A Digital Repository for the Herbarium Collection of Brasília Botanical Garden

Milton Shintaku*[1], Roberta G. Chacon†[2], Ana L. R. Caldas‡[2], Caio N. de A. Dias§[2], Tiago E. N. Braga¶[1], Thayse C. Santos‖[1], Washington L. R. de C. Segundo**[1], Diego J. Macedo††[1], and Ronnie F. de Brito‡‡[1]

[1]Instituto Brasileiro de Informação em Ciência e Tecnologia - Ibict
[2]Jardim Botânico de Brasília - JBB

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Abstract

The Brazilian flora, due the continental characteristics of the country, has revealed the interest of many researchers since the Brazilian discovery. It presents distinct biomes that feature various endemic specimens. Thus, the units of conservation and botanical gardens have shown an important role in the search, dissemination and cataloging new species, preservation of endangered species, among others benefits. In this context, the Brasilia Botanical Garden becomes a reference in regard to the Cerrado Biome, mainly by actions on the sense of the biome preservation, research and education of the community, in addition to maintaining a herbarium with a significant collection. The Brasília Botanical Garden and the Brazilian Institute for Information in Science and Technology has been developing a project to implement a repository for the purpose of the preservation and dissemination of information concerning the herbarium collection. With that offering a system with many facilities in organization, archiving, retrieving, searching, among others The main objective is to construct a information base the flora of the Cerrado (Savanna Central Brazil) but also generate a specific case use of a repository of open data.

Keywords: Digital Repositories, DSpace, Metadata, Preservation, Herbarium, Exsiccate.

1 Introduction

The Brazilian fauna and flora have always been the target of scholars . Since the Brazil discovery, several naturalist expeditions had cataloged plants, animals, and others . According to dos Santos Pinto and Alencastro (1998) [2] the first impressions about the Brazilian flora and fauna are present in the Letter of Caminha, which was wrote to the King of Portugal to announce the discovery of Brazil . Other later works, even without scientific nature, do reference to the Brazilian flora and fauna, such as the works of Staten Hans, 1557, " Two trips to Brazil" or Thevet André, 1558, "The Curiosities of Antarctic France ". Of a scientific nature, one can cite the work of the dutch George and William Marcgraf Floor , published in 1648 , "Historia naturalis Brasiliea ", treating, among other matters of Brazilian plants and animals , specifically

*shintaku@ibict.br
†rgchacon@gmail.com
‡analoo@gmail.com
§cna.jbb@gmail.com
¶tiagobraga@ibict.br
‖thaysecantanhede@gmail.com
**washingtonsegundo@ibict.br
††diegomacedo@ibict.br
‡‡ronniebrito@ibict.br

those that occur in the northeast region. Many other foreign expeditions had cataloged specimens, but it was always published in Europe, and there where highlighting Von Martius, Langsdorf, and others.

In specific relation to naturalistic expeditions about the flora, several botanical studies had performed in Brazil, mainly by the continental dimensions of the country, which have many endemic species, because the country presents distinct ecosystems, from the semi-arid regions to the Amazon. In this sense, the botanical gardens becomes important site of research, and to preserve the habitat and provide environment for rare specimens, reports Sellaro (2008) [3], so should be socialized in order to promote discussion on the preservation and conscientization (CERATI , LAZARINI, 2009) [1].

2 Brasília Botanical Garden - JBB

The JBB was created in 1985, however, its plan comes from the Brasília project, in the 60's. It is a Botanical Garden with 500 hectares of public visiting area and 4500 hectares of Ecological Station, a unity of integral protection, intended to preserve the Cerrado in the urban area. It is founded by the govern, and it has many places dedicated to recreation and learning, with themed gardens, bromeliads collections, cacti and orchids and ecological trails.

The JBB is inserted in the Cerrado biome and it is compose with native vegetation with gallery forest, typical savanna and dry grassland. It has a source of a stream where the water is used for the public supply on the neighborhood. The preservation of this biome has extreme relevance because it has the three main river basins of the South America.

3 JBB Herbarium

According of the standard definition, a herbarium is a collection of dried plants arranged according to a particular system and that, after his herborization are held in appropriate facilities for conservation. In particular, the Herbarium Ezechias Paulo Heringer - HEPH, previously belonging to the Federal District Zoo-botanical Foundation, was moved in 1984 to the Botanical Gardens. Named in honor of its founder, Professor Ezechias Paulo Heringer, that was responsible for the first collections deposited in the herbarium. In 1989 it was accepted into Index Herbarium and recorded under the symbol HEPH. Since 2008 the HEPH is accredited as a faithful depository herbarium. The collection of HEPH consists of 30,000 plants,mostly from the Cerrado biome.

4 Herbarium Repositories

The Repository for HEPH developed in DSpace version 4, has the objective to promote the **exsiccate** (samples of dehydrated plants in greenhouses and pressed, labeled, stuck in standard sheet for purposes of botanical study, Figure 1) collection that is maintained by the JBB Herbarium in digital format. Then, at the end of the project the repository should provide a digital collection of more than 15,000 images of exsiccates with several species, and with emphasis on the Cerrado biome.

The informational structure used by the repository followed the standard taxonomy for classifying living beings, in which the kingdom and phylum form the communities and sub-communities, and the families are the collections. So the repository HEPH is structured in two main communities, Plantae and Fungi, due the fact that the collection contains items from plants and fungi, and so there are subdivisions in each of this communities. The complete scheme of organization of the repository archives is in the Figure 2.

