

THE HERBARIUM AS A TOOL FOR BIODIVERSITY CONSERVATION

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“One of the most significant contributions to our knowledge about natural world, in the last generation of twenty century, was the discovery that many species are disappearing from planet and that Homo sapiens L. is primarily the responsible for this disappearance” (7).

The biodiversity conservation in seasonal semideciduous forest depends on its fragments conservation, dispersed over whole Country (1). Forest fragments could serve as a real seed bank, supplying biodiversity. Thus, floristic and structure analysis of vegetal community allow to get information about fragments situation (2).

The forest fragments are a vestige of previously continuous forests that generally, exhibit gradual changes. On the other hand, forest fragments are submitted to direct alterations due to actions exerted on the edge. Abrupt changes may cause an idea that fragments are samples of a unique and homogeneous part of the original forest. Moreover, even if a small fragment contains a significant vegetation diversity, forming a vegetational mosaic, that is related to substratum types, successional phase and/or, the edge effect (3, 4). This relation is relevant since threatened biodiversity is conserved in remainders of tropical forest (5).

The Atlantic Forest has a huge historical devastation. However, this biome still contains forest remainders of extreme scenic beauty and biological importance. It contributes to the fact that Brazil has the highest biodiversity on Earth (6). In Atlantic and Cerrado vegetation edge, there is a forest formation that contains characteristics of these both biomes, known as seasonal semideciduous forest (2).

Researches on floristic diversity form a systematic inventory of vegetal patrimony. They are essential to identify native vegetation fragments with more preservation potential (hotspots fragments) and to subsidize studies aiming to reforestation of impacted areas. This is specially important to consider that: “One of the most significant contributions to our knowledge about natural world, in the last generation of twenty century, was the discovery that many species are disappearing from planet and that Homo sapiens L. is primarily the responsible for this disappearance” (7).

The implantation of herbariums in colleges or in research centers is essential to the conservation of vegetal diversity (i.e. the variety, the relative distribution range and the abundance of encountered organisms) (8, 9). The Herbarium is a scientific collection composed by plants samples proceeding from several ecosystems. It provides a record and a reference about flora from a specific region. In general, plants are collected in the fertile stage, with flowers and/or fruits, which are indispensable elements for the scientific identification. The scientific name of a plant is the first stage to the correct access all botanical information. This collection serves as a base for several researches in taxonomy and related areas (for example, phytogeography, phytochemistry, ecology, etc.).

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Many different activities may be developed at Herbariums. At Faculdade Integrado de Campo Mourão-PR the Herbarium is used to the development of didactic material for many disciplines; as a place for students training and; as an arrangement of a complete pile of fanerogamous (including fruits), fungus, bryophytes, pteridophytes and algae. This sort of work is stimulated by Herbariums Brazilian Network (Rede Brasileira de Herbários-RBH) of Brazilian Botanical Society (Sociedade Botânica do Brasil). Thus, herbarium's guardians and taxonomists are able to exchange information about collections. It allows them to share and divulge their politics with their strategies of development and maintenance of piles (10).

The teaching and learning strategies of Botany in Brazilian Universities is currently facing a new challenge. The biologists are forced by the society to give immediate answers to complex biological questions. However, probably due to their academic formation, researchers are not always capable to answer these questions instantly. Maybe, this is due to the fact that the professional formation did not follow the fast evolution of biological knowledge. There are some studies challenging these shortfalls by using surrogates for biodiversity (11). Some methods used in several Universities are already being renewed, such as the usage of internet and multimedia. The internet use allows to follow the continuous changes in science into classroom. Multimedia utilization comprises a representation of biological phenomena in a screen, providing a more realistic vision of them, simple and fast. It also facilitates the agreement of theoretical lessons with practical ones. The instruction of Botany is also and fundamentally based on several traditional disciplines, such as Vegetal Anatomy, Organography, Vegetal Physiology, Taxonomy and Vegetal Systematic, indispensables in the curricular grating of the Biological Sciences course (12). Thus, the Herbarium becomes an important foundation for these research fields by supporting an enormous plant data base.

Studies aiming to understand ecosystem functions and its dynamics are essential to decipher the causes of the high biological diversity observed in some regions (13). However, these studies do not still have much

success. For that, herbariums could be essential. For example, the use of pile in a herbarium, allows to verify the collected plants from an area and measure its diversity over environmental gradients or over time. Thus, in places where great species richness is found, periodic visits becomes a tool for evaluating historical and environmental questions, since gradual changes of vegetation may be registered in the herbarium.

