

Brazil's Virtual Herbarium: Outputs, Outcomes, and Challenges

Dora Ann Lange Canhos

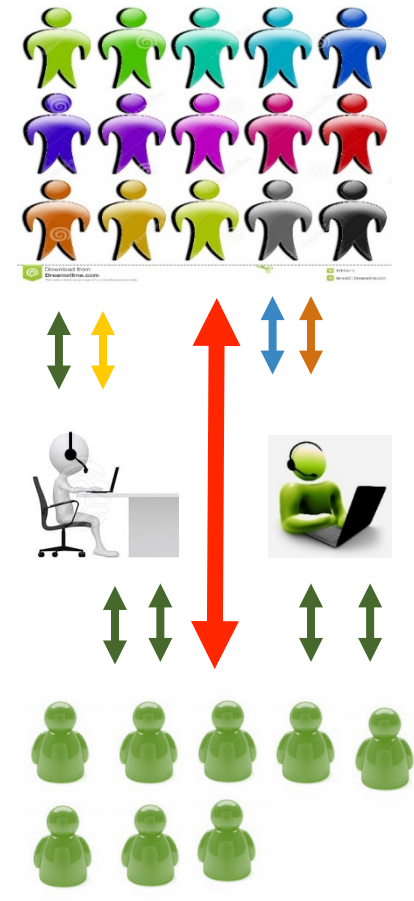
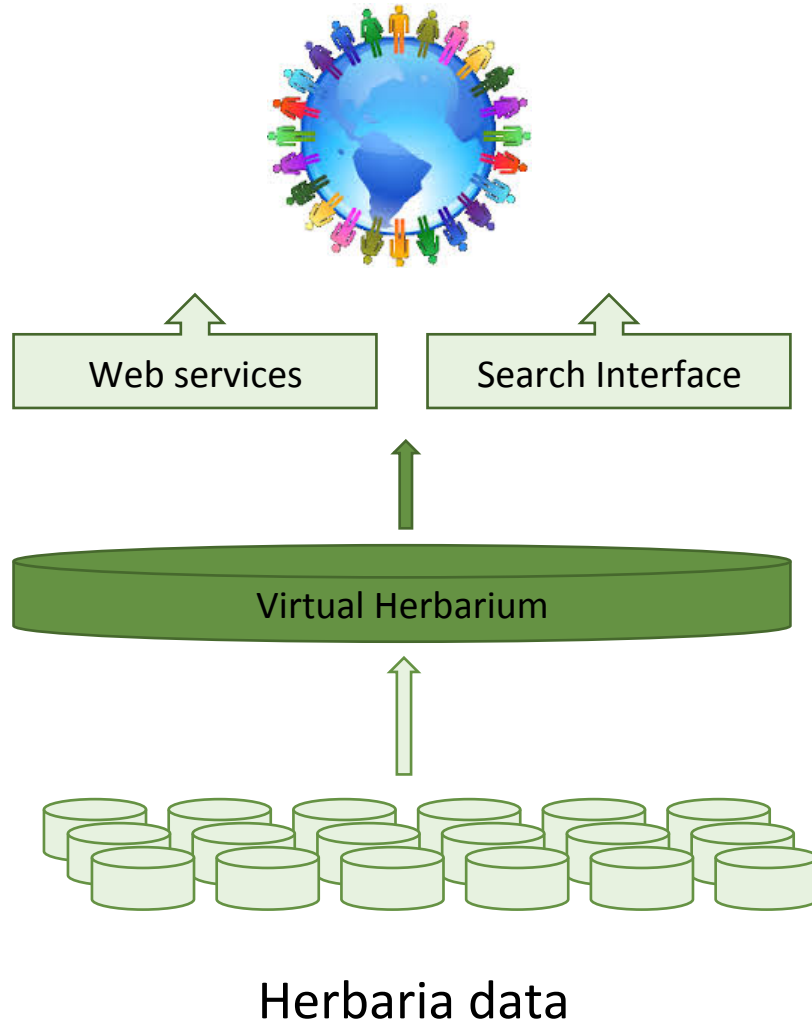
Centro de Referência em Informação Ambiental

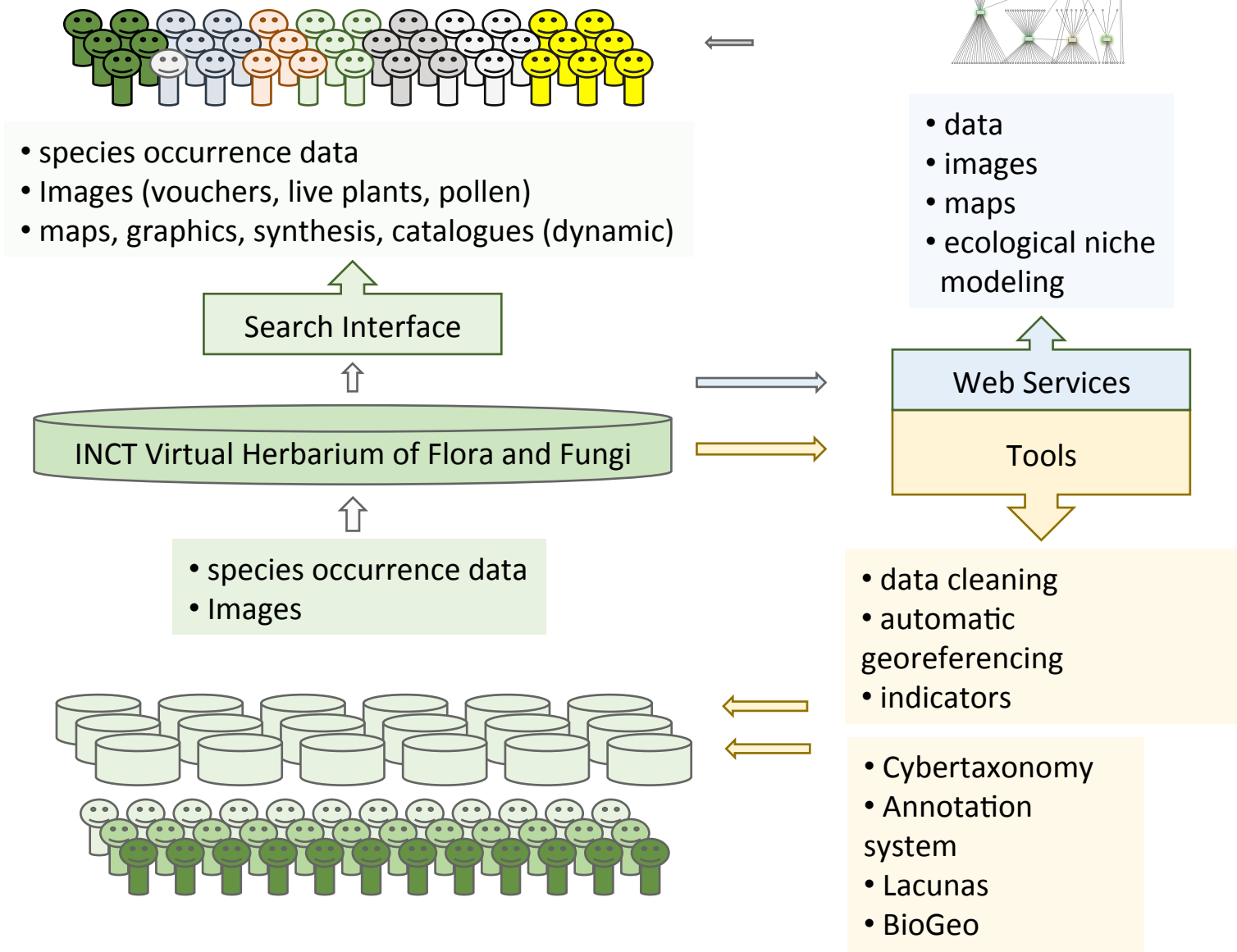
dora@cria.org.br

Brazil's Virtual Herbarium

- Virtual Institute based on a collaborative scientific community, in partnership with RNP (Brazilian National Research and Educational Network)
- Target user: scientific community, policy & decision makers
- Free & open access to on-line data
- Services and collaborative tools for the Brazilian and Global Botanical Communities

