	2. China	3
2. Australia	3	2. Spain	3

Number of research publications in February 2015 citing use of GBIF-mediated data, ranked by country according to affiliation of author. Top eight countries shown.

Total 2015

1. United States	20	4. Australia	4
2. Germany	6	4. Colombia	4
3. Mexico	5	4. Spain	4
3. Belgium	5	4. United Kingdom	4

Number of research publications from January and February 2015 citing use of GBIF-mediated data, ranked by country according to affiliation of author. Top eight countries shown.

Relationship line represents collaboration between authors affiliated in different countries.

# GBIF AND 'DATA PAPERS'

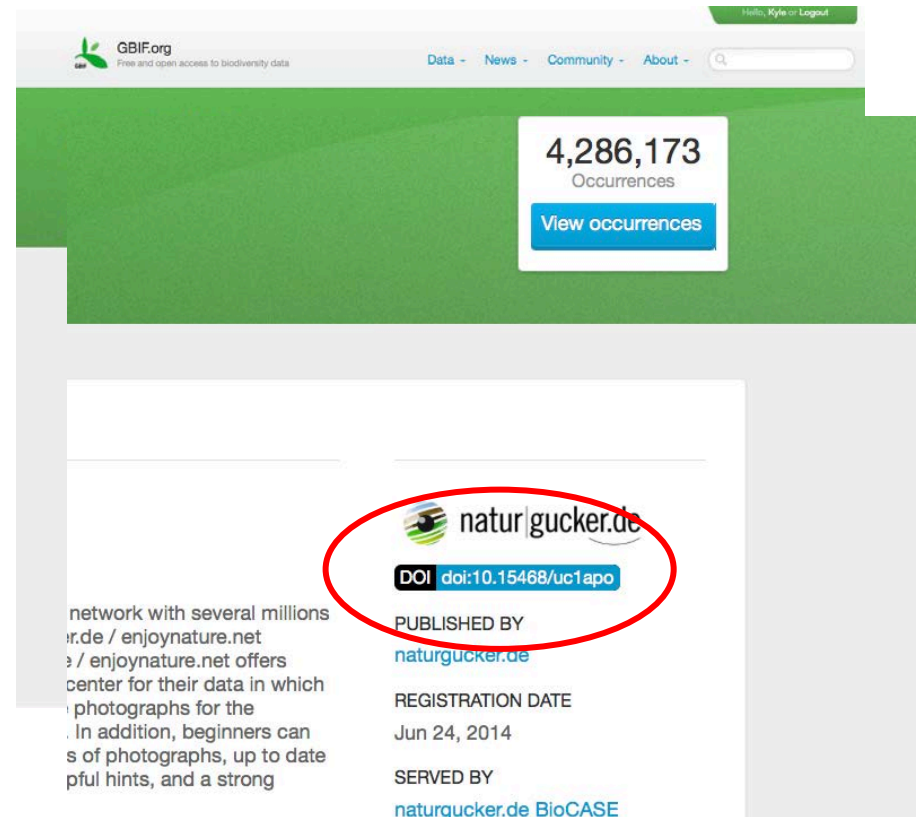
Scholarly publication of searchable metadata through Pensoft & Nature Publishing

- Describes a dataset or group of datasets in structured, human-readable form
- Promotes and publicizes the existence of data
- Provides scholarly credit to data publishers through citable journal publications



# DOIs: DIGITAL OBJECT IDENTIFIERS

- Stable, easy-to-use model for citing data sources
- Improves ability to track use of data in research and web applications
- Publisher- or IPT-assigned DOIs for datasets
- DOIs for downloads simplify citation of complex user-defined searches



The screenshot shows the GBIF.org website interface. At the top, the GBIF logo and tagline "Free and open access to biodiversity data" are visible. A navigation menu includes "Data", "News", "Community", and "About". A search bar is present on the right. A large green banner displays "4,286,173 Occurrences" with a "View occurrences" button. Below this, a dataset entry is shown for "naturgucker.de". The DOI "doi:10.15468/uc1apo" is highlighted with a red circle. The entry also includes the publisher "naturgucker.de", the registration date "Jun 24, 2014", and the service "SERVED BY naturgucker.de BioCASE".

# Conservation challenges in a threatened hotspot: agriculture and plant biodiversity losses in Baja California, Mexico

**Biodiversity and  
Conservation**

Sula Vanderplank • Exequiel Ezcurra • Jose Delgadillo • Richard Felger •  
Lucinda A. McDade

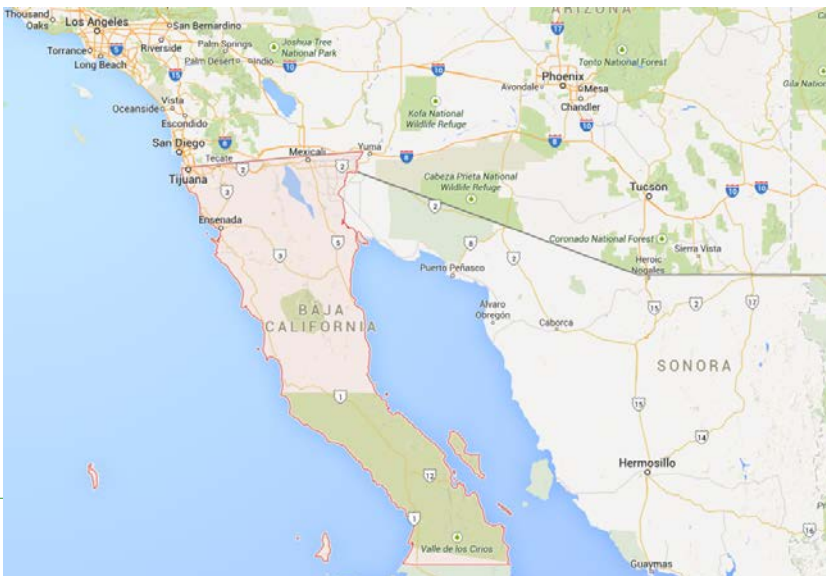


Modern agricultural practices pose threats to biodiversity worldwide

Historical collections indicate that habitat loss to agriculture has been a direct cause of species losses