Several questions about ecological restoration can also be subsidized by herbarium data. This is due to the fact that the management of plant species or choice of a specific methodology will be based on species information of studied area. In long-term restoration, where each phase has a constructive role in biological community, the importance of the herbarium guardian (that precisely recognizes species through carefully identifications) is enhanced. For example, the identification of plant species is fundamental to evaluate the reestablishment success of the vegetational community.

The evolutionary science supported by recent genetic methods of identification, show a novel approach to improve Botany. In addition, contributions of embryology, cytogenetic, phylogenetic and molecular systematic to handle native and exotic species are becoming gradually higher over time (14-17). However, even with the revolution caused by genetics and many other scientific fields, the Planet is still suffering with the misuses of the natural resources, and the society is obligated to face innumerable environmental damages. In this sense, laboratories such as Herbariums are fundamental tools for ecosystem's restoration and biodiversity's recovery in several impacted areas. Therefore, laboratories need especial attention, as well as instruction of Botany in Educational Institutions. It is particularly relevant that biologists have to answer questions not only imposed by society, but also imposed by nature itself. In this way, the future may be improved by new professionals, and the destructive practicals that *Homo sapiens L.* currently develops in the environment may be changed.

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REFERÊNCIAS

- 1) TABANEZ, A.J.; VIANA, V.M.; DIAS, A.S. Conseqüências da fragmentação e do efeito de borda sobre a estrutura, diversidade e sustentabilidade de um fragmento de floresta de planalto de Piracicaba, SP. **Revista Brasileira de Biologia**, v. 57, n. 1, p. 47-60. In: SILVA, L.A.; SOARES, J.J. Composição Florística de um Fragmento de Floresta Estacional Semidecídua no Município de São Carlos-SP. **Revista Árvore**. Viçosa-MG, 2003, v.27, n.5, p.647-656.
- 2) SILVA, L.A.; SOARES, J.J. Composição Florística de um Fragmento de Floresta Estacional Semidecídua no Município de São Carlos-SP. **Revista Árvore**. Viçosa-MG, 2003, v.27, n.5, p.647-656.
- 3) ESPÍRITO-SANTO, F.D.B. et al. Variáveis ambientais e a distribuição de espécies arbóreas em um remanescente de floresta estacional semidecidual montana no campus da Universidade Federal de Lavras (UFLA), MG. **Acta Botânica Brasílica**, 2002, v. 16, n. 3, p. 331-356. In: MACHADO, E.L.M.; OLIVEIRA-FILHO, A.T de; CARVALHO, W.A.C.; SOUZA, J.S.; BORÉM, R.A.T.; BOTEZELLI, L. Análise Comparativa de Estrutura e Flora do Compartimento Arbóreo-Arbustivo de um Remanescente Florestal na Fazenda Beira Lago, Lavras-MG. **Revista Árvore**, Viçosa-MG, 2004, v. 28, n.4, p.499-516.
- 4) NUNES, Y.R.F. et al. Variação da fisionomia, diversidade e composição de guildas da comunidade arbórea em um fragmento de floresta semidecidual em Lavras, MG. **Acta Botânica Brasílica**, 2003, v. 17, n. 2, p. 215-231. In: MACHADO, E.L.M.; OLIVEIRA-FILHO, A.T de; CARVALHO, W.A.C.; SOUZA, J.S.; BORÉM, R.A.T.; BOTEZELLI, L. Análise Comparativa de Estrutura e Flora do Compartimento Arbóreo-Arbustivo de um Remanescente Florestal na Fazenda Beira Lago, Lavras-MG. **Revista Árvore**, Viçosa-MG, 2004, v. 28, n.4, p.499-516.
- 5) MACHADO, E.L.M.; OLIVEIRA-FILHO, A.T de; CARVALHO, W.A.C.; SOUZA, J.S.; BORÉM, R.A.T.; BOTEZELLI, L. Análise Comparativa de Estrutura e Flora do Compartimento Arbóreo-Arbustivo de um Remanescente Florestal na Fazenda Beira Lago, Lavras-MG. **Revista Árvore**, Viçosa-MG, 2004, v. 28, n.4, p.499-516.
- 6) SILVA, I.M.M. de Sá e; SALES, M.F. Florística de dois remanescentes de mata atlântica na Usina São José, Igarassu-Pernambuco. **IV Jornada de Ensino, Pesquisa e Extensão da UFRPE** – Recife, Imprensa Universitária 22 a 26 de novembro de 2004.
- 7) BROOKS, D.R.; MCLENNAN, D.A. Biodiversity: Exploring the future. In: BROOKS, D.R.; MCLENNAN, D.A. **The Nature of Diversity**. An evolutionary voyage of discovery. Chicago: The University of Chicago Press. p. 525-559, 2002.