The importance of local e-Infrastructures



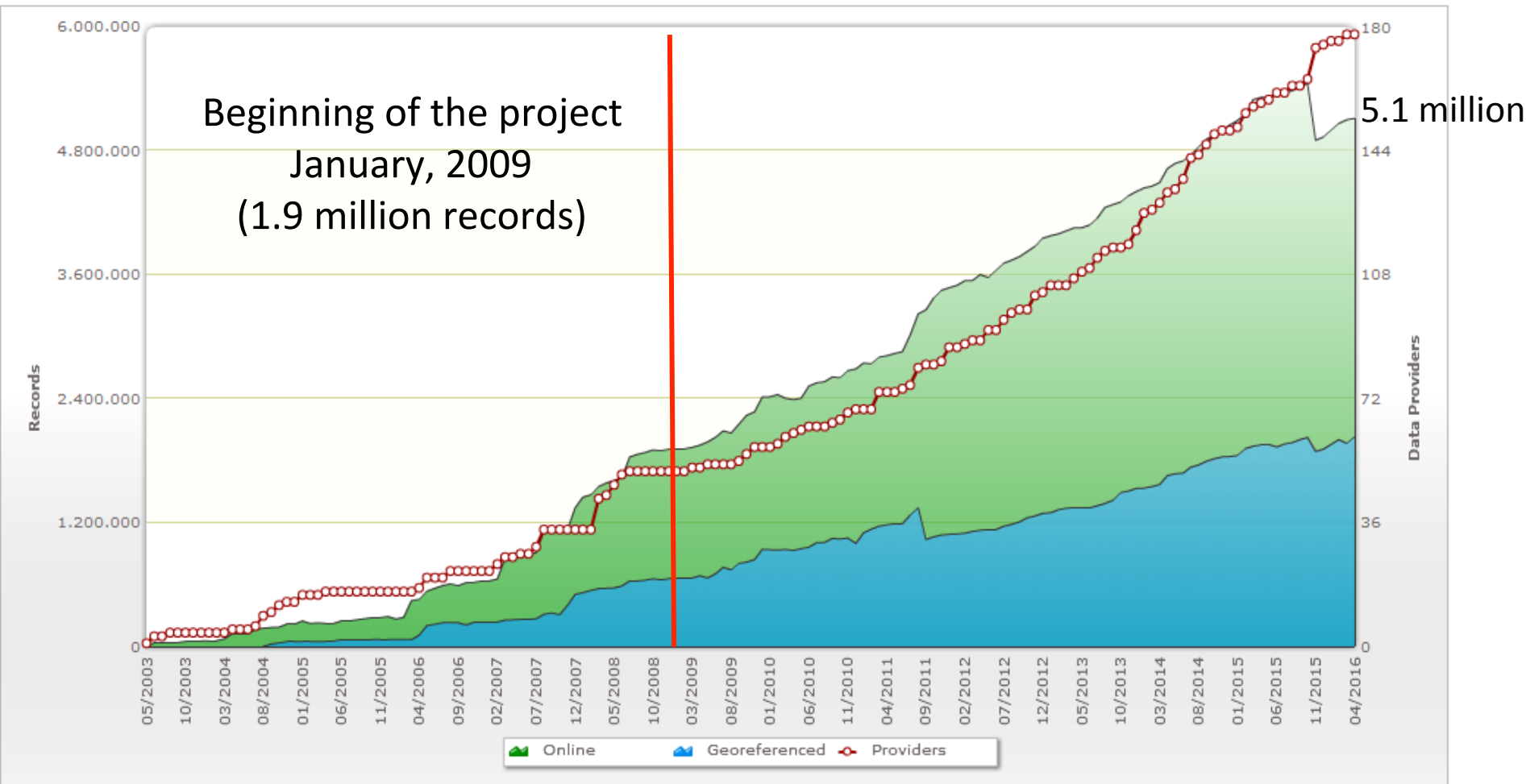


Indicators: network evolution

Yr 8

[See other options for indicators here](#) ↓

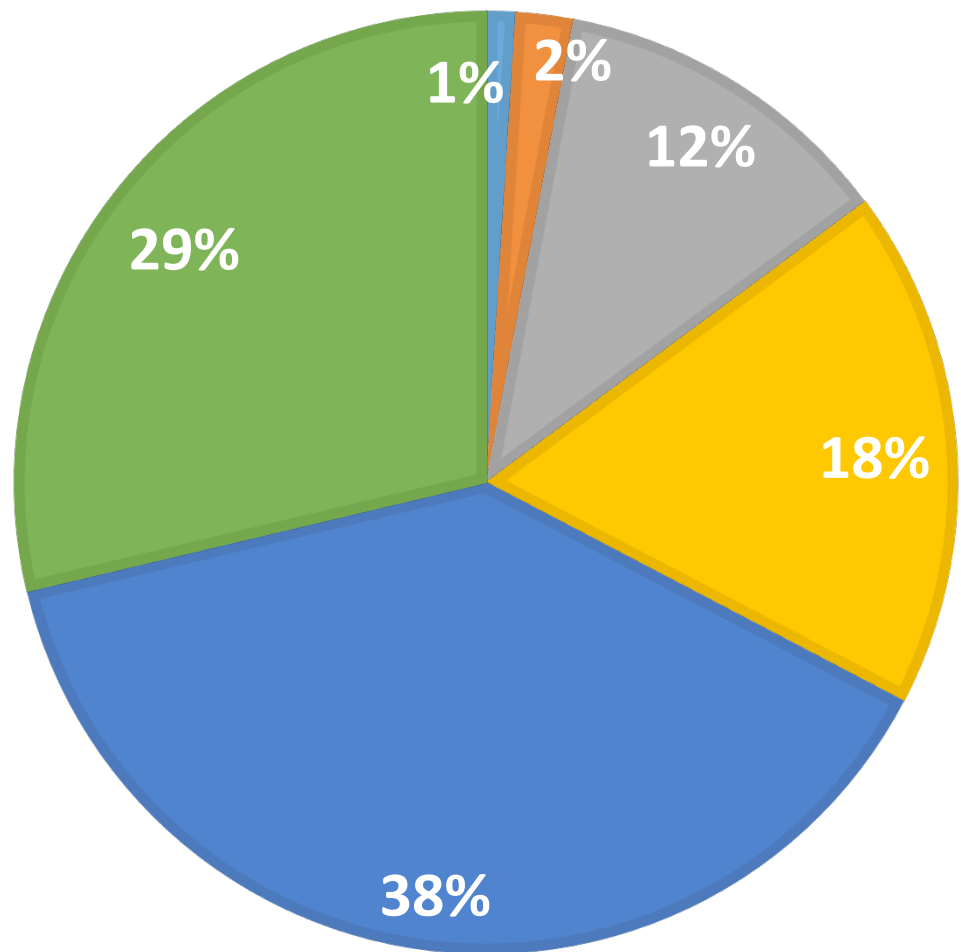
All Networks - Plants and Fungi (dried specimens) - records