78% of the vernal pool taxa have been lost from the flora and 11 % of plants of riparian and pond habitats

Floristic survey 2005 – 2010, plus BajaFlora.org, SEINET, CONABIO, and GBIF

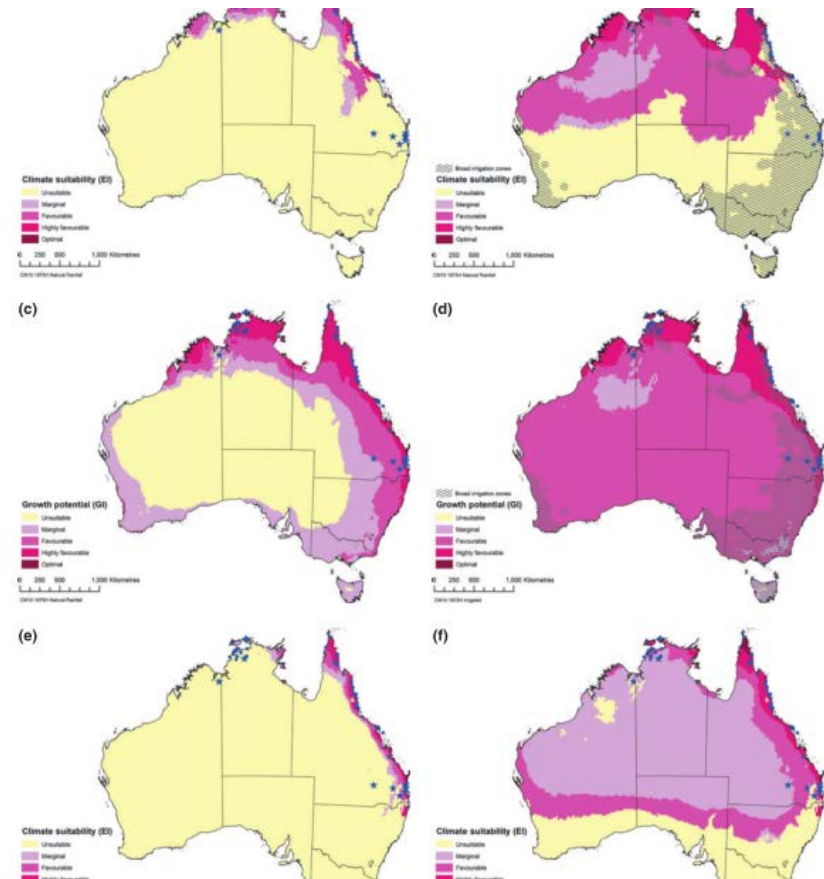


# Balancing bioenergy and biosecurity policies: estimating current and future climate suitability patterns for a bioenergy crop

D. J. Kriticos, T. Murphy, T. Jovanovic, J. Taylor, Her\* ,J . Rai Son, D. O'connell



- Paradox: bioenergy crops offer potential **benefits** to a world adjusting to climate change, as well as potential ecological and economic **threats**
- bioclimatic niche model for a candidate biofuel crop *Milletia pinnata*
- Australia as a case study
- comparatively quick and easy method to can produce a rich array of data products to inform the interests of both bioenergy proponents and biosecurity regulators.



