



Advances promoted by the National Institute of Science and Technology INCT-VIRTUAL HERBARIUM of Brazilian Plants and Fungi

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<http://inct.florabrasil.net>



**Ministério da
Ciência e Tecnologia**



Introduction



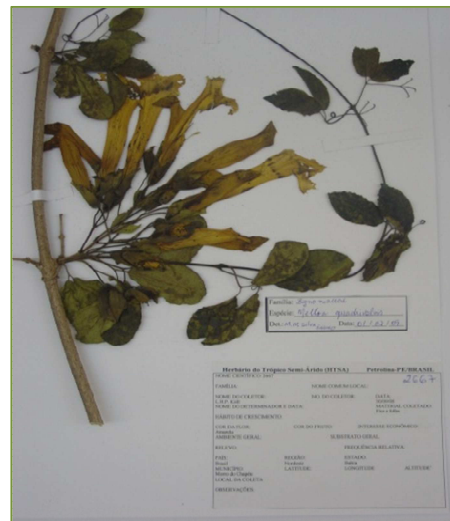
- Continental dimension of the country & its megadiversity
- Insufficient collections and knowledge
- 125 active herbaria in the country with an estimate of 6 million samples



Introduction



- Small number and unequal distribution of collections and taxonomists
- Need to have more effective means to exchange knowledge and data

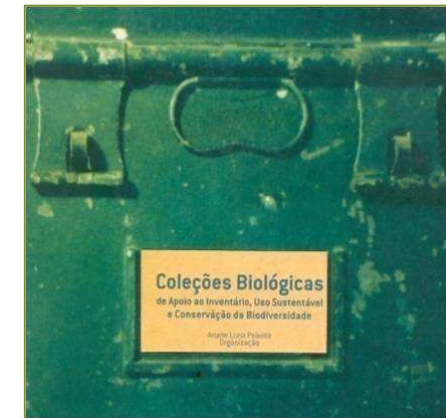


Introduction

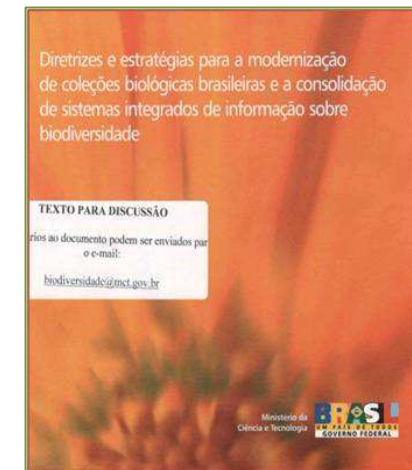


Fundamental elements for the proposal

1. Existence of the Network of Herbaria of the Botanical Society of Brazil
2. Documents defining strategies for collections
 - Peixoto et al. , 2003
 - CGEE/MCT, 2006
3. The speciesLink Network
4. Graduate courses in Botany



2003



2006 – CGEE e MCT
COP 8

Mission



- Expand the knowledge base about the diversity of flora and macroscopic fungi in Brazil;
- Improve the quality of the holdings in Brazilian herbaria;
- Encourage the formulation of public policies aimed at ensuring the sustainability of herbaria, the training of taxonomists, and the provision of support for biodiversity studies;
- Make species occurrence data a fundamental instrument for decision making and for the formulation of public policies concerning biodiversity;
- Encourage as a standard conduct, free and open data and information sharing in a comprehensive, useful and usable format; and,
- Offer data and information to make environmental sustainability just as important as social and economic development in the formulation and assessment of public policies.