Brazil's Virtual Herbarium

HERBARIA

- > 500K
- 300-500K
- 100-300K
- 50-100K
- 10-50K
- <10K

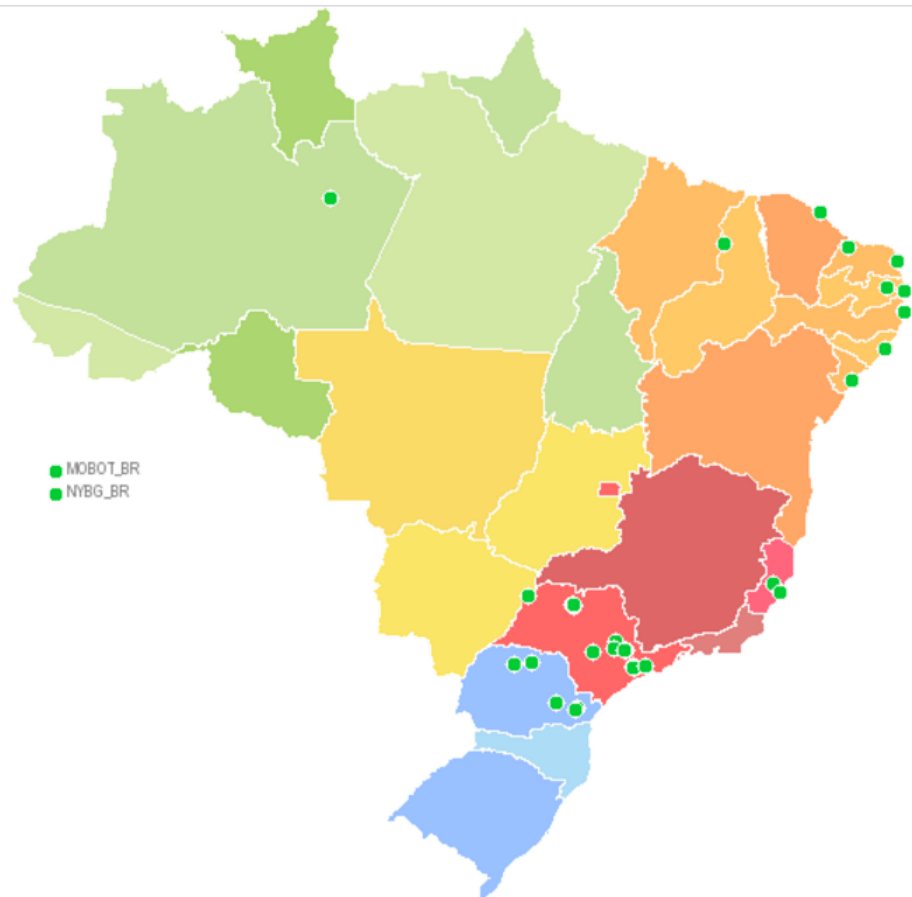


Brazil's Virtual Herbarium

<http://www.splink.org.br/showNetwork>

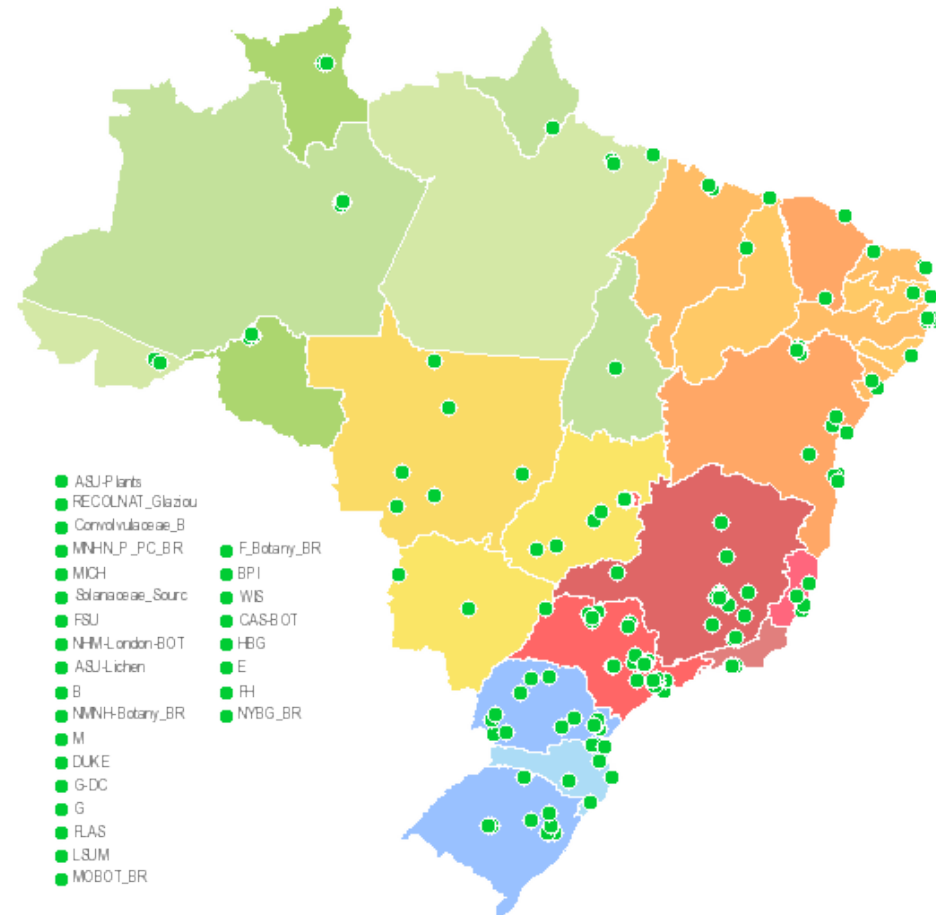


2008: 48 datasets



2 from abroad

2016: 178 datasets



26 from abroad

Data cleaning reports: improving data at origin

specieslink

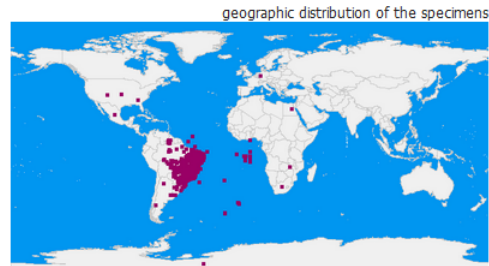
dataCleaning
português

This tool aims at helping curators in identifying possible errors and to standardize data. Records are not modified. The system just presents "suspect" records, recommending that they be checked by each author or curator. The tool is under constant development, so any suggestion is more than welcome.

Select a collection ASE

collection: ASE

total number of records on-line	32796
- without coordinates	18
- georeferenced	32778
- access to georeferenced data denied	0
- in the sea	58
- blank catalognumber	1
smaller: 1 larger: 35763	[gap]
repeated records	
catalog number	335
duplicate records	0
collector's name and number	1296
last update - error logs	
of the collection: 12-09-2015	of dataCleaning: 13-09-2015



collection profile
dataCleaning statistics
geographic coordinates analysis

taxonomic data	
inventory	scientific name - collector - identifier - types
family	not found
genus	not found
species	24 suspect records
subspecies	not found
author	142 suspect records
duplicate	1648 suspect records
other inconsistencies	not found

locality data	
inventory	country - state - municipality
name of the country/state	610 suspect records
outlier	9 suspect records
long/lat outside the world limit	not found
equal long/lat	not found
long or lat equal to zero	12 suspect records
long/lat in the sea (Brazil)	27 suspect records
municipality name (Brazil)	3740 suspect records
coordinate unit analysis (Brazil)	11 suspect records
other inconsistencies	not found

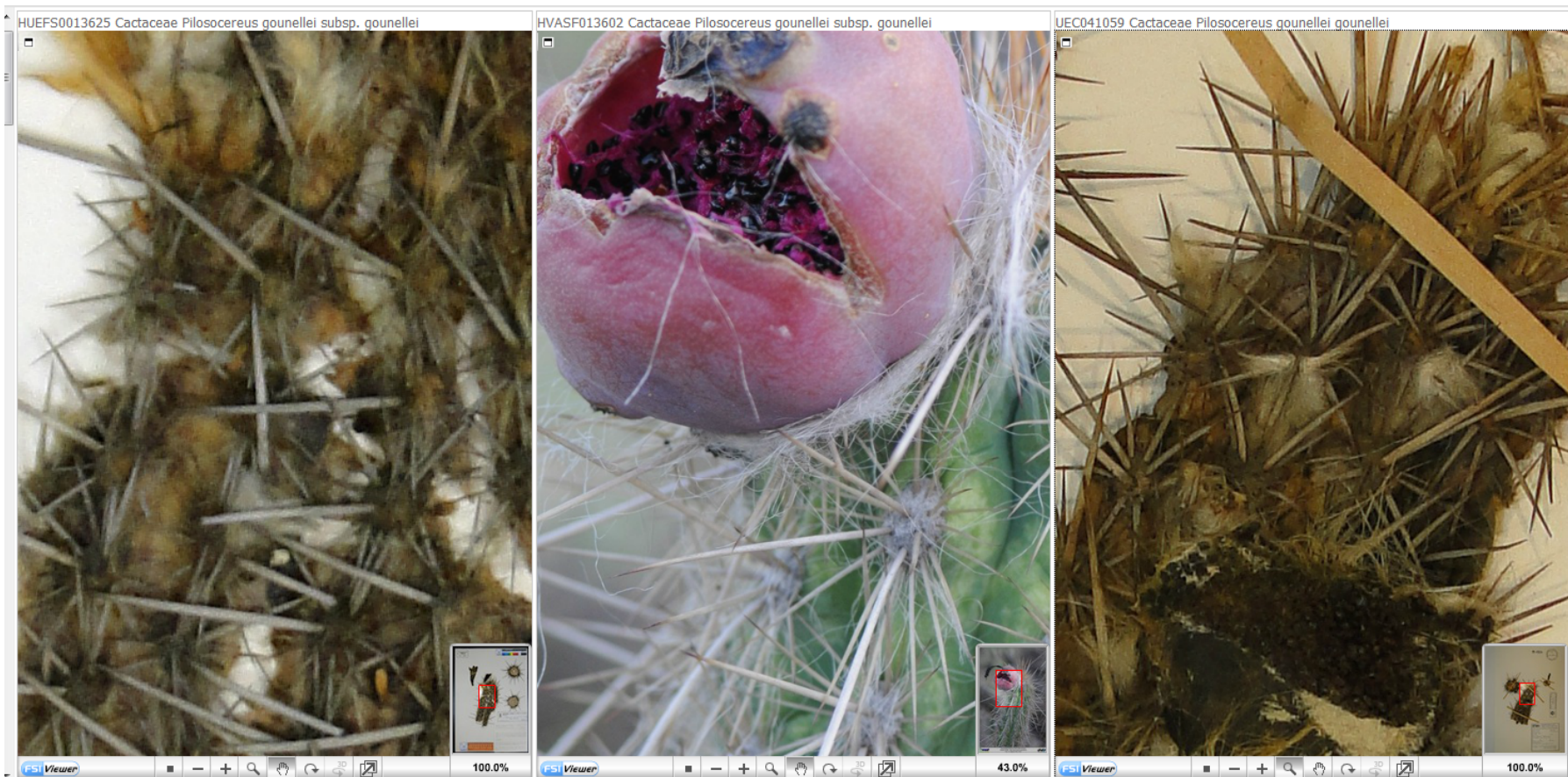
date collected	
collected before 1902	not found
last update previous to date collected	not found
identification year previous to date collected	not found

suggestions for blank fields	
long/lat (Brazil)	11 suggestions 
country/state name	22 suggestions
municipality name (Brazil)	211 suggestions

search dataCleaning email
Centro de Referência em Informação Ambiental, CRIA

Highlight suspect records & inconsistencies

- Taxonomic data
- Dates
- Locality data
- Blank fields



Annotations

Herbário Dr. Roberto Miguel Klein - FURB

Universidade Regional de Blumenau, FURB



PLANTAE DICOTYLEDON CACTACEAE

Rhipsalis cereuscula Haw.. Det: Zappi, DC **13/12/2012**

FURB 11879 Collect: Dreveck, S; Carneiro, FE 386 **18/11/2008**.

