PROJETO FLORA AMAZÔNICA: EIGHT YEARS OF BINATIONAL BOTANICAL EXPEDITIONS

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SUMMARY

*A review of the history and results of the first eight years of fieldwork of Projeto Flora Amazônica is given. This binational plant collecting program, sponsored by the Conselho Nacional de Desenvolvimento Científico e Tecnológico and the National Science Foundation, has mounted 25 expeditions to many parts of Brazilian Amazonia. Expeditions have visited both areas threatened with destruction of the forest and remote areas previously unknown botanically. The results have included the collection of 32,976 numbers of vascular plants, 16,482 of cryptogams, as well as quantitative inventory of 18.67 hectares of forest with the collection of 7,294*** numbers of sterile voucher collections. The non-inventory collections have been made in replicate sets of 10-13 where possible and divided equally between Brazilian and U.S. institutions. To date, 55 botanists from many different institutions and with many different specialities have taken part with 36 different Brazilian botanists. The resulting herbarium material is just beginning to be worked up and many new species have been collected as well as many interesting range extensions and extra material of many rare species.*

INTRODUCTION AND HISTORY OF THE PROGRAM

After eight years of intensive fieldwork in Brazilian Amazonia, the series of papers in this volume seek to present some of the results of the Brazilian - U.S. collaborative program entitled Projeto Flora Amazônica. In this paper we give a general overview of the U.S. side of the program and of the overall results. Some specific results which have not been published so far are given in the papers which follow.

Programa Flora is a special program of the Brazilian National Research Council (Conselho Nacional de Desenvolvimento Científico e Tecnológico - CNPq) that was

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*** See note to Table 2

conceived and planned in 1975. The program officially began in 1976, and fieldwork commenced in mid-1977.

The main aim of Programa Flora was to accelerate the gathering of information about the plants of all taxonomic groups in all ecosystems of Brazil with an emphasis on their value as natural resources for the future. The original program had four principal objectives:

1. To produce as complete an inventory as possible of the plant resources of Brazil.

2. To make the data gathered available in an easily accessible form so that it can be used for the social and economic benefit of mankind.

3. To establish regional research centers throughout Brazil competent to carry out the inventory on a local basis, in preparation for work on economic uses of plants, ecological problems, and conservation of the environment.

4. To stimulate the education and training of Brazilian botanists, especially in plant systematics and data management, through graduate courses and short-term training programs.

Programa Flora was considered a prerequisite for a more rational management of the plant resources of Brazil, for determining the economic uses of plants, for siting of new highways, for the establishment of agricultural priorities, etc. The program, therefore, had a definite economic emphasis and its promotional literature stressed both economic botany and conservation.

Because of the enormous size of Brazil, Programa Flora was divided into five regional projects: Projeto Flora Amazônica, Projeto Flora Nordeste, Projeto Flora Centro-Oeste, Projeto Flora Sudeste and Projeto Flora Sul.

These areas represent the five major geographic divisions of Brazil which fortunately correspond reasonably well with phytogeographic regions. Programa Flora started with Projeto Flora Amazônica, which covers the largest and least known part of the Brazilian territory. The other regional projects are also in progress and considerable work has been done in northeastern and central Brazil. This paper is concerned only with Projeto Flora Amazônica with which we have been involved.

Each individual project has three areas of emphasis:

1. Herbaria: Specimen label data are being gathered from all Brazilian herbaria and put into machine-readable form. This is finished in the Amazonian herbaria at Belém and Manaus and in several other Brazilian herbaria.

2. Libraries: An inventory of library resources referring to the Brazilian flora was planned for Brazilian and foreign libraries, but has not been implemented as part of the program.

3. Fieldwork: Intensive botanical collecting is carried out especially in little-known areas and in areas threatened by development projects such as roads, mining projects and dams. It is in this part and also in education that the U.S. collaboration has been most developed, and this paper seeks to summarize the results

of such collaboration.

The Program emphasizes botanical inventory and the establishment of data banks. It does not plan to publish a flora of Brazil, although checklists and many other uses and products of the data bank are possible.