Structure



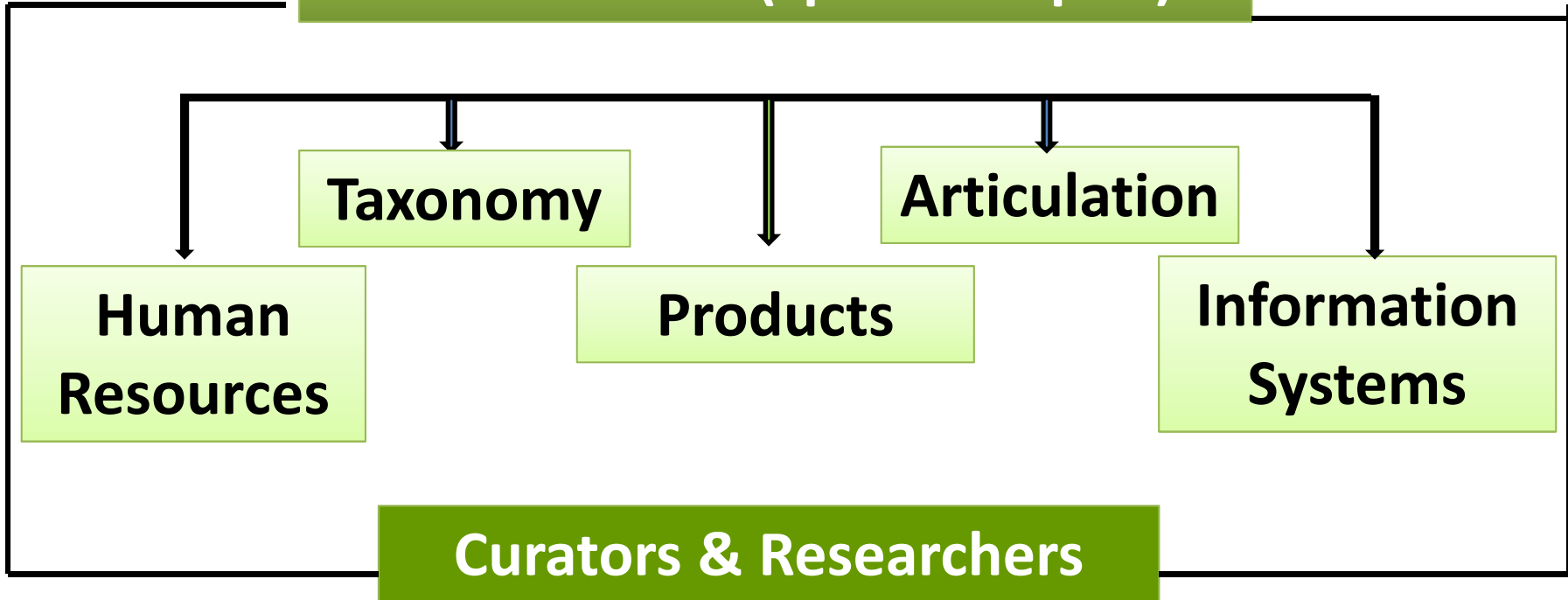
Coordination



Steering Committee



Coordinators (specific topics)



Human Resources

Taxonomy

Products

Articulation

Information Systems

Curators & Researchers



Coordination



Coordinator: Leonor Costa Maia

Vice Coordinator: Maria Regina de V. Barbosa

Steering Committee:

Leonor Costa Maia (UFPE)

Maria Regina de V. Barbosa (UFPB)

Ariane Luna Peixoto (JBRJ)

Mariângela Menezes (MN-UFRJ)

João Renato Stehmann (UFMG)

Ana Odete Santos Vieira (UEL)

Coordinators of specific topics:

José Rubens Pirani – USP (taxonomy of phanerogams)

Kátia Cavalcanti Pôrto – UFPE (taxonomy of cyptogams)

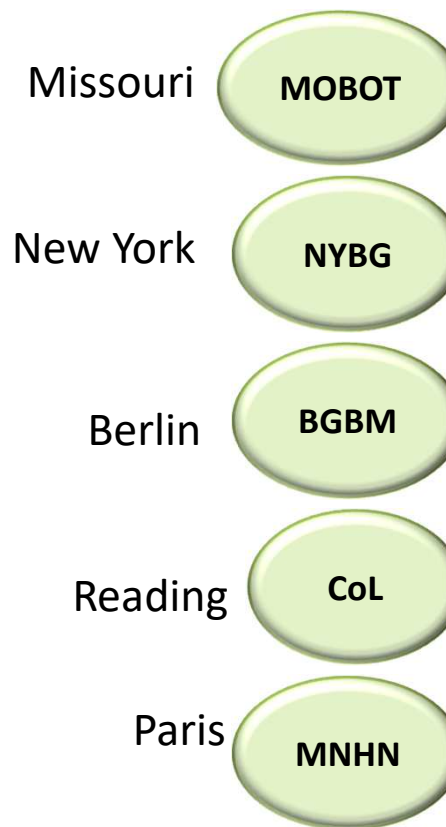
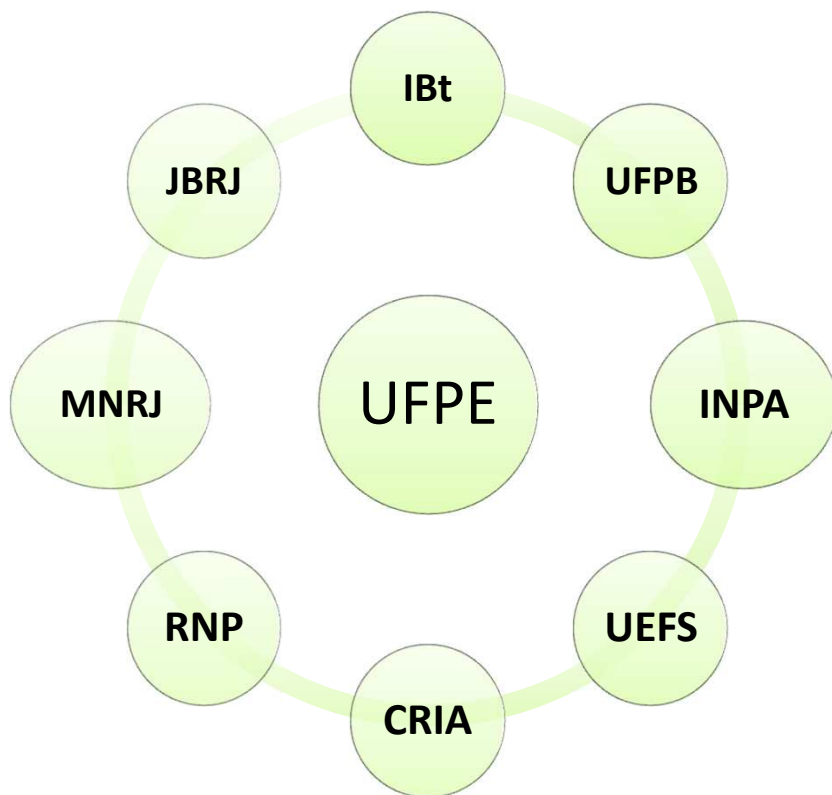
Ariane Luna Peixoto – JBRJ (human resources)