Loc: Linha Santa Terezinha, Herval d'Oeste, Santa Catarina, Brasil Barcode: **FURB01187**.

Coord orig: [lat: -27.135 long: -51.435 WGS84] Altitude: 742m.

Notes: Florística IFFSC 2100(Epífita); epífita;; Floresta Estacional Decidual; Estágio Avançado

Basis of record: preserved specimen



reference

CACTACEAE

Rhipsalis baccifera (J.S.Muell.) Stearn. Det: S. Dreveck **18/11/2008** Barcode: **FURB01187**. **FURB 11879** Collect: S. Dreveck 386 Loc: Linha Santa Terezinha Herval d'Oeste Santa Catarina Brasil **18/11/2008**. [lat: -27.135 long: -51.435 WGS84]

comment

sciname

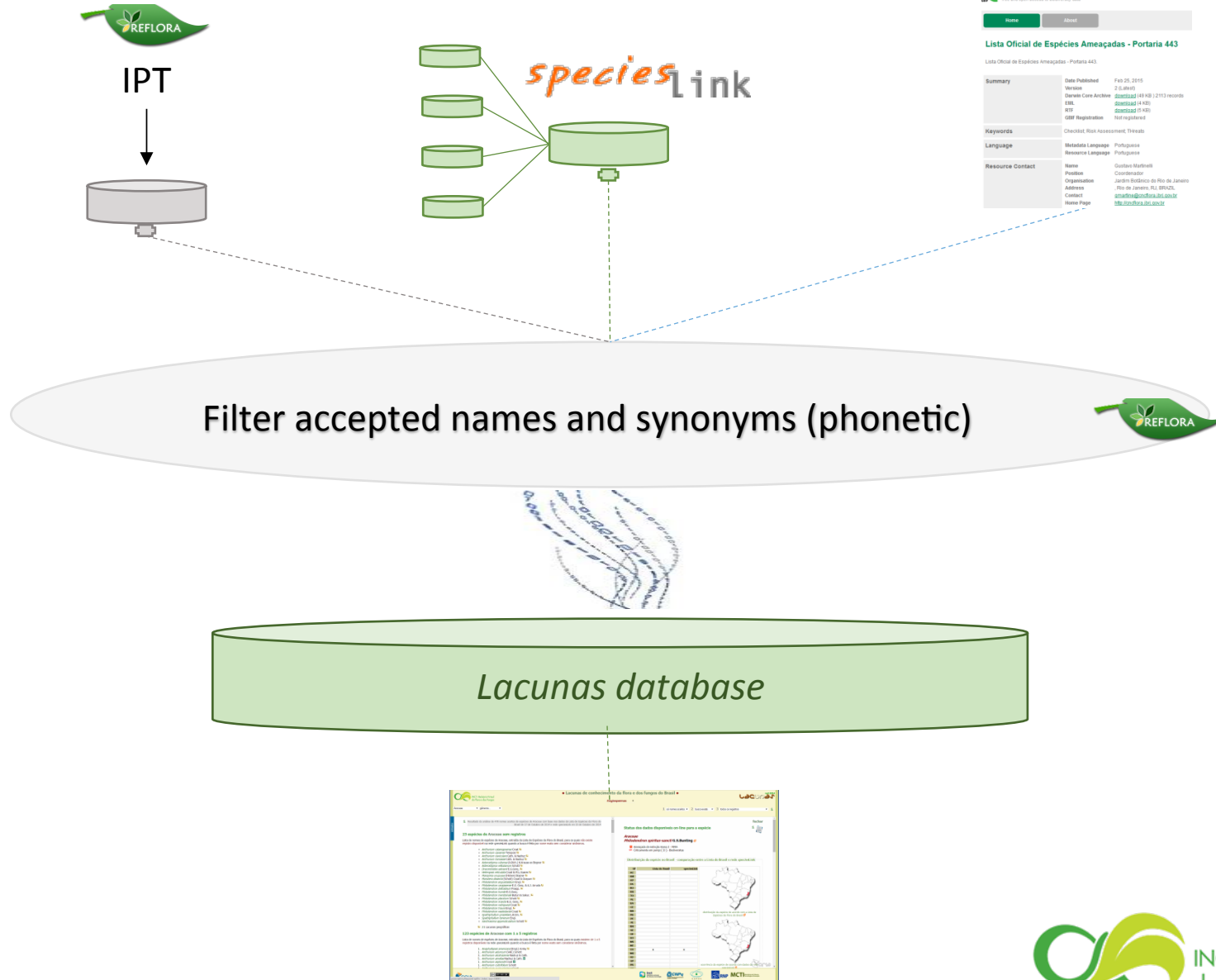
Olá! Com certeza esse espécime não é *R. baccifera*, poderia enviar uma imagem em alta resolução para que eu possa identificar corretamente? Muito obrigada, Zappi

Daniela Zappi
13-Dec-2012 00:16

Accepted names,
synonyms, states
of occurrence

Status and origin of data
states of occurrence

Portaria 443
(redlist)



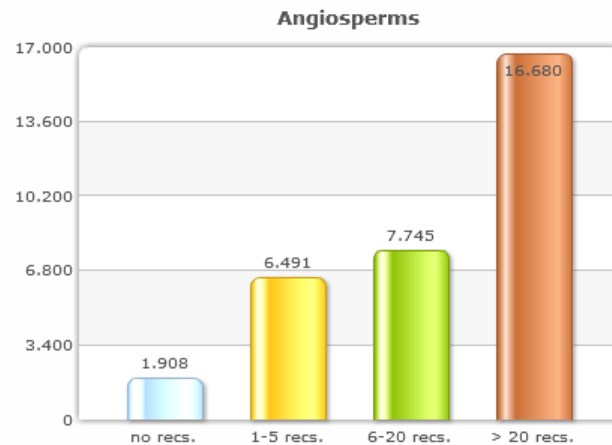
GBIF INTEGRATED PUBLISHING TOOLKIT (IPT)
View this Open Access Record by clicking here

Home		About	
Lista Oficial de Espécies Ameaçadas - Portaria 443			
Lista Oficial de Espécies Ameaçadas - Portaria 443			
Summary		Date Published	Feb 20, 2015
Version		2.0.0010	
Dataset Core Archive		Download (41 KB)	(2113 records)
DSB		Download (4 KB)	
RIF		Download (5 KB)	
GBIF Registration		Not registered	
Keywords		Checklist	Non-assessment
Language		Metadata Language	Portuguese
Resource Language		Portuguese	
Resource Contact		Name	Gustavo Mattioli
Position		Coordinator	
Organization		Jardim Botânico do Rio de Janeiro	
Address		Rio de Janeiro, RJ, BR19276	
Contact		gsmattioli@jbrj.gov.br	
Home Page		http://jbrj.gov.br	

On-line Report: Angiosperms

1 include synonyms ▾ 2 phonetic search ▾ 3 all records

Number of species of Angiosperms in accordance to the number of records available in the *speciesLink* network following the above criteria (32824 total)

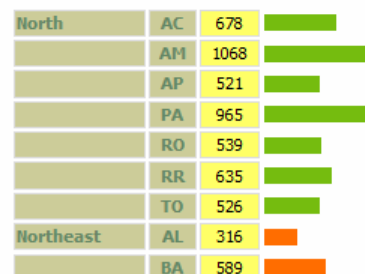


The bars represent (in this order):

1. Number of species that don't have any records in the *speciesLink* network
2. Number of species with 1 to 5 records in the *speciesLink* network
3. Number of species with 6 to 20 records in the *speciesLink* network
4. Number of species with more than 20 records in the *speciesLink* network

Geographic gaps

Number of species of Angiosperms reported as occurring in a specific state of Brazil but having no records in the *speciesLink* network

