

# Herbaria and the importance of botanical collections for the study of medicinal plants in Brazil

Herbários e a importância de coleções botânicas para o estudo de plantas medicinais no Brasil

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The pre-historic times, as well as the Early Age, have continually revealed the way of interaction of men and plants, as a conjugation process of survival needs and understanding of the subtle properties of natural resources, what was made by experimentation.

The nomadism of the first human groups imposed the need of food and medicine in different places. However in the Middle East, ten thousand years ago, the seek for food and medicine was succeeded by the techniques developed by means of the empirical experimentation. That experimentation had resulted in agricultural practices, the knowledge on plant reproduction, the implantation of processes of irrigation, and the cultivation of drugs to cure illnesses. Then, the world was transmuting from the absolute realm of the gods to the cooperation with the men. The myth was replaced by the rationality of the Greek civilization, which philosophical project inaugurated by Descartes in the Modern Times, seems to have attributed to him, unwittingly, a mythifying character (Ronan 2001).

The rationalization of the universe, without the interference of magic or superstition, had led the Greek world to the development of medicine and the use of herbs. Drawing on a range of plants and animals that were collected, Aristotle (384 BC) established a new age for science. Since after the creation of the Lyceum, he described near 500 plants and animals, and proposed a taxonomic classification for plants, which had Theophrastus, his pupil, as its follower, who wrote *Opinions of Natural Philosophers* (Colin 1984). However, the first herbarium, which was then called *Orto Botanico di Pisa*, was created by Luca Ghini in 1544, in collaboration with the University of Bologna, where this botanist was a professor (Sumner 2000).

The importance of biological collections as repositories and information sources about the biological diversity is currently widespread in the different academic areas as well as in the society in general. Curators of collections and scientists who deal with them have sought to combine modern techniques with traditional practices.

For instance is the combination of practices mainly derived from the technology of information, such as georeferenced information, manage data bank systems, and digital images, with the typical biological systematics as a science that primarily deals with the specimens in the process of collecting, identification and classification.

Nowadays the biodiversity sciences, those one that deal with biodiversity, face one of the great contemporary challenges: to build bridges between different knowledge, that may allow different understandings of the biological collections, so that it can be appreciated not only by the taxonomy, but by all the group of the biodiversity sciences, trying to contribute to solve one of the major contemporary problems which is to stop, the loss of habitats and species.

In this sense, botanical records in biological collections are of crucial importance for the medicinal use of plants. The need of the correct linking of a scientific binomial with a biological species is essential in the case of any kind of phytochemicals markers, which might ever be used in natural remedies, is as old as the origins of plant systematics. At the same time, the ancestral rooting of the use of plants as food, in healing and in religion in different human cultures has created a natural and incidental trouble to this process, ie, get to know accurately about the biological unit that is being talked about, if we only by reference to traditional knowledge.

The formalization of the current registry of a phytomedicine in Brazilian Health Ministry requires the official botanical nomenclature, which includes the Latin binomial of the species, its author and the botanical family to which it belongs. In fact, answering this question leads to other demands for which the botanical collections are fundamental: they are the guardians of the samples that identify and represent the plant species from which derived the phytomedicine that is being registered. And because of that, the herbarium play another important role in process research and development of

herbal medicines. They allow the access to the historical relationship of all the ways in which one or another biological unit may have been accessed, besides of the guarantee of the production of evidence to ensure the plant species identification. It may support not only researchers in technology, but by all of those who participated in the survey that culminated with the registration of a new phytomedicine.

Under this outlook, the publication of papers investigating the chemical or medicinal use of plants has always required the citation of herbarium specimens of herbarium records in the plant species that were studied. This fact in itself has allowed a contribution in expanding the numbers of registries in the collections. Currently, the process has become even more demanding, requiring the input of information to the geo referencing of collection sites and / or cultivation of plants in the study. It has allowed a vast contribution of biogeographic information, involving pharmaceutical and medical research in the consolidation of a database that converges to the knowledge of Brazilian biodiversity, another fundamental contribution to Brazil to fulfill its commitment as a signatory to the Convention of Biological Diversity. At the same time, medical research and pharmaceutical companies are much larger part of the context of all the sciences of biodiversity.

The botanical collections, unlike what occurred in the past, are now much more available to the scientific network. They appear as fundamental tools for the activities and conservation actions. However, much more needs to be done. The estimated universe of 56,000 plant species for Brazil, almost 19% of the world flora (Giulietti et al. 2005), provides the size of the effort being undertaken to inventory taxa, biomes, geographic regions and many other parameters typical of a country continental extension. Actively engaging in conservation activities should be a priority for taxonomists, so that it can be highlighted the value of each stamp to the binomial scientific research that it originates in biodiversity sciences and many others.

However, a great diversity of skills and knowledge is required to professionals who deal with herbaria. They emerge from the researcher working on the boundaries of phylogenetic studies, to the horticulturist responsible for the cultivation of one species endangered of extinction and that has never before been cultivated. They also involve the educator, who is a specialist in public communication, in order to transmit to younger generations the importance of biodiversity at global, regional and local levels (Mayo 2010). The continuous training of active professionals and the training of new ones is also a challenge for the exercise of all of these activities.

Among the aims of the Global Taxonomy Initiative, there is the encouragement of initiatives and of national, regional, and local networks to consolidate their objective of taxonomic training and technical cooperation at those three levels. So, sustainability will be achieved in an easier way, through interactions in which the enhancement of collections and the importance of biodiversity science become more apparent. The training of professionals and technicians to deal with these sciences is complex and requires, besides a long period of dedication, mastery of subjects belonging to different fields. Human activity is full of production of material evidence that make

connections between mental activities, creative and enforceability of man. Herborized collections – objects of material culture and means of preserving the human history of, plants and their habitats – have shown ability to overcome the barriers of space and time. In the herbarium, as in other museums, these two dimensions are interlinked and surpass their era and overcome space because they often transcend the boundaries of their places and time of origin (Granato 2009).

Once understood these temporal and spatial dimensions, the botanical collections are privileged spaces for this training by interconnecting necessary activities and actions of research and conservation of specimens in their natural habitats. They also preserve different stories, such as geographical and morphological ones, at different times from that one when the specimen was collected. Besides of their role as information sources, to the collections has been transformed into cultural heritage, testimony to the history of discovery and expansion of Brazilian society in its territory, as highlighted by Rangel (2008). It is this context, the plant collections should be recognized as potential spaces for conceptual construction. When they make use of modern instruments, they create working conditions which might facilitate the access to their users, including testimonies of new possibilities and achievements. as a fertile field under much different glances of the biological as well as in other sciences.

Scientists who deal with these sciences must, in addition to continuous training, seeking to elect between their different research activities, other ones and actions of most relevance in relation to contemporary problems as recommended by the GTI. Understanding how each species fits and works in the ecological system, the herbarium has much greater potential to contribute solidly in comprehension and addressing the major issues of today. Considering the transforming and loss of habitat, biodiversity loss, destruction of ecological resources, loss of cultural heritage, sustainable resource use and exploitation of the pharmacochemical potential of native species.

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