Ana Odete Santos Vieira – UEL (articulation)

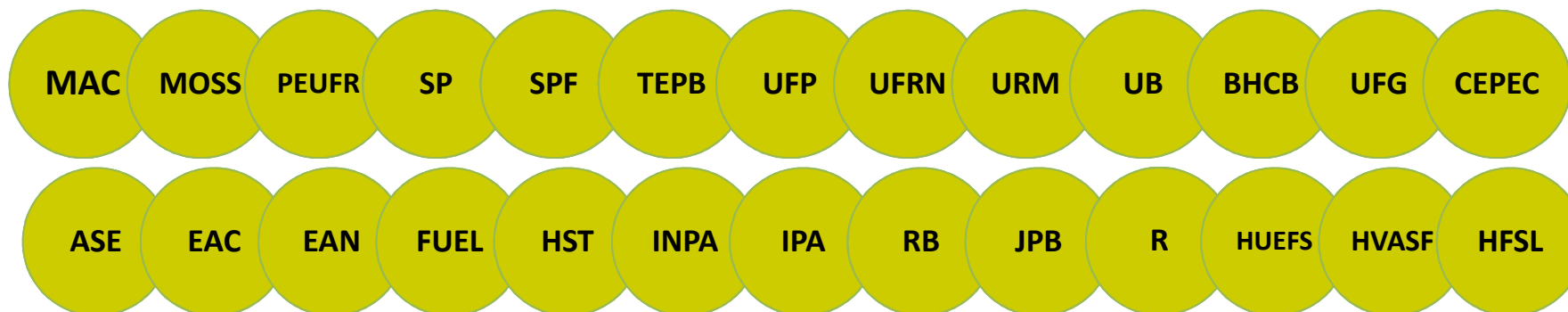
Maria Regina Barbosa – UFPB (products)

Dora Ann Lange Canhos – CRIA (information systems and online products)

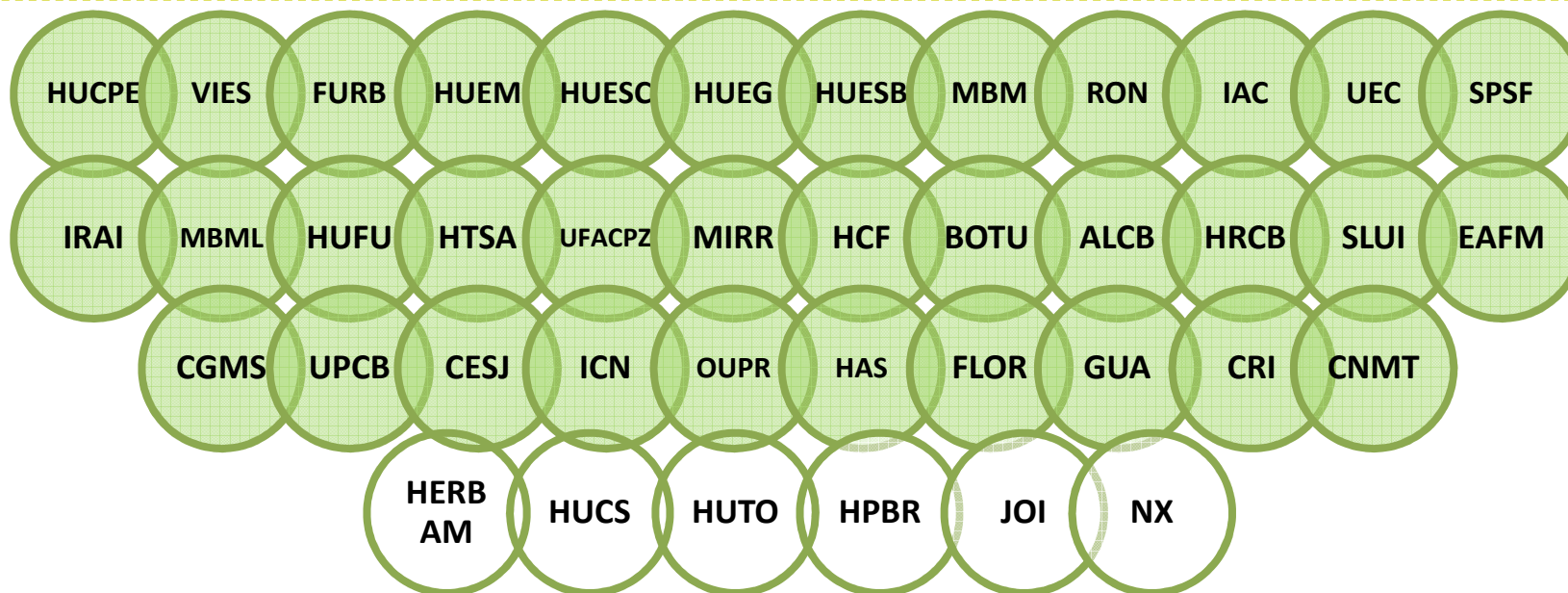
Leading and Associate Institutes and Partners