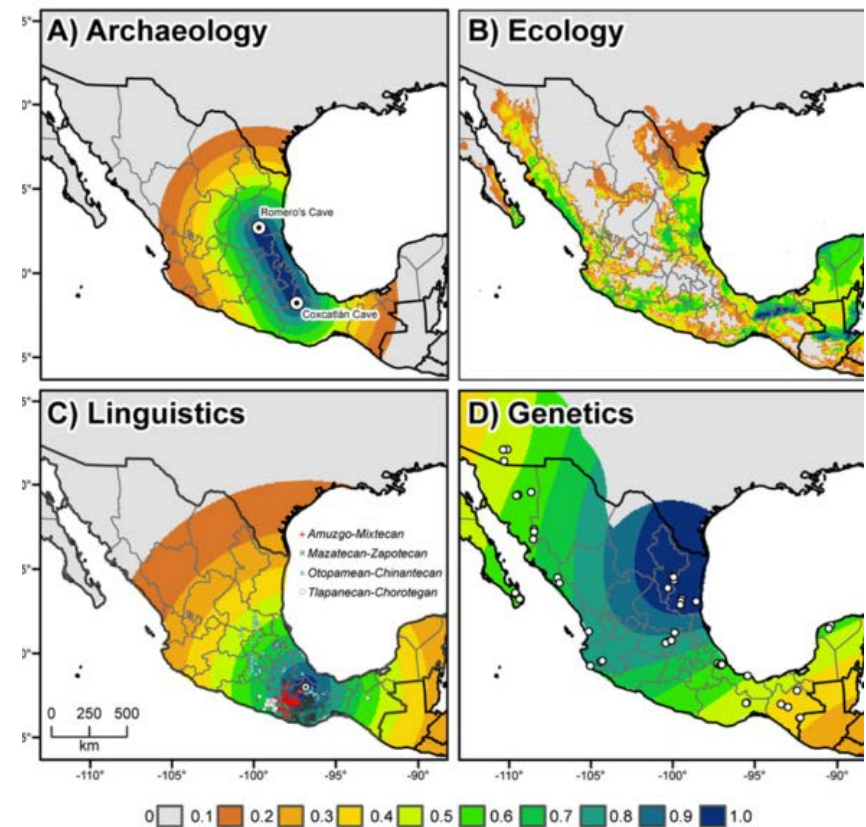


# Multiple lines of evidence for the origin of domesticated chili pepper, *Capsicum annuum*, in Mexico

K.H. Krafta, C.H. Brownb, G.P. Nabhanc, E. Luedelingd, J.J.L. Ruize, G.C. d'Eeckenbruggef, R.J. Hijmansg, P. Geptsa

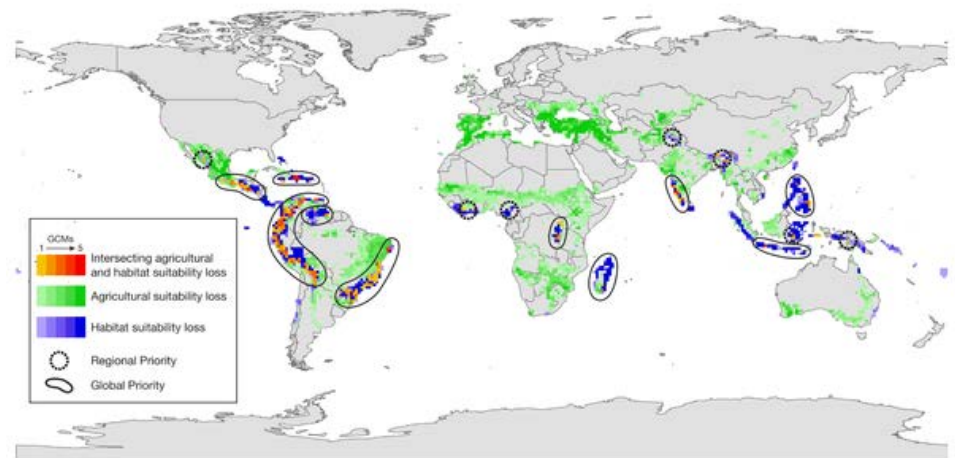


- crop origins:
  - species distribution modeling
  - Paleobiolinguistics
  - microsatellite genetic data
  - archaeobotany
- Four lines of evidence identify 1-2 areas in Mexico
- Difficulties to identify the time and place of origin can be overcome by combining contrasting lines of evidence



# Global Climate Change Adaptation Priorities for Biodiversity and Food Security

L. Hannah, M. Ikegami, D.G. Hole, C. Seo, S.H.M. Butchart, A.T. Peterson, P.R. Roehrdanz



- 1,263 species
- general circulation models (GCM)
- ten global priority areas where **human** and **natural** adaptation needs intersect:
  - 9.3% of the world's habitable lands
  - 10.6% of remaining natural habitats
  - 7-9% of the world's poor inhabit these areas
  - all of the areas intersect global biodiversity hotspots

# DISCUSSION POINTS

Whose **goals** we are aiming at?  
Whose and what **demands** we address?

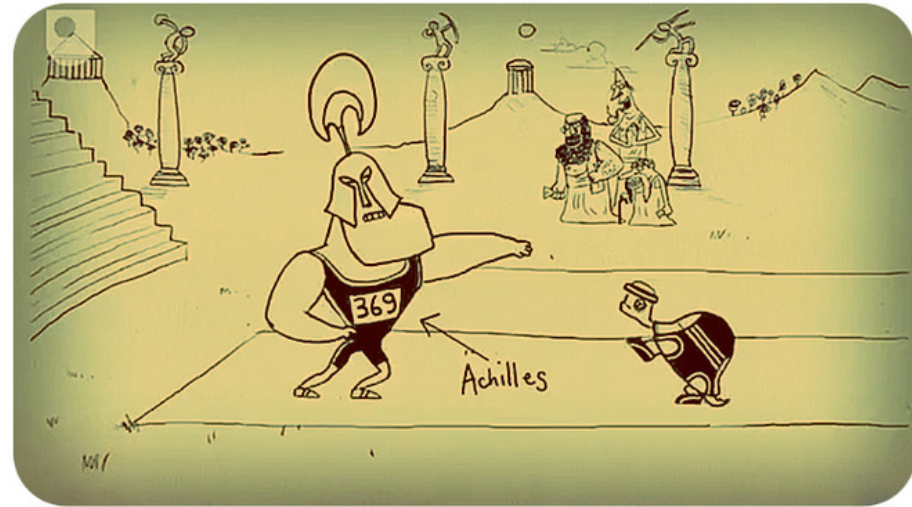
**Success & impact and end products:**  
demand-driven reverse planning.

Scientific evidence of agrobiodiversity changes  
**publications**, lag?  
data **portals** and analytical e-tools, users?  
**assessments**, opinion, data, literature based?