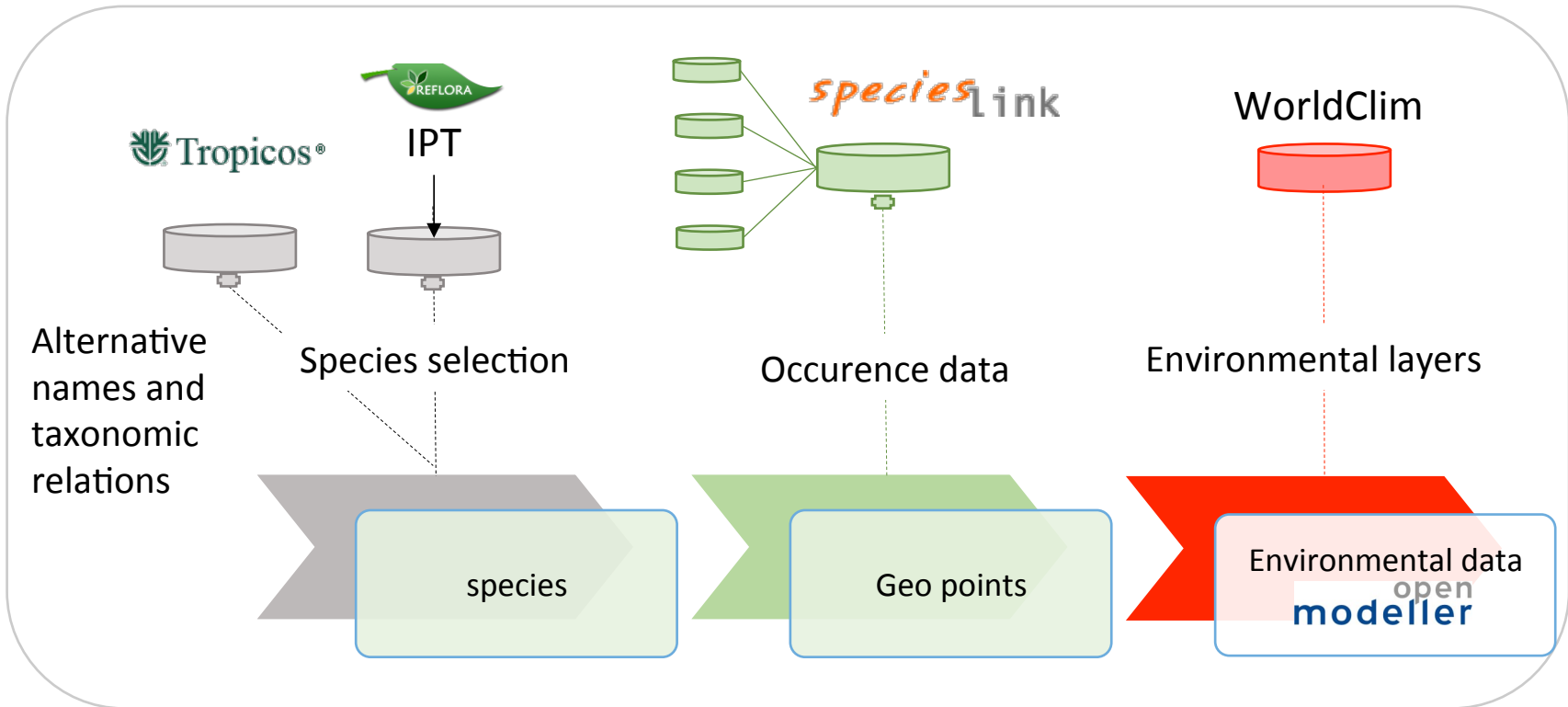


Lacunas: How to know what we don't know

Species with no data records: phonetic search including synonyms, with or without geographic coordinates

Taxonomic Groups	Brazil's Flora	Jan/2013		Jan/2016	
	No. Species	Species	%	Species	%
Algae	4.746	2.517	53%	2.454	52%
Angiosperms	32.824	2.371	7%	1.908	6%
Bryophytes	1.524	323	21%	213	14%
Fungi	5.710	2.850	50%	2.133	37%
Gymnosperms	30	0	0%	2	7%
Ferns & Lycophytes	1.253	115	9%	77	6%
Total	46.087	8.176	18%	6.787	15%

Platform for e-Science: BioGeo



126 specialists

The screenshot shows the 'Biogeografia da Flora e Fungos do Brasil' web interface. The selected species is *Macrotrichus utriculatus* (Mart.) Perkins. The interface displays the following information:

- Situação:** modelo aprovado + 3º procedimento de modelagem (13-05-2014) n° de pontos: 22
- Algoritmo:** Consenso Maxent, GARP BS, ENFA, Mahalanobis, SVM
- Observações sobre o modelo:** Modelo de consenso construído com base em cinco algoritmos diferentes. O resultado exibido é a maioria dos algoritmos; em vermelho todos os algoritmos concordam; em laranja quatro tomadas de decisão. **Atenção:** o modelo não é da distribuição real e sim da distribuição potencial adequada ambientalmente para a espécie de acordo com os parâmetros da modelagem.
- Comentários adicionais:** nenhum
- Histórico de modelos:**

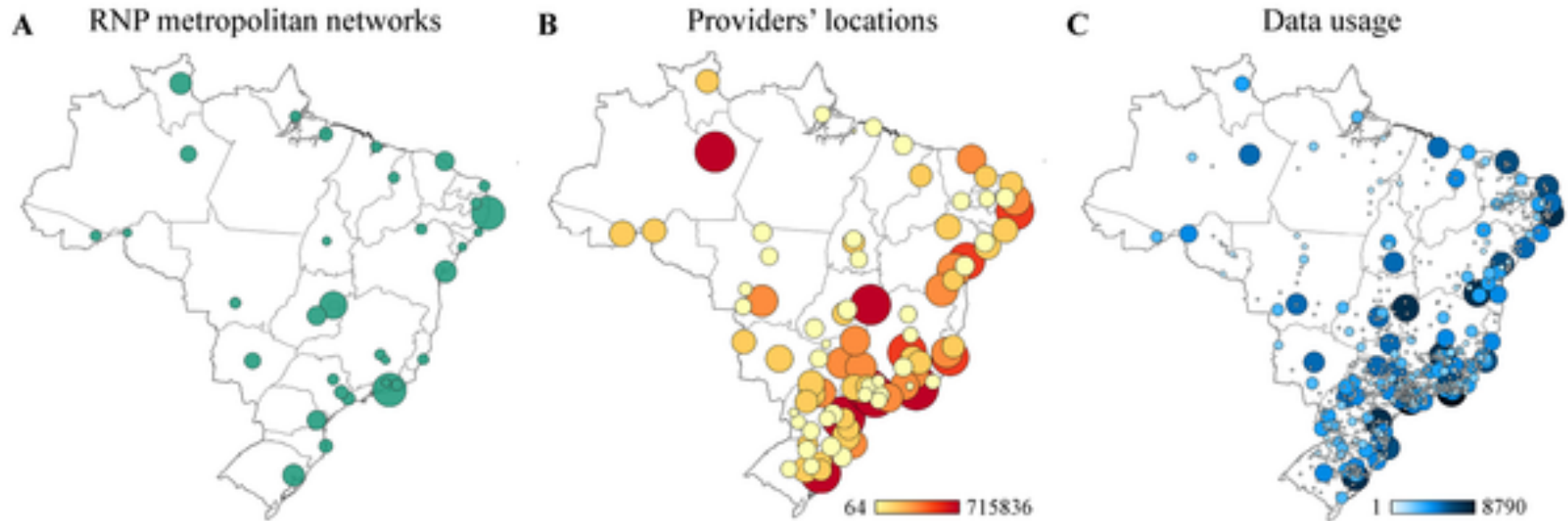
Modelo	Data	Pontos
v1	09-04-2014	22 pontos
v2	12-05-2014	19 pontos
v3	13-05-2014	22 pontos
- Situação atual dos dados:** Total de registros de ocorrência disponíveis: 104 [pixels únicos selecionados: 22] última atualização: 13-05-2014
- Supervisores atualmente cadastrados:** Elton John de Liro (desde 05-2013)

Species with distribution models

Taxonomic Groups	Brazil's Flora	Species with Models	%
Algae	4.746	0	0,0%
Angiosperms	32.824	3.484	10,6%
Bryophytes	1.524	5	0,3%
Fungi	5.710	10	0,2%
Gymnosperms	30	4	13,3%
Ferns & Lycophytes	1.253	59	4,7%
Total	46.087	3.562	7,7%

