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A. Title of Proposed Project – Taxon line – Network of Biological Collections in Parana State.

B. Contact Information for Principal Investigator(s)

- Name: Luciane Marinoni
- Address: Universidade Federal do Paraná, Centro Politécnico, Cx. Postal 19020, CEP 81.531-980, Curitiba, PR.
- Country: Brazil
- Telephone: 55 41 3361 1650; 55 41 9192 8220.
- Fax: 55 41 3361 1764
- Email: lmarinoni@ufpr.br; taxonline@ufpr.br
- Website: www.taxonline.ufpr.br

C. Contact information for Managing Institution – The same information above

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Abstract. The Project Taxon line has started in the beginning of 2006 and nowadays congregates 18 biological collections within the State of Paraná, Brazil (www.taxonline.ufpr.br). The primary goal of this network is to pass information contained within the museums to the scientific community. Among the developmental stages of this project are included the organization of the material and of the support infrastructure as well as making the information available on the Internet. Digitization of the collection data as well as that on all labeled specimens for computer storage is the requisite first-step for the realization of that goal. In this proposal it is intended to start a specific POLLINATOR cross-cutting line of work focusing in the families belonging to Diptera, Coleoptera and Lepidoptera (Insecta).

Resumo. O projeto Taxon line começou no início de 2006 e atualmente congrega 18 coleções biológicas no Estado do Paraná, Brasil (www.taxonline.ufpr.br). Caracteriza-se pela passagem das informações contidas nos acervos à sociedade científica. Entre as etapas de desenvolvimento estão: a organização do material das coleções, da infra-estrutura de apoio e das informações a serem disponibilizadas via Internet. A digitalização dos dados das coleções, ou a captura e passagem dos dados das etiquetas de cada exemplar biológico para um sistema de armazenamento em computador, é o passo inicial essencial para tornar a imensa quantidade de informações das coleções acessíveis e passíveis de ser transformadas em produtos úteis para a sociedade. Através da presente proposta pretende-se consolidar, dentro da Rede Taxon line, uma linha de trabalho específica para polinizadores iniciando com famílias pertencentes à Diptera, Coleoptera e Lepidoptera (Insecta).

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Introduction and goals

The project Taxon line – Network of Biological Collections has started in 2006 and nowadays congregates 18 collections in the State of Paraná: **Entomological** Collection Father Jesus Santiago Moure (DZUP) **Entomological** Collection at the State University of Ponta Grossa (UEPG); **Ascidiacea** Collection of the Zoology Department of the UFPR (DZUP); **Mammal** Collection of the Zoology Department at the UFPR (DZUP); **Fish** Collection at the Capão da Imbuia Natural History Museum (MHNCI); **Collection of Sounds** at the State University of Londrina (CSUEL); Zoology Museum at the State University of Londrina (MZUEL); **Fish** Collection at the State University of Maringá (NUPELIA); Curitiba Municipal Botanical Museum (MBM); Herbarium of the Botany Department of the UFPR (UPCB); The Herbarium at the State University of Londrina (FUEL) and the Herbarium at the State University of Maringá.

The state of Paraná has a rich history of biodiversity studies, for which its researches are known both nationally and internationally, primarily for their work in taxonomy. Two of the most important Brazilian Naturalists have made important contributions that have led to the current situation of the biological collections in the state: Dr. Gerdt Guenther Hatschbach and Father Jesus Santiago Moure. Their work has led to national recognition of the state of Paraná as an important force in the study of Brazilian biodiversity.

Father Jesus S. Moure founded the Zoology Department of the Federal University of Paraná in 1938, the same year as that of the Faculty of Philosophy, Science and Letters. Despite being an entomologist, Father Moure initiated the Marine Biology Program in 1951, in which he helped create the Marine Studies Field Station. Beginning with his work in Insecta and Hymenoptera, particularly with bees, he started what has become the largest insect collection in Brazil, and that which bears his name: the Father Jesus Santiago Moure Entomological Collection (DZUP). This collection contains approximately five million insects, mostly in the Orders Coleoptera, Diptera, Hemiptera, Hymenoptera and Lepidoptera.

This structure permitted growth, organization and study of the collection and its specimens. Since its inception, the program in Entomology has granted 265 masters degrees and 129 doctoral degrees.

Since the formation of these programs, their professors and students have published more than 1,300 papers in national and international research journals, most on taxonomy and systematics, as well as biogeography and molecular systematics. In 1984, with the creation of the Center for Phytophagous Insect Identification (CIIF) with support of the Studies and Project Support Fund (FINEP) and the National Council for Scientific and Technological Development (CNPq), the collection and its supporting infrastructure have grown dramatically.