Single surveys -> repeated surveys & timelines, **patterns** -> monitoring, **processes**  
=> **trends**

**Data types:** from occurrence to **sample based data:**  
binary, quantitative -> sampling events and abundances

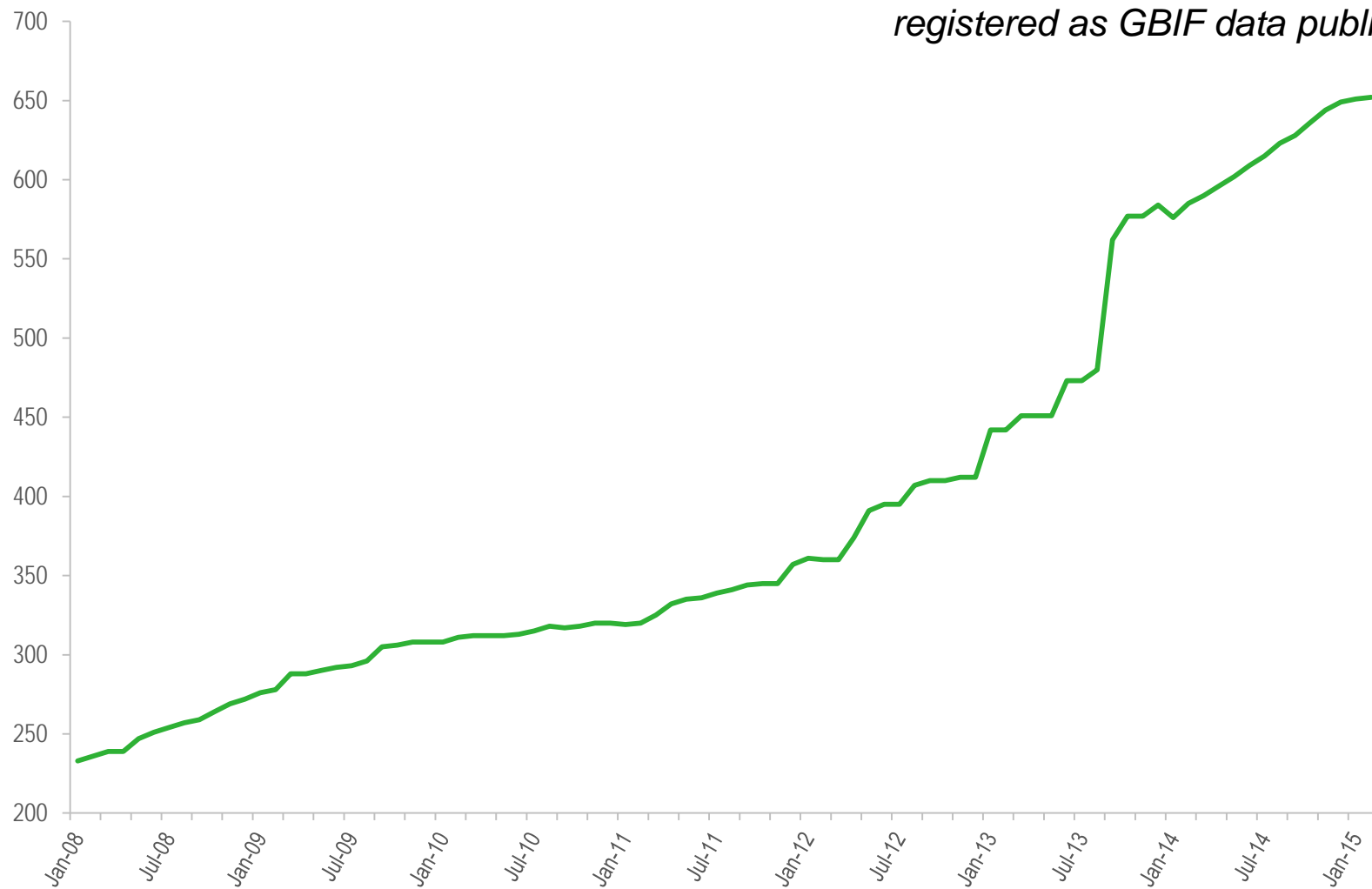
**Use and demand** will dictate the data types and its fitness for use,  
affecting the monitoring and research plans