Research infrastructure and biodiversity data usage in Brazil

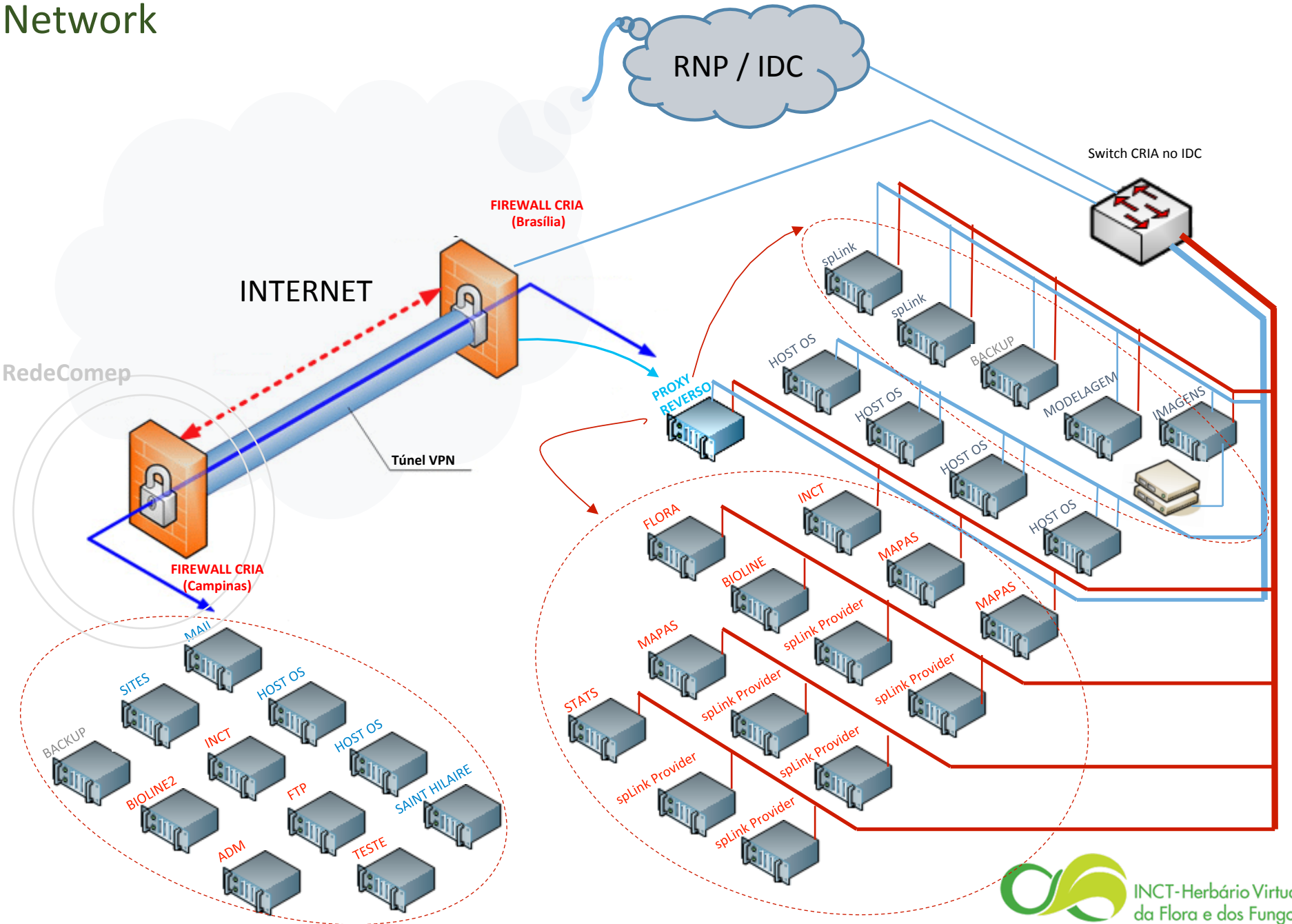
1.4 million records/day



Canhos DAL, Sousa-Baena MS, de Souza S, Maia LC, Stehmann JR, et al. (2015) The Importance of Biodiversity E-infrastructures for Megadiverse Countries. *PLoS Biol* 13(7): e1002204. doi: 10.1371/journal.pbio.1002204

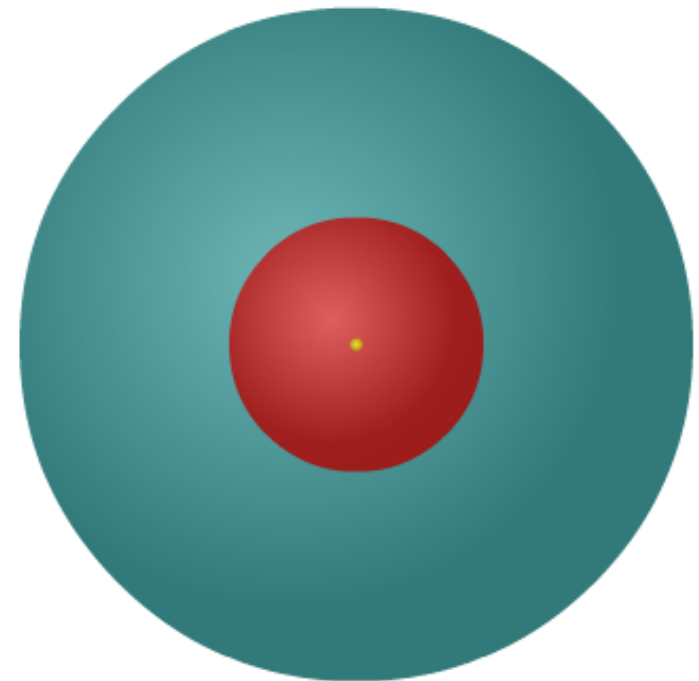
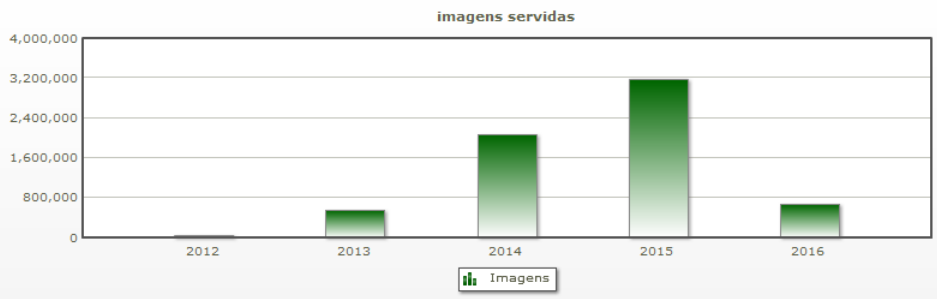
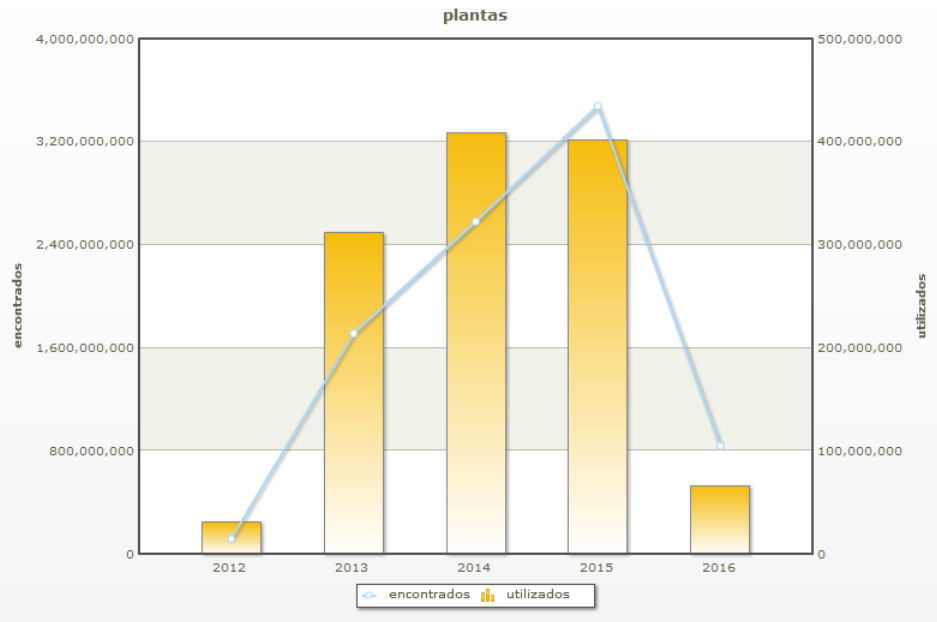
<http://journals.plos.org/plosbiology/article?id=info:doi/10.1371/journal.pbio.1002204>

Internet Data Center – Brazilian National Research and Educational Network



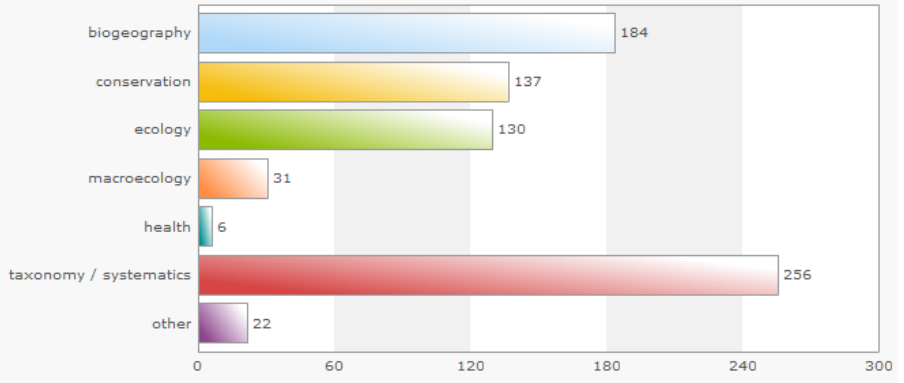
Usage

	Records
Matches	8.7 billion
Used	1.2 billion
Average Holdings	2.4 million
Images served	6.5 million