Programa Flora is coordinated in Brasília by the CNPq. Projeto Flora Amazônica was initiated in January 1976. Data-gathering from herbarium labels in the Amazonian herbaria is complete, and several new botanists have been trained in Belém and Manaus. Most of the trainee botanists have taken part in the expeditions. These botanists also helped to extract label data from the herbaria of INPA in Manaus and IAN and MG in Belém and now are involved in fieldwork and collection of new data. Data-gathering at the Brasília herbarium is also complete and work is underway in some other herbaria.

Data gathered from the five regional projects are sent to a central organization, the Data Processing Center, organized by the CNPq. This center receives data which is transferred to a machine-readable form ultimately intended for a data bank for manipulation and processing by computers. The TAXIR information retrieval system was mounted in Brasília by Dr. George Estabrook of the University of Michigan. The construction and maintenance of the data bank was contracted to SERPRO (Serviço Federal de Processamento de Dados), the federal government data-processing service, and SERPRO produced the data-gathering form which is being used.

Recently the central organization of the program has slowed down, but the field activities of the Instituto Nacional de Pesquisas da Amazônia (INPA) in Manaus and the Museu Paraense Emílio Goeldi in Belém have continued. The program works closely with these two institutions, and it is their staff and students who comprise most of the Brazilian participants in the field expeditions. Arrangements are currently being made to run the computer data for the Manaus and Belém herbaria on their local computers.

The Brazilian organizers of Programa Flora solicited international cooperation in order to obtain data about earlier collections of Brazilian plants, to obtain assistance in the training of personnel, and expertise on computers. Programa Flora organizers were put in touch with the U.S. botanical community by the U.S. National Academy of Sciences, which sponsored an initial meeting in Brasília. This meeting, held in April 1976, paved the way for U.S.-Brazilian cooperation in Projeto Flora Amazônica. The United States was represented at the meeting in Brasília by Dr. Jean H. Langenheim (Chairperson), Dr. Richard S. Cowan, Dr. George Estabrook, Dr. Ghillean T. Prance and Mr. Wesley Copeland (NAS). In meetings involving U.S. botanists it was apparent that the United States is mainly interested in the collection of new data through participation in Projeto Flora expeditions. In return they are able to participate in the other aspects of international cooperation requested by the Brazilians. The Brasília meeting suggested that the best way to cooperate was through a series of international collecting expeditions with an equal number of botanists from each nation. Certain areas of high priority were chosen for collecting, in which expeditions have since taken place.

As a result of the meetings in Brasília, the United States began collaborating on the computer aspects of Programa Flora with the four month visit of Brazilians Cláudio P. Spiguel and Edson J. Barbosa to the United States to gather information for Programa Flora. They studied the SELGEM system of the Smithsonian Institution and the TAXIR system of the University of Colorado. Collaboration with the University of Michigan Computing Center was also initiated, and Dr. R. C. Brill introduced the Brazilians to the MTS Computer Terminal System. The Rockefeller Foundation made a small grant to Dr. Robert Bartels, Director of the University of Michigan Computing Center, to pay for release time and airfare to send Dr. Brill to visit Brazil to help with the installation of MTS in that country. Dr. Brill and Dr. Estabrook made their trips to Brazil and mounted the entire system in Brasília in February and March 1978, and Dr. Spiguel studied for his Ph.D. at Michigan.

United States participation in the fieldwork began in October 1977 with two international field teams. Since then a succession of expeditions has taken place, the details of which are reported below. The U.S. side of the work has been supported by two grants from the Cooperative Science Program in Latin America of the National Science Foundation made to the New York Botanical Garden (Grants INT77-17704 and INT78-23341), and by two from Systematic Biology (Grants DEB8106632 and BSR8409536).

In the United States, the National Academy of Sciences did much of the initial organizing and planning. Later the U.S. side of Programa Flora was organized directly between the International Office of the National Science Foundation and the U.S. botanical community. Programa Flora is a program designed to stimulate progress in Amazonian systematic and economic botany through collecting, training, and greater use of already available data. It came at a critical time in the history and development of the region. The botanical community of the world and especially that of Brazil is fortunate that the Brazilian Government was wise enough to include such an investment in botany as part of its new focus on Amazônia. Because future development inevitably means further destruction of the natural vegetation of Amazônia, it is of vital importance to document the botany of the region in order to help guide the conservation of its areas of greatest diversity. Projeto Flora Amazônica was planned to achieve these goals. Because of the shortage of Brazilian botanists and financial resources at the start of the program, foreign assistance was necessary. Through international collaboration the project also afforded a unique opportunity to the systematic botany community of the United States.