The collection presents a greater representation of plants, in the Plantae community, and angiosperms exhibit a higher number of herbarium specimens. This representation reflects the own distribution of plants and fungi in the cerrado and other environments as angiosperms has a greater amount of specimens.

Figure 1: Exsiccate example

Regarding the description of exsiccates, we chose to use the Dublin Core Metadata Schema Qualified, adjusting it to reproduce the catalog cards of exsiccates. We notice that a exsiccate has no title or author, but has collector, scientific name and common name of the plant. Thus, the following metadata (Table 1) was used.

	Element and Qualifier	**Label**
1	dc.title	*Scientific Name*
2	dc.title.author	*Scientific Name's Author*
3	dc.title.alternative	*Common Name*
4	dc.contributor.author	*Collector*
5	dc.contributor.other	*Contributors*
6	dc.identifier	*Registration number*
7	dc.description.taxonomy	*Taxonomy*
8	dc.description.habitat	*Habitat Characteristics*
9	dc.description.abstract	*Plant Description*
10	dc.description.other	*Additional Information*
11	dc.date.issued	*Date of Colect*
12	dc.coverage.spacial	*Specific Place; st. Country*
13	dc.coverage.latitude	*Latitude*
14	dc.coverage.longitude	*Longitude*
15	dc.rights.holder	*Copyright*
16	dc.rights.license	*Adopted License*

Table 1: Metadata Scheme

The taxonomy field (dc.description.taxonomy) it was used a controlled vocabulary to fill it, for the purpose of standardization of content, and thus the recovery too. The items belonging to the collection can be given by specifying a search in taxonomic tree (by the vocabulary controlled), or by filters of the following fields: collectors, collect date, scientific name, common name and full taxonomy. And the facets, on the faceted search, are Collector, Scientific Name, Common Name and Date of the Collect.

The items are listed by columns presenting thumbnail, date of collect, scientific name, common name, collector name, and taxonomy (Figure 3). This presentation form is idealized to be in according with the users needs, whether catalogers, students or researchers. The item has the exsiccate image in high definition, this allows the visualization of the plants and fungi details.

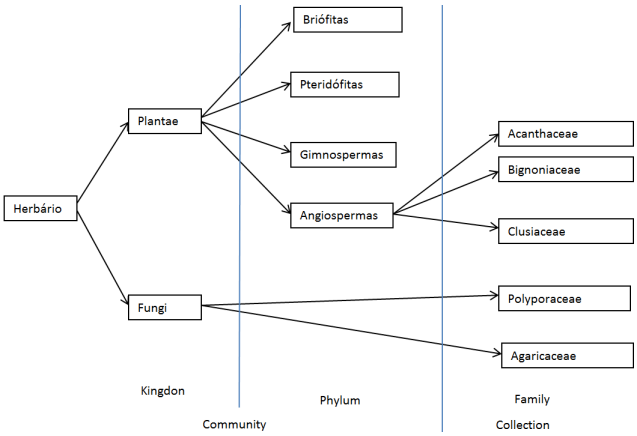

Figure 2: Taxonomic organization

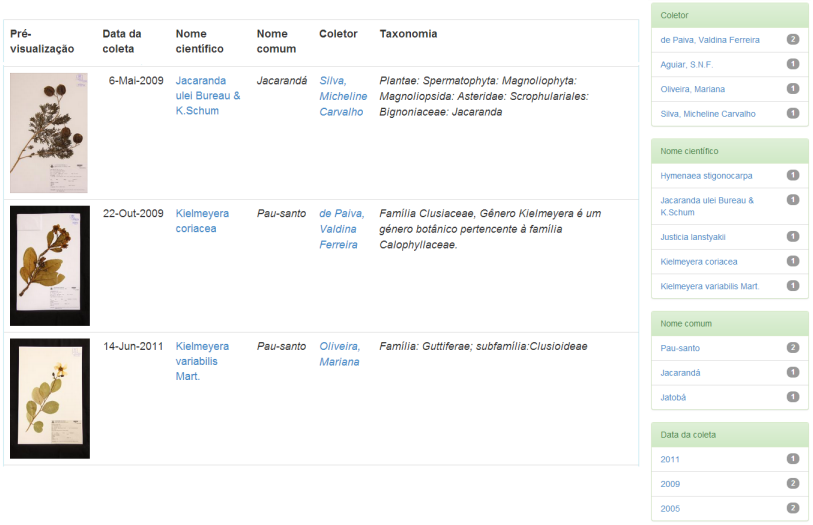

Figure 3: Presentation list

5 Conclusion

The adaptation of DSpace software, originally for academic repositories, to develop a repository for a Digital Herbarium seems effective, making it possible to give access to a type of collection usually restricted, in an organized and structured manner. In this sense, this repository offers a wider community information about the Cerrado plants and fungi.

It also showed the flexibility of DSpace in order to provide access to documents, adapting itself on providing facilities spread of different types of collections. In the same way it highlighted the versatility of the Qualified Dublin Core metadata to describe a wide range of document types.

Therefore, there is an relevant importance of offering an information service that provides a collection of exsiccates, which has aspects of digital data. Thus, it is a structured open data repository, while disseminates information relating to the herbarium.

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