The growth of the collection is largely due to the contribution of two projects: The Organization of the Entomological Collection of the Department of Zoology, and the Entomological Survey of the State of Paraná (PROFAUPAR). Through these two projects, the museum has acquired 4,000 insect drawers and the cabinets with which to hold them, dehumidifiers and heaters for climate control, and more than four million specimens from eight locations in the state. Additionally, the CIIF was instrumental in improving the collection by means of the acquisition of private collections, such as those of Moacir Alvarenga, Fritz Plaumann, Anton Maller and Dmytro Zajciw.

Main Goals of the Taxon line Network:

- To improve the infrastructure of the collections in order to make the zoological and botanical collections permanent;
- To improve the quality of the collections by identifying more of the as yet unidentified specimens;
- To place on line the primary data of the collections, starting with the type information and including digital imagery;
- To implement a data base of the material in the collections in order to integrate with the SpeciesLink Program of the Reference Center on Environmental Information (CRIA) from Campinas, São Paulo (<http://www.cria.org.br>);
- To increase the geographical representation of the collections by promoting more collecting studies and projects.

Goal of the present proposal:

- To consolidate a cross-cutting line of work on pollinators starting with the material deposited in the Entomological Collection Father Jesus S. Moure belonging to Diptera, Coleoptera and Lepidoptera.

Use, Users and Beneficiaries

The internationally-recognized research quality in the state of Paraná may be measured by the productivity of its researchers and of its masters and doctoral programs. Hundreds of articles are published yearly in national and international scientific journals, along with the many undergraduate monographs and masters and doctoral theses. Researchers from others institutions often visit the collections for study and loan of the material therein. Such collaboration favors the exchange of ideas and knowledge among the interested researchers and their institutions. This interchange also engenders the interest of undergraduate students who often find opportunities for their future as scientists and professors.

The following institutions are among the many, both national and international, that are actively involved in collaboration: 1. Agronomical Institute of Paraná (IAPAR). 2. Botanical Garden of Rio de Janeiro, Rio de Janeiro; 3. Botanical Institute of São Paulo, São Paulo; 4. Brazilian Institute for Farming and Livestock Research (EMBRAPA - in many states); 5. Emilio Goeldi Museum, Belém, Pará; 6 . Faculty of Public Health, University of São Paulo, São Paulo;7 . Federal University of Mato Grosso, Mato Grosso;8. Federal University of Minas Gerais; Minas Gerais; 9. Museum of Zoology at the University of São Paulo (USP), São Paulo;10. National Museum of Rio de Janeiro, Rio de Janeiro; 11. National Research Institute of Amazonia, Manaus;12. Oswaldo Cruz Institute Foundation, Rio de Janeiro; 13. State University at Campinas; São Paulo;14. Zoobotanical Foundation of Rio Grande do Sul, Porto Alegre; **Among the foreign institutions:** 1. Department of Agriculture of Canada, Ottawa; Canadá;_2 . Florida State Collection of Arthropods, Gainesville, Estados Unidos;3 . Instituto de Biologia, Universidade Nacional Autónoma de México, México; 4. Museu de História Natural, Lima, Peru;5 . Museum National d'Histoire Naturelle, Paris, França;6. Royal Botanic Gardens Kew, Inglaterra;7. Smithsonian Institution, Washington, D.C., Estados Unidos; 8. The American Museum of Natural History, Nova Iorque, Estados Unidos;9. The Natural History Museum, Londres, Inglaterra;10. The New York Botanical Garden, Estados Unidos; 11. The University of Oxford, Inglaterra;12. Universidad de Puerto Rico; Porto Rico;13 . Universidad Nacional del Nordeste, Argentina;14 . University Museum of Zoology, Cambridge, Inglaterra;15. University of Florida, Gainesville,

Estados Unidos;16. University of Minnesota, Estados Unidos;17 . Zoologisches Museum der Humboldt Universität, Berlin, Alemanha;

In addition to the above mentioned institutions, various others that are involved in environmental politics have used the collections described herein as a means to gather pertinent information for decision making. Recent examples include: The Red Book of Threatened and Endangered Animals and the constitution for the State Council for Protection of Native Fauna - CONFAUNA, both of which counted on the support of various researchers in biodiversity, including many in the Department of Zoology, Federal University of Paraná and the State University at Londrina. An initiative of the Environmental Institute of Paraná (IAP) of the State Secretariat for the Environment and Water Resources, CONFAUNA's mission is to establish, based on preliminary diagnoses, which questions of state and regional focus will support strategies and protocols for conservation of the native fauna. Such diagnostics will lean heavily on the support provided by the state's zoological collections.

The relationship between biological collections and graduate studies is very useful and brings benefits to both parties. Indeed, many collections began as those of graduate students while carrying out their research, and whose research benefited from the development of the collections. Due to the lack of funding, collections have been supported at times by the resources of the graduate programs, in whose clear interest is the maintenance of the collections. Institutions that have worked in this way include seven graduate programs: Masters and doctoral programs in Zoology and Entomology, Masters programs in Botany and in Ecology and Conservation, all at the UFPR, and Masters in Biology, at the UEL.