During the initial planning stages of the U.S. side of Programa Flora by the National Academy of Sciences, a preliminary questionnaire was sent to 36 botanical institutions in the country soliciting names of interested persons and information about the specimen needs of each institution. The responses from 28 institutions showed great interest in both participation in fieldwork and receipt of specimens. Specimen distribution within the U.S. was based on information received subsequently from various herbarium directors, department chairmen, and tropical botanists. A second

questionnaire was mailed in 1984 to update information about potential participants and the distribution of material.

After nearly a year of discussions within the United States, during which time the Brazilians developed the framework for Programa Flora, the National Science Foundation called a meeting of 20 U.S. botanists in January 1977 to discuss the best way for U.S. botanists to participate in the Program. At the meeting in January 1977 an Advisory Committee was set up to guide and assist the U.S. involvement in Programa Flora. The Committee consisted of the following members:

Ghillean T. Prance, Chairman, New York Botanical Garden
William R. Anderson, The University of Michigan
Marshall R. Crosby, Missouri Botanical Garden
George Estabrook, The University of Michigan
Jean Langenheim, University of California, Santa Cruz
Lorin I. Nevling, Field Museum of Natural History, Chicago
Rolla M. Tryon, Gray Herbarium, Harvard University
Dieter Wasshausen, Smithsonian Institution

The function of this Committee is to ensure adequate representation of the U.S. systematic botany community in the Project, to control the deposit of the resultant collections in the appropriate U.S. Herbaria, to offer guidance in the preparation of grant proposals and to oversee U.S. interests in Programa Flora. The Committee has met once a year since its formation. Timothy Plowman of the Field Museum of Natural History in Chicago was later added to the above Committee and began to act as Assistant Coordinator of the Project. He has also been co-leader of two of the expeditions.

Fieldwork is carried out in accordance with the terms of a Memorandum of Understanding worked out between the U.S. side and the Brazilians which is basically an agreement to collect in accordance with Brazilian laws governing expeditions and to ensure that the program is binational in every way possible.

EXPEDITION RESULTS (1977-1984)

Listed below is a summary of the results and the participation in the 25 expeditions which the project has organized from 1977-1984. Figure 1 shows the localities of these expeditions, and the rest of the results are summarized in Tables 1-5.

A. Expeditions

Table 1. Summary of Expeditions 1-25 (Phase I-III)

1-4. PHASE I (Grant NSF INT77-17704)

Expedition 1 (Oct - Nov 1977)

U.S. participants:	Kent P. Dumont, New York Botanical Garden, Mycologist; David R. Hosford, Central Washington State University, Mycologist; Gary J. Samuels, DSIR, New Zealand, Mycologist; William C. Steward, New York Botanical Garden, Vascular Plants; William R. Buck, University of Michigan, Vascular Plants, Bryologist	
Brazilian participants:	Izonete de J. Araújo, INPA, Leader, Mycologist; João Bernardi, INPA, Mycologist; Maria Alves de Souza, INPA, Mycologist	
Itinerary:	Amazonas and Roraima: Manaus - Venezuela highway	
Collections:	Fungi - U.S. Collections	1029 numbers
	Brazilian Collections	900 numbers
	Bryophytes	257 numbers
	Vascular Plants	250 numbers

Expedition 2 (Oct - Dec 1977)

U.S. participants:	Ghillean T. Prance, New York Botanical Garden, Vascular Plants; Bruce W. Nelson, University of Maine, Vascular Plants; Michael J. Balick, Botanical Museum, Harvard University, Vascular Plants	
Brazilian and foreign participants	Antonio Sérgio Silva, MPEG, Leader, Vascular Plants; C. C. Berg, Botanical Museum, Utrecht, Netherlands, Vascular Plants	
Itinerary:	Pará: Serra dos Carajás, Transamazon Highway, Tucuruí, Serra do Cachimbo, Santarém-Cuiabá Highway	
Collections:	Vascular Plants - U.S. Collections	1533 numbers
	Brazilian Collection	288 numbers
	Palms M.J. Balick Collection	100 numbers