Participating Brazilian Herbaria



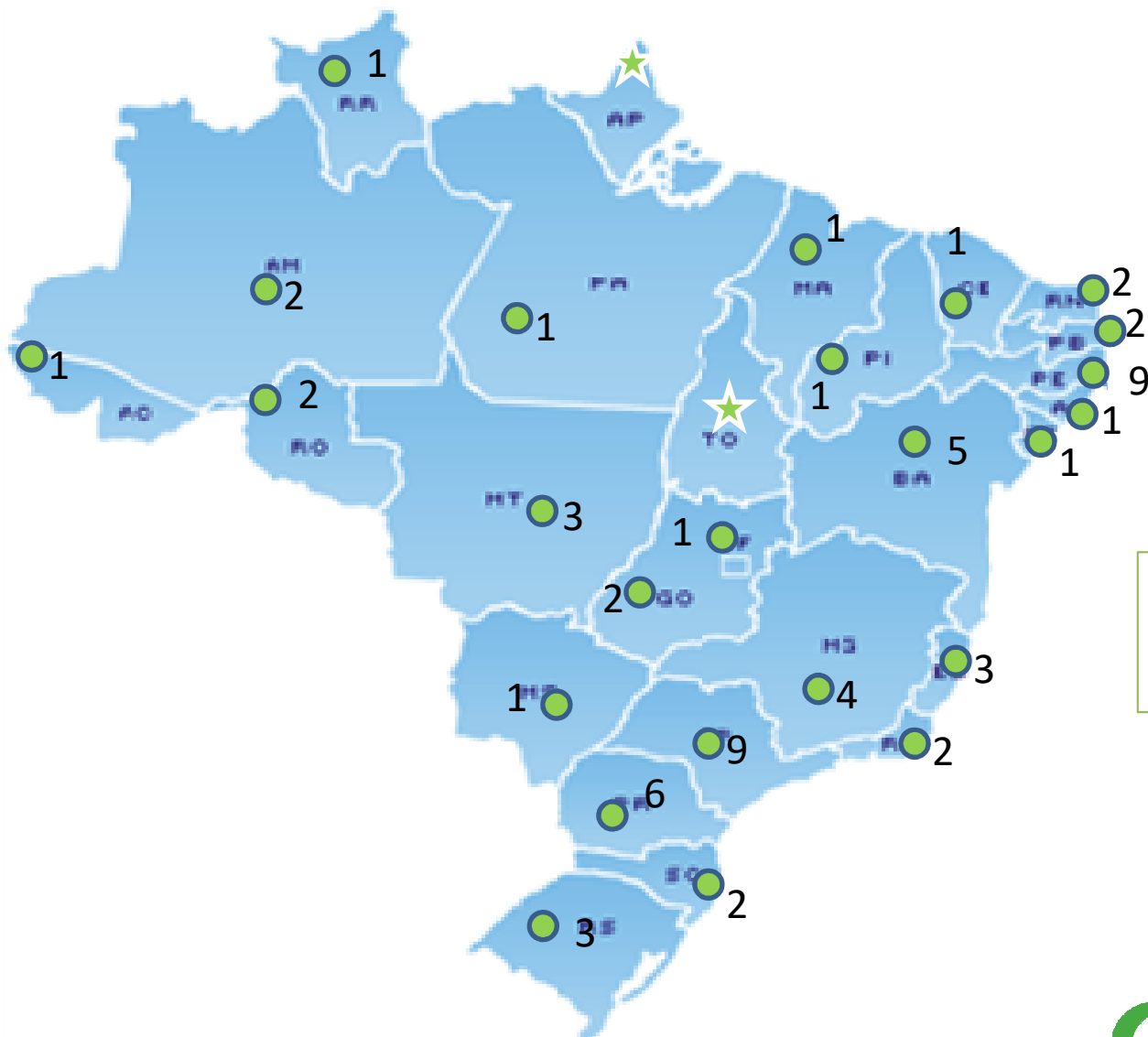
Beginning = 26



Today = 69

Colored = Online

Herbaria - geographic distribution



**INCT Virtual
Herbarium Network**

Principal Activities



- **Research**
 - Studies on the diversity and taxonomy of plants and fungi
 - Use of species occurrence data in the development of public policies
- **Training**
 - Taxonomy, curation, biodiversity informatics
- **Exchange of knowledge**
 - Free and open access to online systems

Action Plan



- Identifying taxonomic groups that represent a bottleneck for the advancement of knowledge
- Development of tools that help evaluate the size of the problem and define priority actions