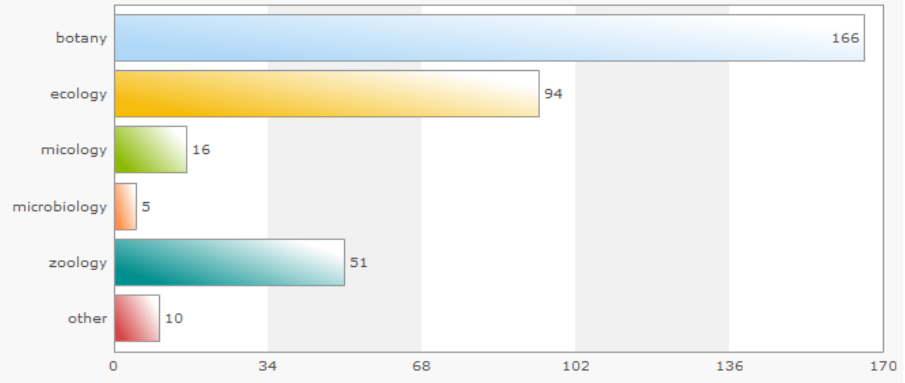


Data use

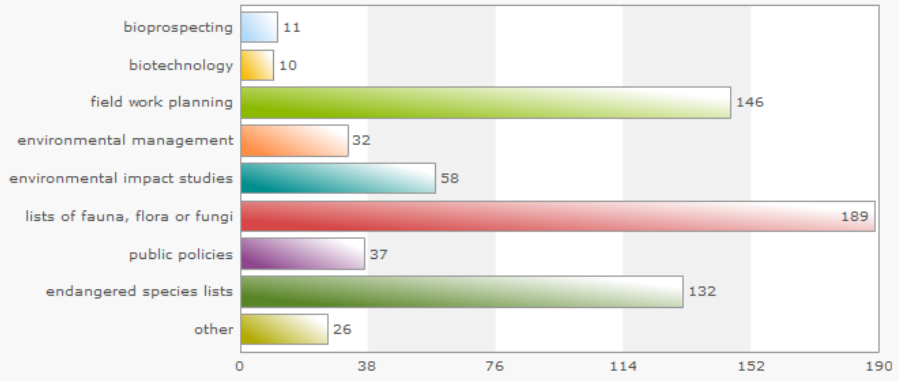
research



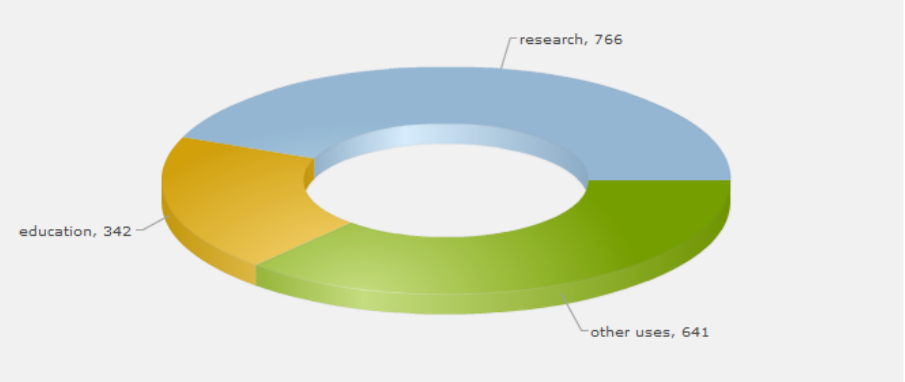
education



other



summary data use



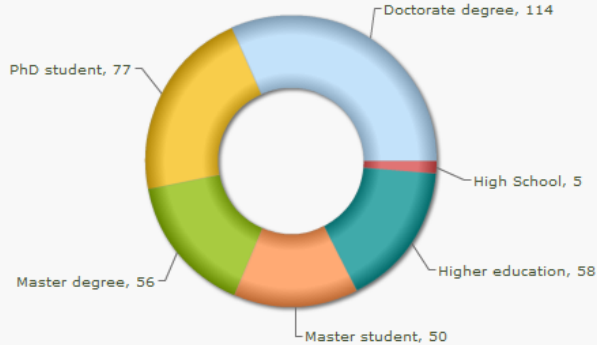
User profile

Users profile

residence



education

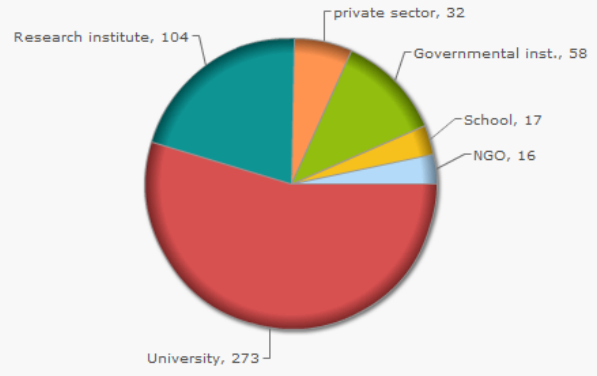


institution

University		Research institute		Governmental inst.	
federal	156	federal	61	federal	28
state	88	state	26	state	22
private	29	municipal	3	municipal	8
community		private	14		

NGO		private sector		School	
Brazilian	13	consultancy/services	31	high school	12
international	3	industry	1	elementary or junior high	5

institution



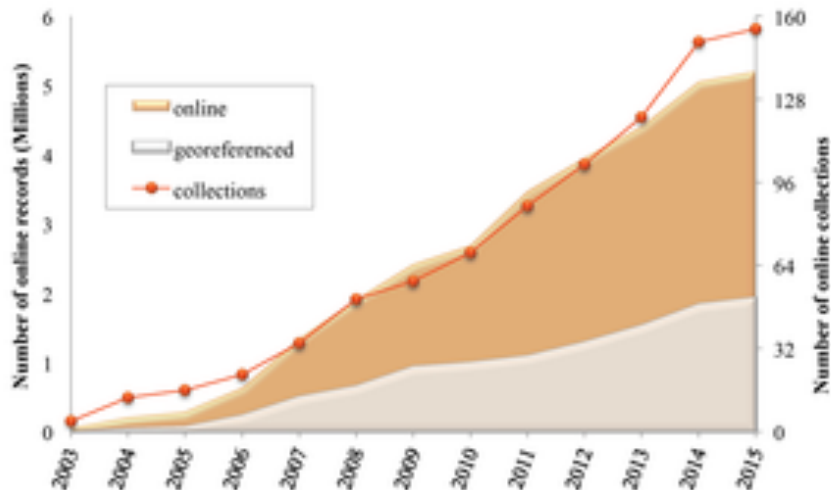
speciesLink network, 360 answers

Outcomes from sharing data

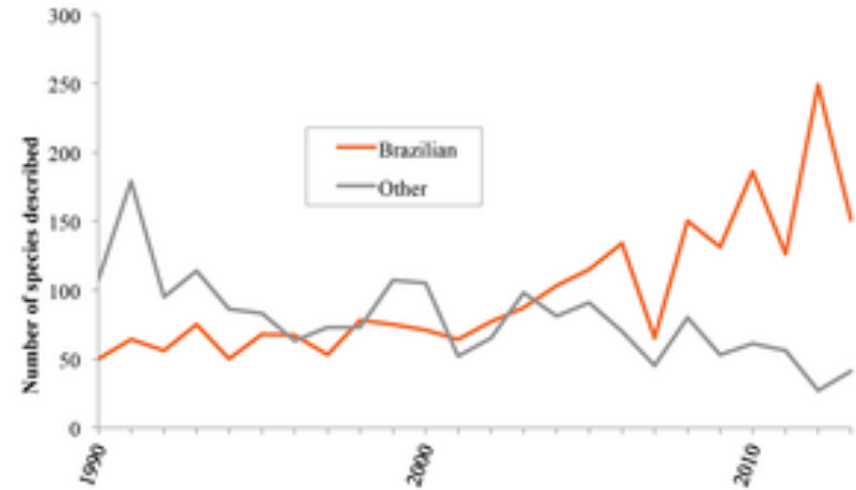
- greater institutional recognition
- greater involvement with graduate courses
- increased number of visits to the herbaria
- increase of the holdings
- increase of grants

The evolution of Brazilian flora primary data available online and species described by Brazilian specialists.

A *Virtual Herbarium evolution*



B *New angiosperm species*



Canhos DAL, Sousa-Baena MS, de Souza S, Maia LC, Stehmann JR, et al. (2015) The Importance of Biodiversity E-infrastructures for Megadiverse Countries. *PLoS Biol* 13(7): e1002204. doi: 10.1371/journal.pbio.1002204