Expedition 3 (Jan - Feb 1978)

U.S. participants:	William C. Steward, New York Botanical Garden, Vascular Plants; Marie L. Farr, USDA, Mycologist; George Rogers, University of Michigan, Vascular Plants	
Brazilian participants:	Izonete de J. Araújo, INPA, Mycologist	
Itinerary:	Amazonas: Rio Negro from Manaus to Camanaus	
Collections:	Fungi - U.S. Collections	239 numbers
	Brazilian Collections	300 numbers
	Vascular Plants - U.S. Collections	300 numbers
	Brazilian Collections	250 numbers

Expedition 4 (Jan - Apr 1978)

U.S. participants:	William R. Anderson, University of Michigan, Vascular Plants; William D. Reese, University of Southwestern Louisiana, Bryologist; Gordon D. McPherson, University of Michigan,	

	Vascular Plants	
Brazilian participants:	Byron W. P. de Albuquerque, INPA, Leader - first part, Vascular Plants; João U. M. dos Santos, MPEG, Leader, second part, Vascular Plants	
Itinerary:	Amazonas (Humaitã), Rondônia, Acre: Serra dos Pacaas Novos, Guajará-Mirim, Rio Branco	
Collections:	Cryptogams, mainly bryophytes	1000 numbers
	Vascular Plants - U.S. Collections	550 numbers
	Brazilian Collections	306 numbers

5-13. PHASE II (on NSF Grant INT78-23341)

Expedition 5 (Jun - Sep 1979)

U.S. participants:	William R. Buck, New York Botanical Garden, Bryophytes; Rudolph M. Schuster, University of Massachusetts, Bryophytes; Jackie M. Poole, University of Texas, Austin, Vascular Plants; Bruce W. Nelson, Projeto Flora, Manaus (NYBG)	
Brazilian participants:	Olga Yano, Inst. Botânica de São Paulo, Rio Negro portion, Bryologist; Lucia Alencar, Rio Negro part, INPA, Vascular Plants; Fernando Almeida, Balbina part, INPA, Vascular Plants; C. A. Cid Ferreira, Balbina part, INPA, Vascular Plants	
Itinerary:	Amazonas: Rio Negro and Serra Curicuriari, Rio Uatumã, Balbina dam to Pitinga	
Collections:	Bryophytes and Lichens - U.S. Collections	2279 numbers
	Brazilian Collections	727 numbers
	Vascular Plants - U.S. Collections	541 numbers
	Brazilian Collections	1795 numbers

Expedition 6 (Sep - Dec 1979)

U.S. participants:	James Zarucchi, Botanical Museum, Harvard Univ., Vascular Plants; Ronald W. Peterson, University of Tennessee, Mycologist; Bruce W. Nelson, Projeto Flora, Manaus (NYBG)	
Brazilian participants:	Maria das Graças G. Vieira, INPA, Leader, Vascular Plants	
Itinerary:	Amazonas: Manaus-Porto Velho highway. Rondônia: Porto Velho/Cuiabá highway, Chapada dos Parecis	
Collections:	Vascular Plants - U.S. Collections	460 numbers
	Brazilian Collections	780 numbers
	Fungi	300 numbers

Expedition 7 (Sep - Dec 1979)

U.S. participants:	Daniel F. Austin, Florida Atlantic Univ., Vascular Plants; Clifton Nauman, Florida Atlantic University, Ferns	
Brazilian participants:	Benedito V. Rabelo, Museu Ângelo Moreira da Costa Lima, Vascular Plants; Ricardo de S. Secco, MPEG, Leader, Vascular	

	Plants	
Itinerary:	Território Federal do Amapá: Macapá to Oiapoque	
Collections:	Vascular Plants	514 numbers

Expedition 8 (Jan - Apr 1980)