Results - diagnosis

Families	Records*
• Fabaceae	33.000
• Euphorbiaceae	16.041
• Rubiaceae	13.324
• Asteraceae	11.752
• Malpighiaceae	10.336
• Myrtaceae	10.276
• Melastomataceae	10.228
• Apocynaceae	6.529
• Malvaceae	5.976
• Poaceae	5.785



*Online records without identification (genus & species)

Results – Defining specialists' visits

Families (Angiosperms)

- Monimiaceae
- Siparunaceae
- Cyperaceae
- Gentianaceae
- Juncaceae
- Rapateaceae
- Phyllanthaceae
- Sapindales*
- Piperaceae
- Passifloraceae
- Erythroxylaceae
- Convolvulaceae
- Rosaceae
- Annonaceae
- Turneraceae
- Boraginaceae
- Combretaceae
- Olacaceae

* Various families

And also:

Bryophytes
Ferns
Lycophytes
Fungi



Results

Visits to Dec/2011 (43 specialists)

Adriana Lobão - UFF

Ana Paula Prata – UFSE

André Amorim – UESC

Andréa Flores – MIRR

Angela Miranda - UFRPE

Ariane Peixoto – JBRJ

Aristônio Teles - UFG

Armando Cervi – UFPR

Carolyn Proença – UnB

Elsie Guimarães – JBRJ

Fátima Salimena - UFJF

Haroldo Lima - JBRJ

Inês Cordeiro – Ibt

Ingrid Koch - UFSC

Jáder Pereira – UESC

João Stehmann - UFMG

Jomar Jardim – UFRN

Jorge Fontella – UFRJ

José Iranildo – UEPB

José Rubens Pirani – USP

Lana Sylvestre – UFRJ

Leif Ryvarden – Univ. Oslo

Lúcia Rossi - IBt

Luciano Paganucci – UEFS

Luis Menini Neto- CES-JF

Ma. de Fátima Freitas - JBRJ

Ma. Iracema Loiola – UFC

Ma. Mercedes Arbo – IBN

Marccus Alves – UFPE

Marcos Sobral – UFMG

Marli Morim - JBRJ

Massimo Bovini – JBRJ

Milton Groppo - USP

Nádia Roque – UFBA

Olga Yano - IBt

Paulo Windisch – UFRGS

Pedro Luís R. de Moraes - UNESP

Regina Célia Oliveira - UnB

Renato Goldenberg - UFPR

Rosângela Simão-Bianchini - IBt

Tatiana B. Gibertoni – UFPE

Vera Lúcia Klein - UFG

Vinícius Cotarelli - FUEL

Results



Visits

2009 = 11

2010 = 23

2011 = 25

- **> 45 herbaria attended**

ALCB, ASE, BHCB, CEPEC, CGMF, CGMS, EAC, EAFM, FUEL, HAS, HBR, HST, HSTA, HTSA, HUICS, HUERM, HUFU, HVAAT, ICN, HAB, HBR, HRB, HSL, HUEFS, IAC, INPA, IPA, JPB, MAC,MBM, MIRR, MOSS, OUPR, PACA, PEUFR, R, RB, RON, SPF, UB, UEC, UFG, UFP, UFRN, UPCB, URM, VIES,

- **Number of examined specimens**

> 40.000

36 Training Courses

- **Coleção, estocagem e preservação de plantas**
- **Técnicas para trabalho em herbários**
- **Organização de coleções botânicas**
- **Taxonomia e ecologia de Cyanobacteria**
- **Taxonomia, morfologia, evolução e desenvolvimento de plantas aquáticas**
- **Usando o Brahms**
- **Criptógamos – como preparar registros para herbários**
- **Identificação morfológica de Glomeromycota**
- **Coleções de herbário: organização e uso para conhecimento e conservação**
- **Latim instrumental para botânicos**



Training Courses

- **Biogeografia**
- **Taxonomia de Glomeromycota**
- **Taxonomia de plantas da Caatinga**
- **Política e gerenciamento de coleções de herbário**
- **Introdução ao uso de ferramentas para banco de dados**
- **Informatização de coleções usando o BRHAMS e o *speciesLink***
- **Técnicas de identificação para Fungos poliporóides tropicais**
- **Identificação de Cyperaceae, Juncaceae e Rapateaceae**
- **Filogenia para entendimento da biodiversidade**
- **Métodos em taxonomia e florística**
- **Nomenclatura Botânica**
- **Coleções biológicas em Botânica**
- **Sistemática de Leguminosas**



Training Courses

- **Total** : 36
- **No. students**
> 480
- **Institutions**
> 30



UEFS, 2009



UFPE, 2009



JBRJ, 2012



UEBA, 2011

Training in biodiversity informatics and knowledge exchange

- **Visits**
- **Instalation of programs and training (digitization, standards, data cleaning, indicators, ...)**
- **New searching tools**