Expected results, advances and applications

Since the 1990s, the Internet has become THE means of communication. With surprisingly fast growth, the Internet has provided rapid, inexpensive and easy information access, even in remote areas. This has allowed the use of a variety of services previously unavailable, from entertainment to scientific research. This tool, therefore, has promoted both education and research.

Primary objectives of this project are the computerization of the biological information, and making that information accessible by means of the Internet. Through these objectives, other subsidiary benefits will accrue for society in general. For example, studies of ecological processes of plants and animals that may benefit conservation will be possible through the information of distribution and abundance provided by the collections. The definition of conservation units as state or federal reserves will also benefit from these data, with associated advances in conservation politics. With easy Internet access, information from these collections can benefit the community as a whole.

As society comes in contact with refined biological information of the collections, dynamically available via the Internet, the biological vision of that society will become more refined and better informed. Thus, the museums will become more than just a place to deposit dried specimens, they will become dynamic centers of learning and of understanding of the great diversity of life that characterizes the state and the country.

Immediate return from this program will include the recognition of institutions of education and research as participants in conservation and education. Also, the public and scientific image of this program and associated institutions will become that of active participation in the scientific and technological development of the

country, as well as their active role of informing and influencing the questions that are important for the preservation of the environment and for the well-being of man in Brazil.

The following is a list of anticipated results: • A modern, effective infrastructure that is capable of maintaining the collections in a manner that respects their quality and value; • An online, in real time, exchange of data and images that minimizes the use of the less secure mail system; • The uploading of research data in real time, in a database that may be accessed by various users; • Promote the instantaneous access of all the information contained within the collections, both general and regional; • Storage of the collection database in a secure digital system (DVDs); • Greater security and longevity of the collected material by minimizing its manipulation; • Immediate recovery of the information contained in the specimen labels, much of which is outdated; • Printing, in an orderly and logical pattern, of all the information within the specimen registry books, as well as updating those registries; • Printing of standardized specimen labels; • Greater use of the Internet to communicate the benefits and use of this institution; • Through the visitation and use of the web pages of the collections, finding the resources necessary for the maintenance of the collections will be made easier by means of partnerships and though the communication of information about supporting institutions.

Information to be released belonging to the target families of Entomological Collection Father Jesus Santiago Moure

Taxon	Number of specimens in the collection	Number of species to be on line in one year	Distributional Range	Researcher Responsible
Syrphidae (Diptera)	Approximately 10,000	10,000	Brasil	Luciane Marinoni
Curculionidae (Coleoptera)	Approximately 70,000	20,000	Brasil	Germano Rosado Neto
Nitidulidae (Coleoptera)	Approximately 8,000	8,000	Brasil	Germano Rosado Neto
Sphingidae (Lepidoptera)	Approximately 6,500	6,500	Paraná	Luciane Marinoni
Erotylidae (Coleoptera)	Approximately 20,000	20,000	Brasil	Germano Rosado Neto
Total Information		64,500		

Chronogram of the activities

	Month 01-03	Month 04-06	Month 07-09	Month 10-12
Digitization of the information on the labels of the species identified of the target families	X	X	X	X
Organization of the material at the collection without identification	X	X		
Identification of the specimens belonging to the target families without previous identification			X	X

Project budget

The project Taxon line – network of biological collections in Paraná State started in January 2006 with Federal Financial support from the **Ministry of Science and Technology** of R\$ 724.000,00 (315,000.00 US dollars). At that time 9 collections were part of the Project.

In 2007 the project received R\$ 500.000,00 (217,000.00 US dollars) more from the **Secretary of Science and Technology of the State** to add six collections to the project. Nowadays, 18 collections are part of the project.

The resources were invested mainly in infrastructure of the collections. The infrastructure of informatics is appropriate to the present proposal. In this way, computers and servers are already bought being considered here as matching funds.

Item	IABIN	"Matching funds"		Total
Equipment		15,000.00 (computers and server)		15,000.00
		2,000.00 (printers)		2,000.00
		10,000.00 (microscope)		10,000.00
Consultant				
Non-consultant technical services	500.00 – 5% of the total amount (contractual expenditures)			500.00
Operating Costs	1,566.00 x 4 (fellowships for digitization) = 6,264.00			6,264.00
	1,700.00 (air tickets, meals and hotel) – for the specialist come to the collection to identify the Nitidulidae species			1,700.00
	1,500.00 (Informatics consultation)			2,000.00
		20,000.00 (Project administration)		20,000.00
Total	9,924.00	47,000.00		56,924.00