U.S. participants:	Gerritt Davidse, Missouri Botanical Garden, Vascular Plants; Timothy Plowman, Field Museum, Chicago, Vascular Plants	
Brazilian participants:	Nelson A. Rosa, MPEG, Leader, Vascular Plants	
Itinerary:	Pará, Maranhão, Goiás: Tucuruí, Imperatriz, Estreito Region	
Collections:	Vascular Plants	2505 numbers

Expedition 9 (Jun - Aug 1980)

U.S. participants:	Don Reynolds, Los Angeles County Museum, Mycologist; Christopher Davidson, Los Angeles County Museum, Vascular Plants	
Brazilian participants:	C. A. Cid Ferreira, INPA, Vascular Plants; Vera Lucia Bononi, SP, Mycologist; Gustavo Martinelli, RB, Vascular Plants	
Itinerary:	Pará: Rio Trombetas and Rio Paru de Oeste	
Collections:	Vascular Plants - U.S. Collections	742 numbers
	Brazilian Collections	2165 numbers
	Fungi - U.S. Collections	1008 numbers
	Brazilian Collections	1000 numbers

Expedition 10 (Sep - Dec 1980)

U.S. participants:	Ghillean T. Prance, New York Botanical Garden, Vascular Plants; Douglas Daly, New York Botanical Garden, Vascular Plants; David Campbell, John Hopkins University, Vascular Plants	
Brazilian participants:	Antonio Sérgio Silva, MPEG, Leader, Vascular Plants; Ubirajara N. Maciel, MPEG, wood anatomist; Milton G. da Silva, MPEG, Xingu part only	
Itinerary:	Maranhão: Amazon transition region; Pará: Rio Xingu, Altamira	
Collections:	Vascular Plants	1500 numbers
	Inventory of three hectares of forest on terra firme and 0.5 ha. of várzea with 1,800 voucher collections	

Expedition 11 (Sep - Dec 1980)

U.S. participants:	Bruce W. Nelson, Projeto Flora, Manaus (NYBG), Vascular Plants; Bernard Lowy, University of Louisiana, Mycologist; Stewart Lowrie, University of Michigan, Vascular Plants	
Brazilian participants:	C. A. Cid Ferreira, INPA, Vascular Plants; leader, Dionísio F. Coelho, INPA, Vascular Plants	
Itinerary:	Amazonas, Acre: Sena Madureira, Rio Branco to Brasileia	
Collections:	Vascular Plants	1724 numbers

	Fungi	1015 numbers
Expedition 12 (Apr - Jun 1981)		
U.S. participants:	Jeremy J. Strudwick, New York Botanical Garden, Vascular Plants; Gail L. Sobel, New York Botanical Garden, Vascular Plants; Bruce W. Nelson, Projeto Flora (NYBG), Manaus, Vascular Plants	
Brazilian participants:	Jacques I. Jangoux, MPEG, Leader, Vascular Plants	
Itinerary:	Pará: Rio Maicuru, Rio Curuá, North of Alenquer	
Collections:	Vascular Plants	1743 numbers
Expedition 13 (Oct - Nov 1981)		
U.S. participants:	Michael J. Balick, New York Botanical Garden, Palms	
Brazilian participants:	Jacques I. Jangoux, MPEG, Leader, Vascular Plants; Nelson A. Rosa, MPEG, Vascular Plants; Anthony B. Anderson, MPEG, Palms	
Itinerary:	Pará: Bragança, Itupiranga; Goiás: Tocantinópolis; Maranhão: Carolina, Balsas; Piauí: Teresina	
Collections:	Vascular Plants (including 54 palms)	215 numbers
	Germ plasm of 140 **Orbignya** palms for CENARGEN	

PHASE III (On NSF Grant DEB8106632)