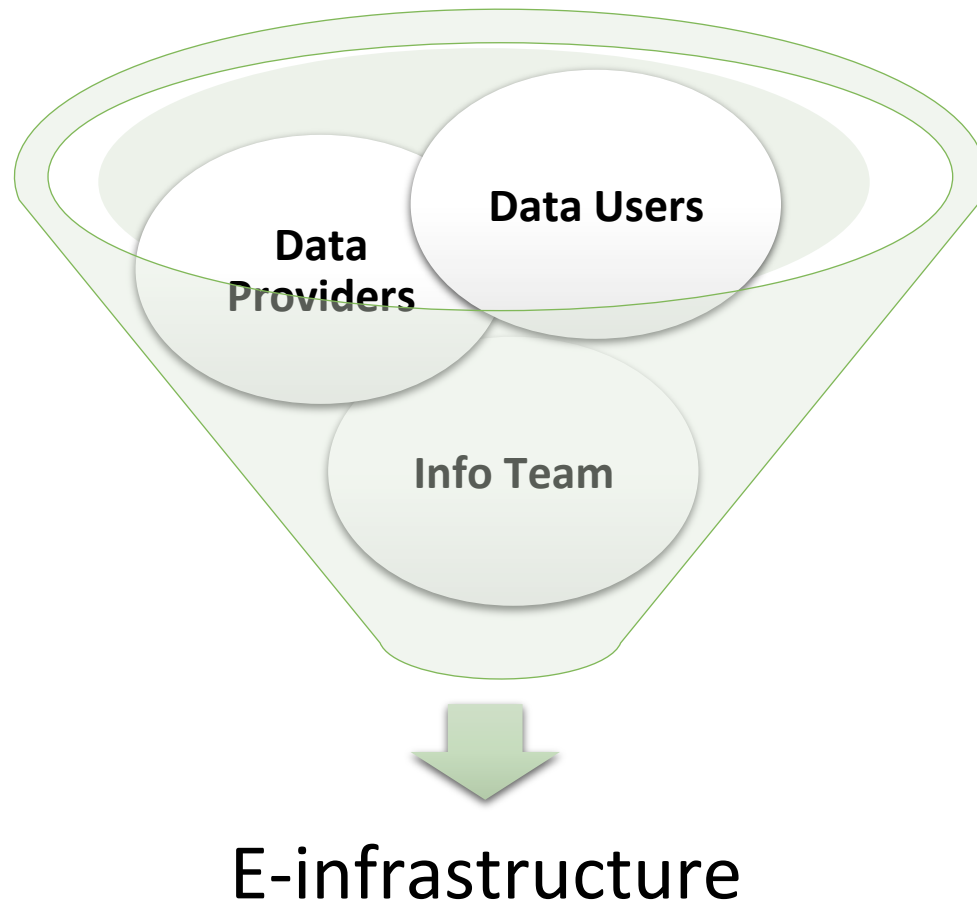
<http://journals.plos.org/plosbiology/article?id=info:doi/10.1371/journal.pbio.1002204>

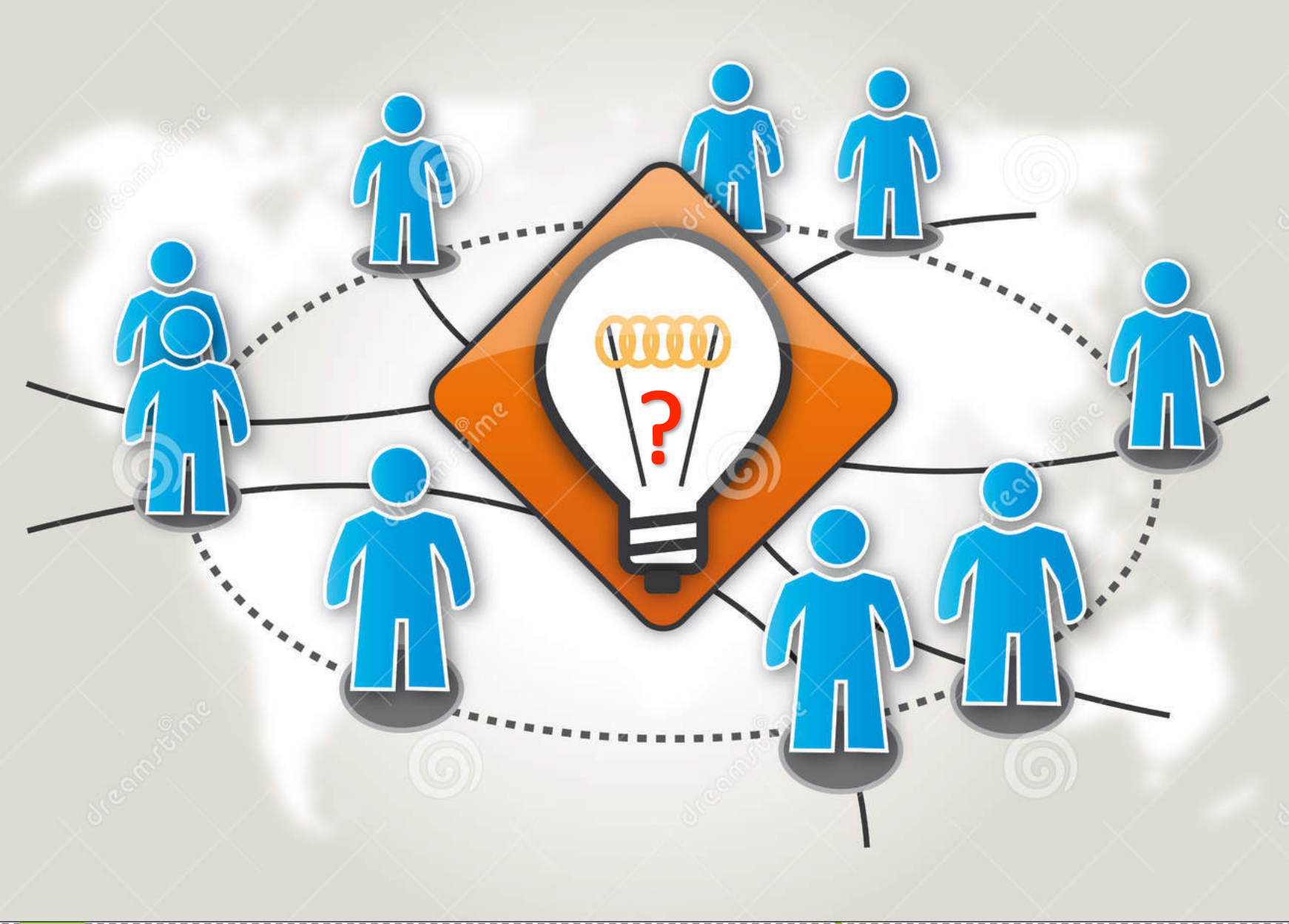
Challenges

- Large institutions resilient to change
- Making data useful and usable to other communities
- Governance of Virtual Institutes
- Sustainability of *e*-infrastructures: from project based grants to long-term support

Lesson learned

- The social network is an essential component of an e-infrastructure
- Interaction among data providers, users, and information management team is the center of innovation





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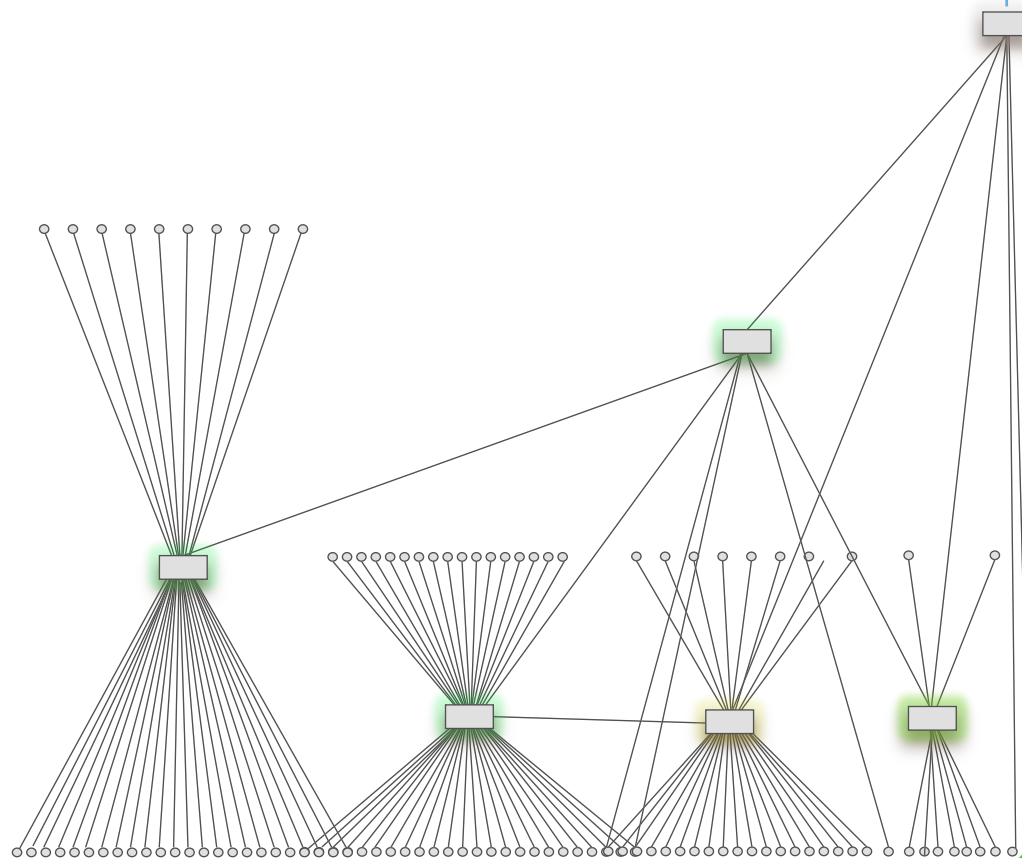


ID 29679222

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artwork by gungos

... paving the way to the future



Thank you!

Dora Canhos (dora@cria.org.br)

- *speciesLink* search interface (www.splink.org.br)
- The Virtual Herbarium (inct.splink.org.br)
- *Lacun*as (lacunas.inct.florabrasil.net)
- *BioGeo* (biogeo.inct.florabrasil.net)
- Data Cleaning Reports (splink.cria.org.br/dc)
- Other tools (splink.cria.org.br/tools)
- CRIA's blog (blog.cria.org.br)