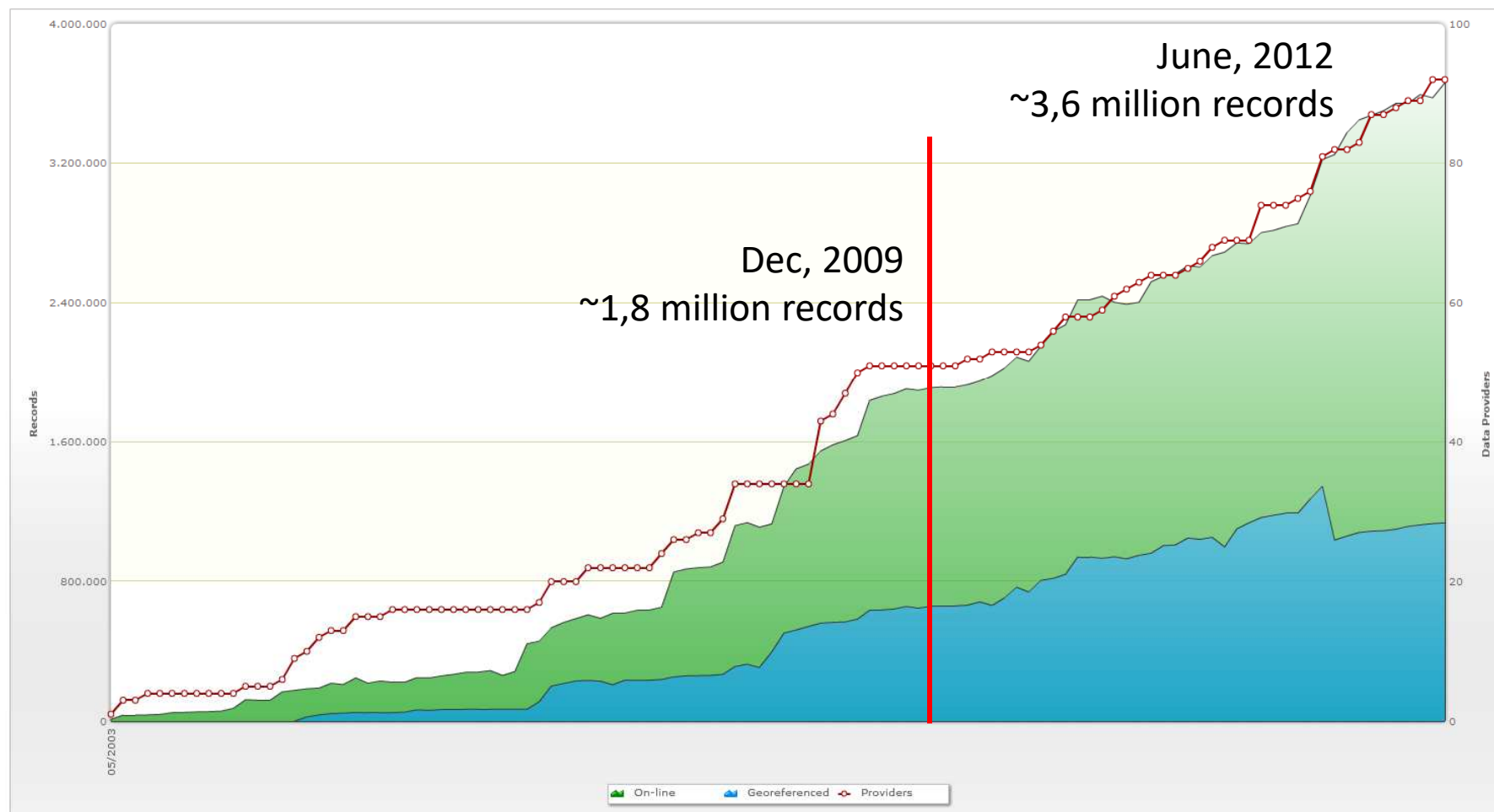
Tools

- Automatic georeferencing
- Data cleaning
- Advanced search interface
- Image server
- Indicators