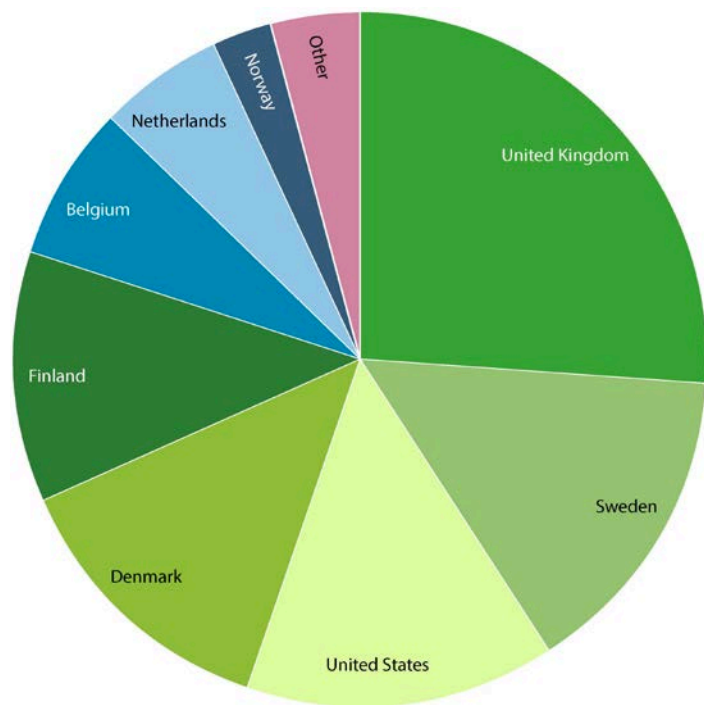
# DATA PUBLISHERS

*Trend in number of institutions registered as GBIF data publishers*

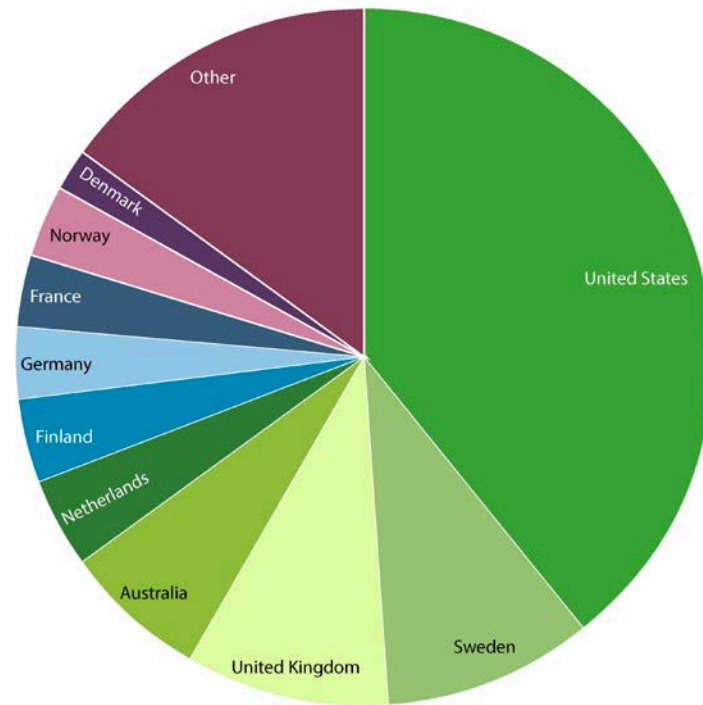


A sharp rise in the number of data publishers in September 2013 results from institutions choosing to register as separate entities rather than sharing datasets through a single publisher at their national node institution. <http://www.gbif.org> | 3 MAR 2015

# DATA—BY GBIF PARTICIPANT



Number of new records published—Top 10 participant Countries  
(1 Jan to 28 Feb 2015)



Total number of records published—Top 10 Participant Countries  
(as of 28 Feb 2015)

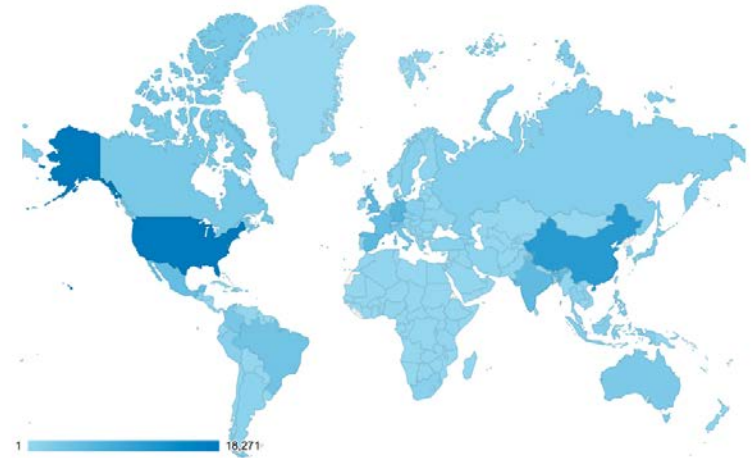
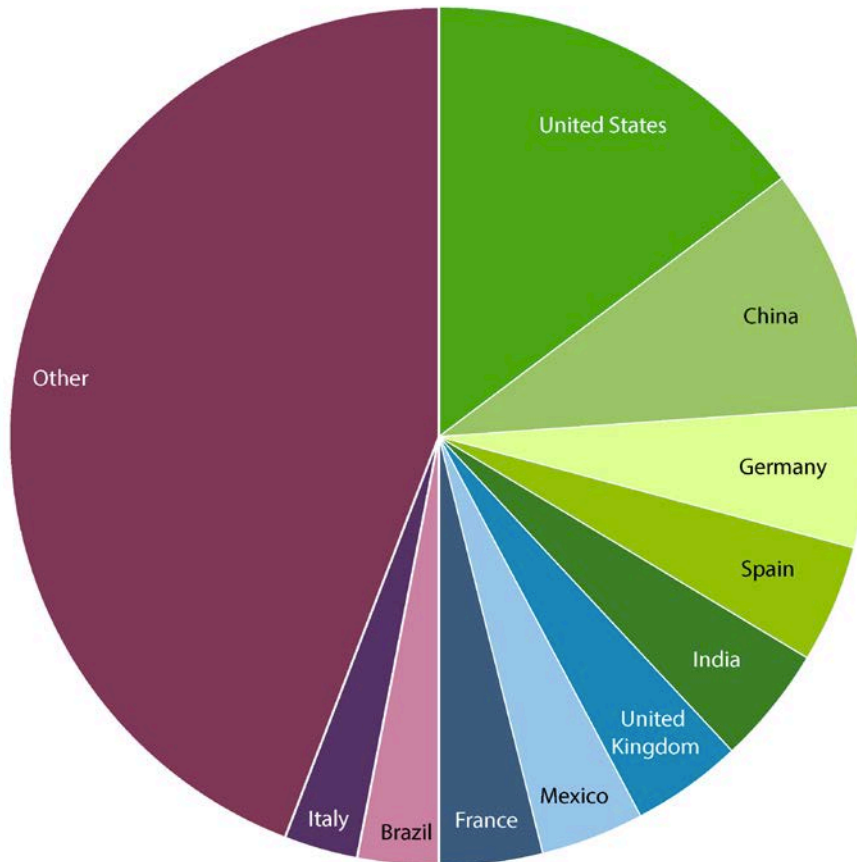
1. United Kingdom	2,354,362	6. Belgium	663,130
2. Sweden	1,324,994	7. Netherlands	517,237
3. United States	1,294,988	8. Norway	252,036
4. Denmark	1,175,506	9. Germany	54,338
5. Finland	1,041,319	10. Canada	40,894