Expedition 14 (Oct - Dec 1981)		
U.S. participants:	Douglas C. Daly, New York Botanical Garden, Vascular Plants; Ricardo Callejas, New York Botanical Garden, Vascular Plants; Elizabeth L. Taylor, Botanical Museum, Harvard University, Vascular Plants	
Brazilian participants:	Milton G. da Silva, MPEG, Leader, Vascular Plants	
Itinerary:	Pará: Tucuruí dam, Marabá, Serra dos Carajás	
Collections:	Vascular Plants	1060 numbers
	Quantitative inventory of 2 hectares of forest including 798 voucher specimens	
Expedition 15 (May - July 1982)		
U.S. participants:	Calvin R. Sperling, Gray Herbarium, Harvard University, Vascular Plants; Martha Condon, University of Texas, Austin, Vascular Plants	
Brazilian participants:	Ricardo de S. Secco, MPEG, Vascular Plants; Nelson A. Rosa, MPEG, Vascular Plants; Antonio de Lima Mesquita, UTAM, Vascular Plants	
Itinerary:	Pará: Serra dos Carajás	
Collections:		1131 numbers
Expedition 16 (May - Jun 1982)		
U.S. participants:	Allan J. Fife, University of Michigan, Bryophytes; Kenneth MacFarland, University of Tennessee, Bryophytes; Bruce W.	

	Nelson, Projeto Flora, Manaus (NYBG)	
Brazilian participant:	L. O. Adão Teixeira, INPA, Vascular Plants	
Itinerary:	Amazonas: Humaitá, Porto Velho, Transamazon highway; Rondônia: Rio Alto Candeias	
Collections:	Vascular Plants	1302 numbers
	Bryophytes	732 numbers
Expedition 17 (Nov - Dec 1982)		
U.S. participants:	Timothy Plowman, Field Museum, Chicago, Vascular Plants; E. Wade Davis, Botanical Museum, Harvard University, Vascular Plants	
Brazilian participants:	Iêda Leão do Amaral, INPA, Vascular Plants; C. A. Cid Ferreira, INPA, Vascular Plants	
Itinerary:	Amazonas: Rio Solimões, Tefé, Rio Japurá	
Collections:	Vascular Plants	2104 numbers
	Wood Collections	247 numbers
Expedition 18 (Jan - Apr 1983)		
U.S. participants:	Elizabeth L. Taylor, Botanical Museum, Harvard University, Vascular Plants; Timothy Rebbeck, Northwestern University, Vascular Plants; George Schatz, University of Wisconsin, Vascular Plants	
Brazilian participants:	Milton G. da Silva, MPEG, Vascular Plants; J. F. da Silva, Orchidaceae; Nelson A. Rosa, MPEG, Vascular Plants; João Ubiratan M. dos Santos, Leader, MPEG, Asteraceae; Manoela F. F. da Silva, MPEG, Litter/Nutrient recycling, Leader; R. Vilhena, MPEG, Leader, Anatomy; M. G. A. Lobo, MPEG, Leader, Vascular Plants	
Itinerary:	Maranhão and Southern Pará	
Collections:	Vascular Plants	1025 numbers
Expedition 19 (Apr - May 1983)		
U.S. participants:	William D. Reese, University of Southwestern Louisiana, Bryophytes; Martyn J. Dibben, Milwaukee Public Museum, Lichens; Lois Brako, New York Botanical Garden, Lichens	
Brazilian participants:	Osmarino P. Monteiro, INPA, Vascular Plants; Iêda Leão do Amaral, INPA, Leader, Vascular Plants; Maria Naélia Silva, INPA, Vascular Plants	
Itinerary:	Pará: Serra do Cachimbo, Santarém-Cuiabá highway	
Collections:	Vascular Plants	1027 numbers
	Bryophytes	860 numbers
	Lichens and Fungi	1913 numbers
Expedition 20 (Jun - Aug 1983)		
U.S. participants:	Steven R. Hill, University of Maryland, Vascular Plants;	

	Carol A. Todzia, University of Texas, Vascular Plants; James L. Zarucchi, Missouri Botanical Garden, Vascular Plants; Bruce W. Nelson, Projeto Flora, Manaus (NYBG)	
Brazilian participants:	C. A. Cid Ferreira, INPA, Vascular Plants, Leader	
Itinerary:	Amazonas: Maués and Borba, Rios Canumã, Abacaxis, Parauari, Urupadi, Maués	
Collections:	Vascular Plants	1488 numbers
	Bryophytes and Lichens	30 numbers

Expedition 21 (Jul - Oct 1983)