See other options for indicators
here



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



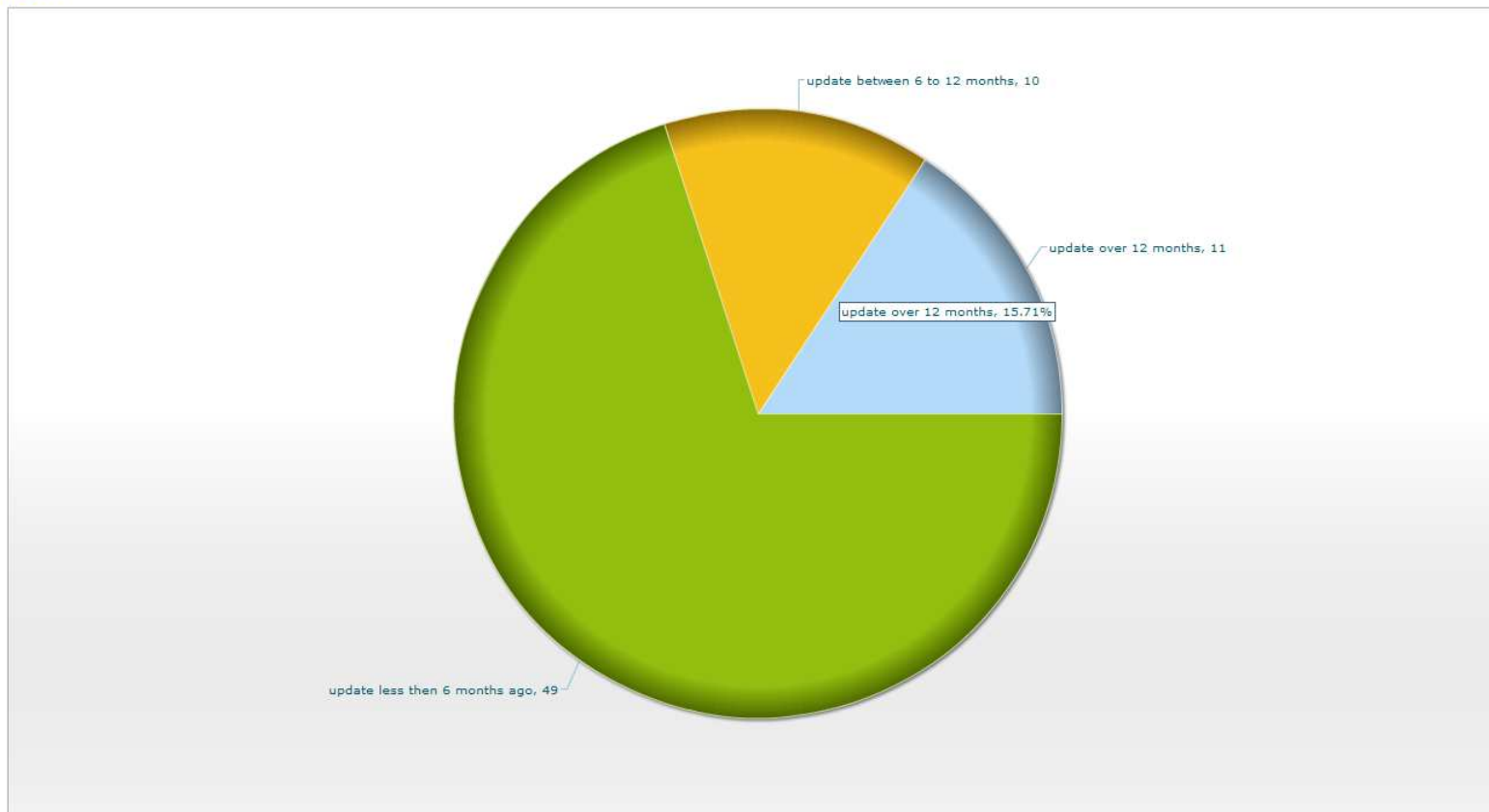
Updating index: 85%



[See other options for indicators here](#)