1. United States	208,206,274	6. Finland	19,553,296
2. Sweden	50,275,077	7. Germany	18,764,068
3. United Kingdom	49,525,750	8. France	17,513,580
4. Australia	36,661,783	9. Norway	17,425,011
5. Netherlands	21,465,722	10. Denmark	10,479,207

*NOTE: Datasets are assigned to countries according to the location of the publishing institution, including aggregated datasets with contributors from many other countries. <http://www.gbif.org> | 6 MAR 2015*

# VISITS TO GBIF.ORG BY COUNTRY

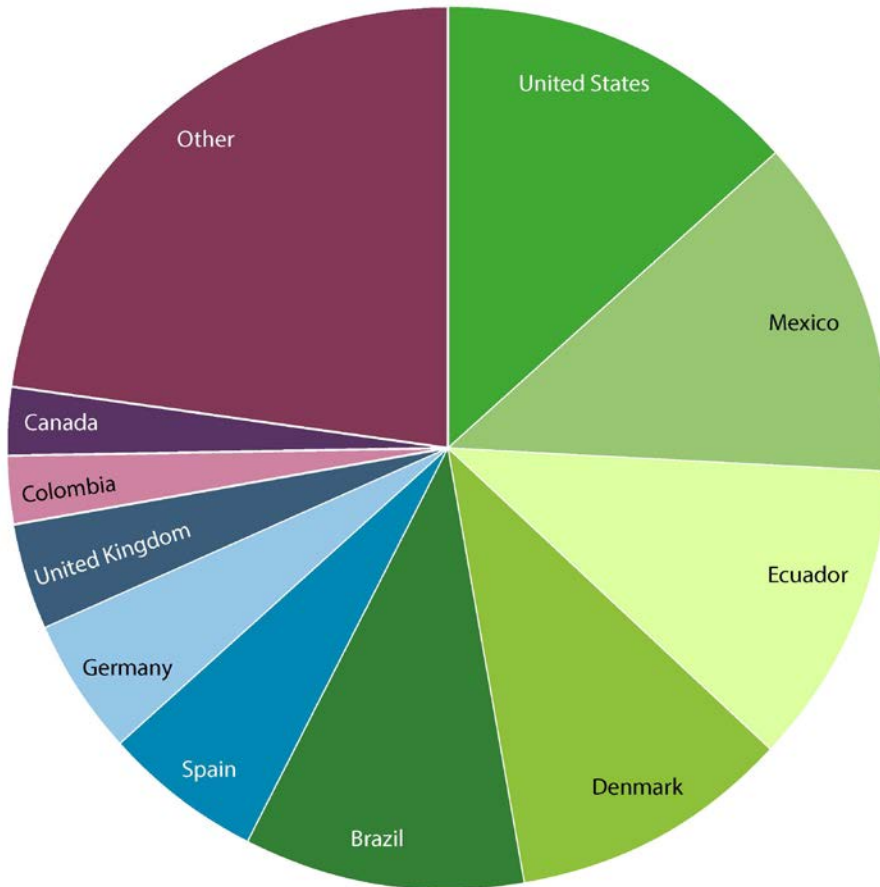
Feb 2015



1. United States	18,271	6. United Kingdom	5,238
2. China	11,355	7. Mexico	4,754
3. Germany	6,389	8. France	4,727
4. Spain	5,614	9. Brazil	3,533
5. India	5,285	10. Italy	3,411