- (8) ORLOCI, L.; ANAND, M.; PILLAR, V.D. Biodiversity analyses: issues, concepts, techniques. **Community Ecology**, 2002, 3:217-236.
- (9) WILSON, E.O. **Diversidade da vida**: Ed. Companhia das Letras. 1994.
- (10) VIEIRA, A.O.S. O Papel da Rede Brasileira de Herbários (RBH) e das Coleções Botânicas. In: 57º Congresso Brasileiro de Botânica (Gramado, 2006). **Os Avanços da Botânica no Início do Século XXI: morfologia, fisiologia, taxonomia, ecologia e genética; Conferências Plenárias e Simpósios**. Sociedade Botânica do Brasil. Porto Alegre – RS, 2006.
- (11) BINI, L.M.; DINIZ-FILHO, J.A.F.; RANGEL, T.F.L.V.B.; BASTOS, R.P.; PINTO, M.P. Challenging Wallacean and Linnean shortfalls: knowledge gradients and conservation planning in a biodiversity hotspot. **Diversity and Distributions**, 2006, v.12, p. 475–482.
- (12) SANO, P.T. O ensino da Botânica na Universidade: Novos Tempos. In: 57º Congresso Brasileiro de Botânica (Gramado, 2006). **Os Avanços da Botânica no Início do Século XXI: morfologia, fisiologia, taxonomia, ecologia e genética; Conferências Plenárias e Simpósios**. Sociedade Botânica do Brasil. Porto Alegre – RS, 2006.
- (13) PILAR, V.P. Análise da diversidade: conceitos, métodos e aplicações. In: 57º Congresso Brasileiro de Botânica (Gramado, 2006). **Os Avanços da Botânica no Início do Século XXI: morfologia, fisiologia, taxonomia, ecologia e genética; Conferências Plenárias e Simpósios**. Sociedade Botânica do Brasil. Porto Alegre – RS, 2006.
- (14) DE TONI, K.L.G. Embriologia na família Rubiaceae: histórico e diversidade. In: 57º Congresso Brasileiro de Botânica (Gramado, 2006). **Os Avanços da Botânica no Início do Século XXI: morfologia, fisiologia, taxonomia, ecologia e genética; Conferências Plenárias e Simpósios**. Sociedade Botânica do Brasil. Porto Alegre – RS, 2006.
- (15) GÓES-NETTO, A. Métodos de Análise Filogenética. In: 57º Congresso Brasileiro de Botânica (Gramado, 2006). **Os Avanços da Botânica no Início do Século XXI: morfologia, fisiologia, taxonomia, ecologia e genética; Conferências Plenárias e Simpósios**. Sociedade Botânica do Brasil. Porto Alegre – RS, 2006.
- (16) SCHIFFINO-WITTMANN, M.T. Contribuição da citogenética para estudos taxonômicos e evolutivos no gênero *Lupinus* L. In: 57º Congresso Brasileiro de Botânica (Gramado, 2006). **Os Avanços da Botânica no Início do Século XXI: morfologia, fisiologia, taxonomia, ecologia e genética; Conferências Plenárias e Simpósios**. Sociedade Botânica do Brasil. Porto Alegre – RS, 2006.
- (17) PAULO, E.A.S. Uso e importância da sistemática molecular em conservação, um estudo em Hypnales Bryophyta. In: 57º Congresso Brasileiro de Botânica (Gramado, 2006). **Os Avanços da Botânica no Início do Século XXI: morfologia, fisiologia, taxonomia, ecologia e genética; Conferências Plenárias e Simpósios**. Sociedade Botânica do Brasil. Porto Alegre – RS, 2006.

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