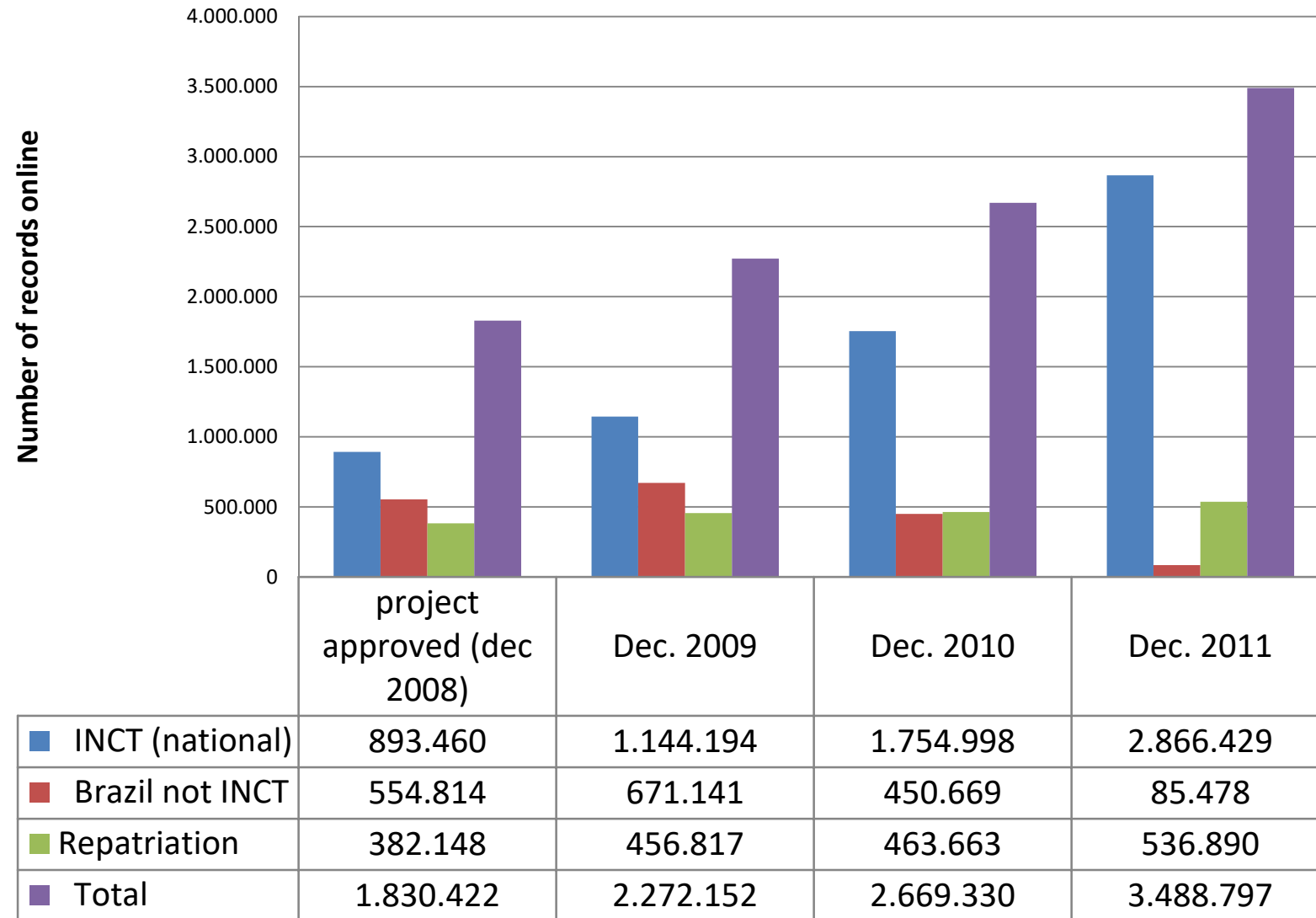


National Network - All Collections - updating index



Virtual Herbarium: partial results

Evolution of the number of online records



Partial Results: 128,114 Images



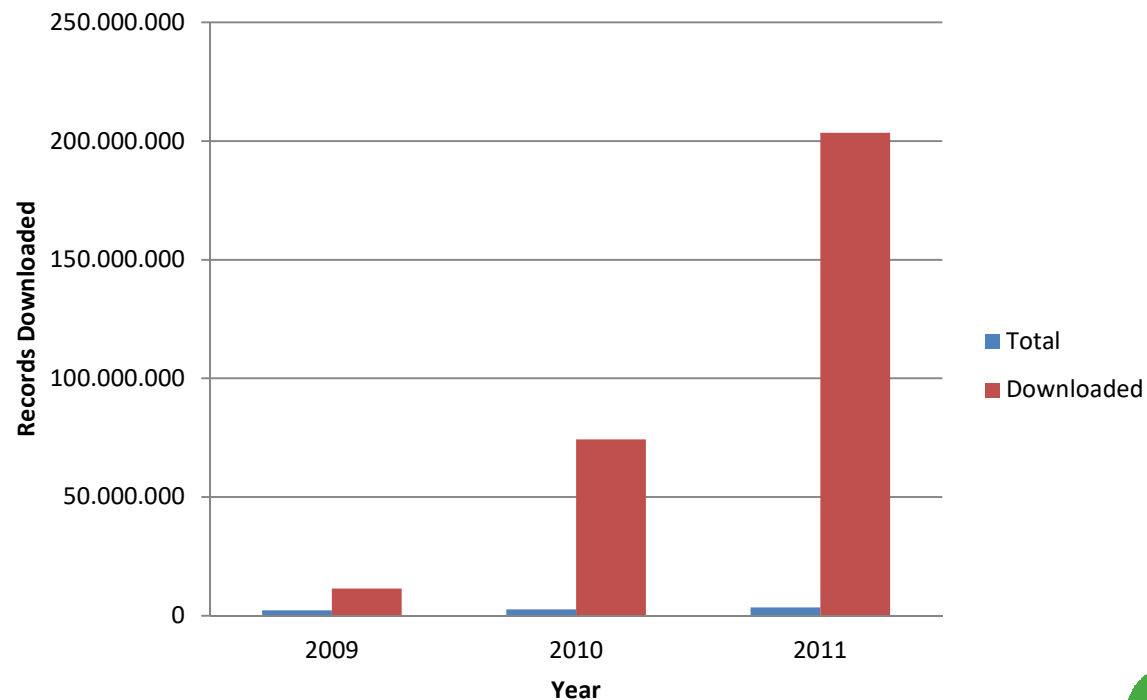
	BHCB	CVRD	EAC	ESA	FLOR	FURB	HVASF	MBM	NY	P	POL	R	SP	UEC	UFG	UFP	URM	US	total
imagens armazenadas	1012	28	30	7595	823	274	3686	1360	94342	6197	85	638	1018	10891	30	90	5	10	128114
códigos de barra	909	28	30	7525	423	254	2267	1340	89203	5971	17	619	1004	10888	15	61	1	10	120565
typus	424			4	7	1	123	1189	8469	2000		304	996	376				10	13903
registros textuais associados	863	5	30	7329	422	254	2267	1214	89186	4988	17	347	1004	9752		44		10	117732



exsiccatae

Use

	2009	2010	2011	Growth (%)
Total Records	2.272.152	2.669.330	3.488.797	54%
Downloaded	11.347.023	74.265.847	203.439.834	1693%
Downloaded /Total	5,0	27,8	58,3	



Thank you!

- **Funding agencies**
- **Partner Institutions**
- **Researchers**
- **Technicians**
- **Students**



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