# DATA DOWNLOAD REQUESTS, BY COUNTRY

1 Jan 2015 – 28 Feb 2015

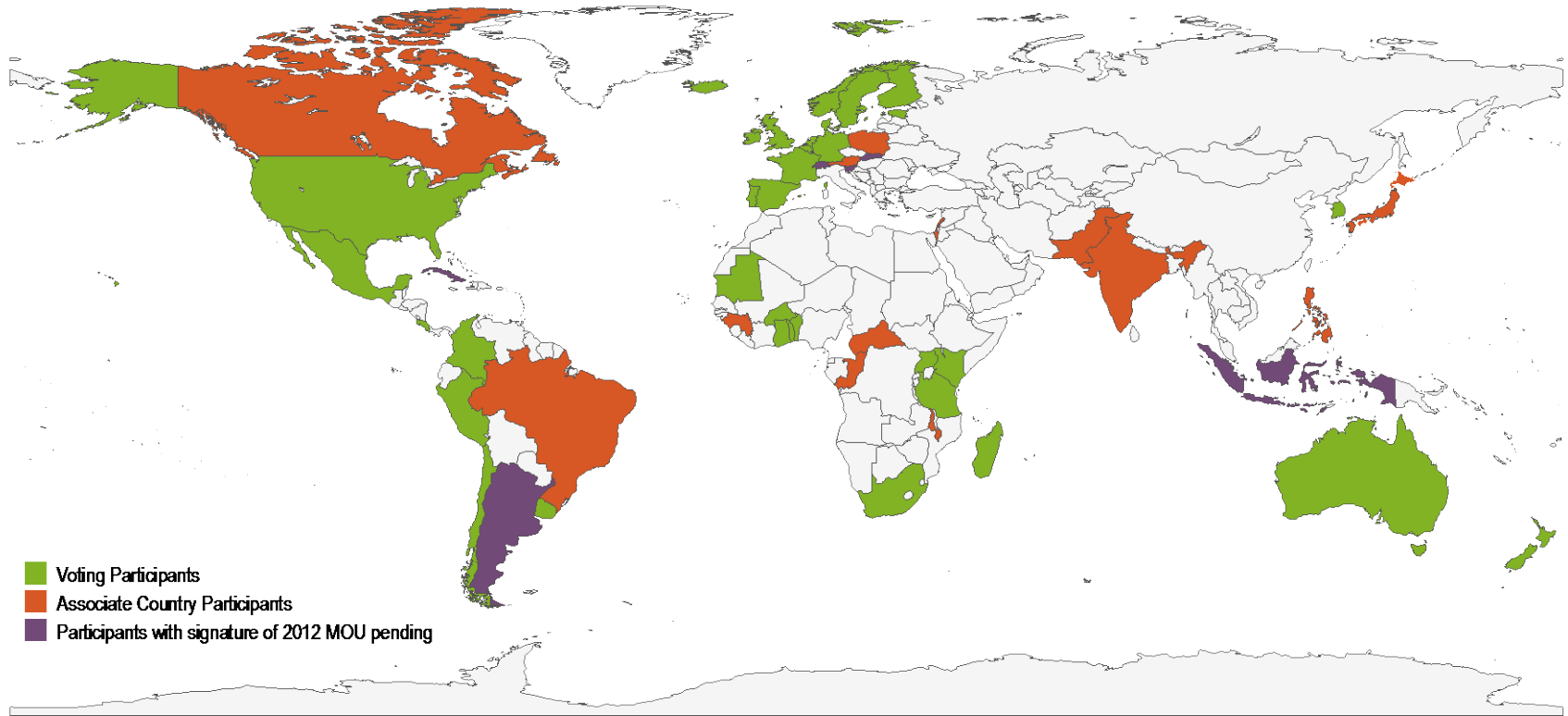


Total of  
**13,562 requests**  
 from **1897 users** in  
**104 countries, islands  
 and territories**

1. United States	1,829	6. Spain	790
2. Mexico	1,684	7. Germany	687
3. Ecuador	1,500	8. United Kingdom	497
4. Denmark	1,418	9. Colombia	356
5. Brazil	1,383	10. Canada	347



# MAP OF GBIF COUNTRY PARTICIPANTS



# GBIF PARTICIPANT LIST

Feb 2015

## Voting Participants

1. Andorra
2. Argentina \*
3. Australia
4. Belgium
5. Benin
6. Burkina Faso
7. Chile
8. Colombia
9. Costa Rica
10. Denmark
11. Estonia
12. Finland
13. France
14. Germany
15. Ghana
16. Iceland
17. Ireland
18. Kenya
19. Madagascar
20. Mauritania
21. Mexico
22. Netherlands
23. New Zealand
24. Norway
25. Peru
26. Portugal
27. Republic of Korea
28. Slovakia \*
29. Slovenia \*
30. South Africa
31. Spain
32. Sweden
33. Tanzania
34. Togo
35. Uganda
36. United Kingdom
37. United States
38. Uruguay

## Associate Country Participants

1. Austria
2. Brazil
3. Canada
4. Central African Republic
5. Guinea
6. India
7. Indonesia \*
8. Israel
9. Japan
10. Luxembourg
11. Malawi
12. Pakistan
13. Philippines
14. Poland
15. Republic of Congo
16. Switzerland \*

## Other Associate Participants

1. ASEAN Centre for Biodiversity (ACB)
2. Albertine Rift Conservation Society (ARCOS)
3. Biodiversity Heritage Library
4. BioNET-Andionet
5. BioNET-INTERNATIONAL
6. Bioversity International
7. Botanic Gardens Conservation International (BGCI)
8. Canadensys
9. Chinese Academy of Sciences
10. Chinese Taipei
11. Ciencia y Tecnología para el Desarrollo (CYTED)
12. Consortium for the Barcode of Life (CBOL)
13. Consortium of European Taxonomic Facilities (CETAF)
14. Discover Life
15. Encyclopedia of Life (EOL)
16. Endangered Wildlife Trust (EWT)
17. European Environment Agency (EEA)
18. ICLEI – Local Governments for Sustainability
19. Inter-American Biodiversity Information Network (IABIN)
20. Integrated Taxonomic Information System (ITIS)
21. International Barcode of Life Consortium (iBOL)
22. International Centre for Insect Physiology and Ecology (ICIPE)
23. International Centre for Integrated Mountain Development (ICIMOD)
24. International Long-Term Ecological Research Network (ILTER)
25. Naturalis Biodiversity Center
26. Natural Science Collections Alliance (NSCA)
27. NatureServe
28. NordGen
29. Pacific Biodiversity Information Forum (PBIF)
30. Plazi
31. Scientific Committee on Antarctic Research (SCAR)
32. Society for the Management of Electronic Biodiversity Data (SMEBD)
33. Society for the Preservation of Natural History Collections (SPNHC)
34. Species 2000
35. TDWG
36. UNEP-WCMC
37. VertNet
38. Wildscreen
39. World Federation for Culture Collections (WFCC)

## GBIF Affiliates

1. Data Observation Network for Earth (DataOne)
2. International Oceanographic Commission of the United Nations Educational, Scientific and Cultural Organisation (IOC/UNESCO)

# SOURCES OF FUNDING

## Agencies contributing to GBIF core funds

Andorra	Institute d'estudis Andorrans
Argentina	CONICET – Consejo Nacional de Investigaciones Cientificas y Técnicas
Australia	Atlas of Living Australia, CSIRO National Research Collections Australia
Belgium	Belgian Federal Science Policy Office (belspo)
Benin	Laboratoire des Sciences Forestières
Chile	Comisión Nacional del Medio Ambiente (CONAMA)
Colombia	Instituto de Investigación de Recursos Biológicos Alexander von Humboldt
Costa Rica	Asociación Instituto Nacional de Biodiversidad (INBio)
Denmark	The Danish Agency for Science, Technology and Innovation
Estonia	Ministry of Environment
Finland	Academy of Finland
France	Direction Générale pour la Recherche et l'Innovation (DGRl)
Germany	Deutsche Forschungsgemeinschaft (DFG) , German Aerospace Center, BMBF
Ghana	Council for Scientific and Industrial Research (CSIR)
Iceland	Ministry for the Environment and Natural Resources
Ireland	National Parks & Wildlife Service
Kenya	National Museums of Kenya
Madagascar	Centre National de Recherches sur l'Environnement (CNRE)
Mauritania	Ecole Normale Supérieure de Nouakchott
Mexico	Consejo Nacional de Ciencia y Tecnología (CONACYT)
Netherlands	Ministry of Education, Culture and Science
New Zealand	Ministry of Business, Innovation and Employment
Norway	The Research Council of Norway
Peru	Ministerio del Ambiente
Portugal	Foundation for Science and Technology
Republic of Korea	Ministry of Science, ICT and Future Planning
Slovak Republic	Ministry of the Environment
Slovenia	Ministry of Higher Education, Science and Technology
South Africa	Department of Science and Technology
Sweden	Swedish Research Council
Tanzania	Tanzania Commission for Science and Technology (COSTECH)
Uganda	Uganda National Council for Science and Technology
United Kingdom	Department for Environment, Food and Rural Affairs (DEFRA) Natural Environment Research Council (NERC) Royal Botanic Gardens, Kew Natural History Museum, London Joint Nature Conservation Committee
Uruguay	Dirección de Innovación, Ciencia y Tecnología para el Desarrollo (DICYT)
USA	National Science Foundation Smithsonian Institution U.S. Department of State U.S. Department of Agriculture

## Supplementary funding

University of Copenhagen (IT equipment)

I4Life

Eye on Earth

OpenUp!

EU BON

GIASIP, CBD

GBIO 4, CBD

EMODNET Biology 2

ViBRANT

Ministry of the Environment of Japan

BID - EU

### **Note on Agencies**

*Voting Participants that have financially contributed or declared their intention to contribute to GBIF core funds within the period of January 2014 until present.*

### **Note on Supplementary funding**

*Projects or agencies that contributed or declared their intention to contribute to GBIF supplementary funds within the period of January 2014 until present.*

# CURRENT AFFILIATIONS

<i>Partner</i>	<a href="#">Biodiversity Indicators Partnership</a> (BIP)
<i>Member, Dialogue group</i>	<a href="#">Biodiversity Knowledge Network for the European Union</a> (KNEU)
<i>Observer</i>	<a href="#">Convention on Biological Diversity</a> (CBD)
<i>Observer</i>	<a href="#">Convention on Migratory Species</a>
<i>Council</i>	<a href="#">Encyclopedia of Life</a> (EOL)
<i>Participant</i>	<a href="#">European Biodiversity Observation Network</a> (EU BON)
<i>Partner</i>	<a href="#">Eye on Earth Biodiversity Special Initiative</a>
<i>Member, Steering committee</i>	<a href="#">Global Genome Biodiversity Network</a> (GGBN)
<i>Partner</i>	<a href="#">Global Invasive Alien Species Information Partnership</a> (GIASIP)
<i>Partner</i>	<a href="#">Global Partnership for Plant Conservation</a> (GPPC)
<i>Participant</i>	<a href="#">Group on Earth Observations</a> (GEO)
<i>Member, Steering committee</i>	<a href="#">Group on Earth Observations Biodiversity Observation Network</a> (GEO-BON)
<i>Observer</i>	<a href="#">Intergovernmental Platform on Biodiversity &amp; Ecosystem Services</a> (IPBES)
<i>Associate data unit</i>	<a href="#">IOC-UNESCO International Oceanographic Data and Information Exchange/Ocean Biogeographic Information System</a> (IODE/OBIS)
<i>Member, Policy &amp; Science Board</i>	<a href="#">LifeWatch</a>