U.S. participants:	Scott A. Mori, New York Botanical Garden, Vascular Plants; Douglas C. Daly, New York Botanical Garden, Vascular Plants; David G. Campbell, New York Botanical Garden, Vascular Plants	
Brazilian participants:	Benedito V. Rabelo, Museu Ângelo Moreira da Costa Lima , Leader, Vascular Plants; Milton G. da Silva, MPEG, Vascular Plants	
Itinerary:	Amapá: Rio Falsino, Macapá and Camaipi	
Collections:	Quantitative inventory of five hectares of forest with trees permanently marked with aluminum tags.	2600
	Vascular Plants	2213 numbers

Expedition 22 (Jan - Mar 1984)

U.S. participants:	Ghillean T. Prance, New York Botanical Garden, Vascular Plants; John J. Pipoly, New York Botanical Garden, Vascular Plants; Gary T. Samuels, DSIR, New Zealand, Mycologist ; Alan Cress, University of Maryland, Vascular Plants	
Brazilian participants:	Iêda Leão do Amaral, INPA, Leader, Vascular Plants; Aldalea Sprada Tavares, INPA, Vascular Plants; Luiz Antonio Cisneros, INPA, Lichens; José Mauro de Souza Miralha, INPA, Vascular Plants; William Antonio Rodrigues, INPA, Vascular Plants; Milton Gonçalves da Silva, MPEG, Vascular Plants	
	In addition this expedition was joined by four members of the Southampton University Expedition to Brazil: Steven R. Bowles, Edward J. Cooper, Ian D. Dunn and J. Treive Nicolas.	
Itinerary:	Terr. Roraima: Vicinity of Igarapé Repartimento de Ajarani; Amazonas: Pico Rondon, Serra Aracá and vicinity	
Collections:	Vascular Plants - U.S. Collections	904 numbers
	Brazilian Collections	826 numbers
	Lichen & Fungi	1210 numbers
	Quantitative inventories of four hectares of lowland forest types in the foothills of Serra Aracá and 1181 sterile voucher collections.	

Expedition 23 (May 1984)

U.S. participants:	Roger Goos, University of Rhode Island, Vascular Plants; Carl Taylor, Milwaukee Public Museum, Vascular Plants; Dawn Frame, New York Botanical Garden, Vascular Plants	
Brazilian participants:	C. A. Cid Ferreira, INPA, Leader, Vascular Plants	
Itinerary:	Rondônia: Porto Velho-Vilhena highway and laterals; Chapada dos Parecis, Ariquemes	
Collections:	Vascular Plants	968 numbers
	Fungi & Lichens	204 numbers

This expedition was shortened due to permit problems and consequently collected fewer plants than most.

Expedition 24 (Sep - Oct 1984)

U.S. participants:	David G. Campbell, New York Botanical Garden, Vascular Plants; William Balée, New York Botanical Garden, Inventory; Patricia Archibald, Slippery Rock College, Pennsylvania, Algae; Florence Nishida, Los Angeles County Museum, Fungi	
Brazilian participants:	C. A. Cid Ferreira, INPA, Vascular Plants; Arito Rosas Jr., Universidade Federal do Acre	
Itinerary:	Acre: Vicinity of Cruzeiro do Sul, Rio Moa, Serra do Divisor	
Collections:	Vascular Plants	267 numbers
	Fungi	488 numbers
	Algae:	1000 (estimate of number of unialgal isolates to be derived from litter & humus samples)
	Inventory:	3.0 ha (1833 tagged & numered; not all of these are vouchered)

Expedition 25 (Sep - Nov 1984)

U.S. participants:	Jeremy Strudwick, New York Botanical Garden, Palms; Gail Sobel, New York Botanical Garden, Vascular Plants	
Brazilian participants:	Anthony B. Anderson, MPEG, Leader, Palms; Maria das Graças Pinto, UFPA, Euterpe	
Itinerary:	Pará: Ilha de Marajó, Anajás, Boa Vista, Breves; Ilha das Onças	
Collections:	Vascular Plants	400 (including 28 palms)
	Inventory	1.17 ha (182 sterile vouchers)

This expedition emphasized ethnoecological and pollination studies of Euterpe sp. (Açaí).

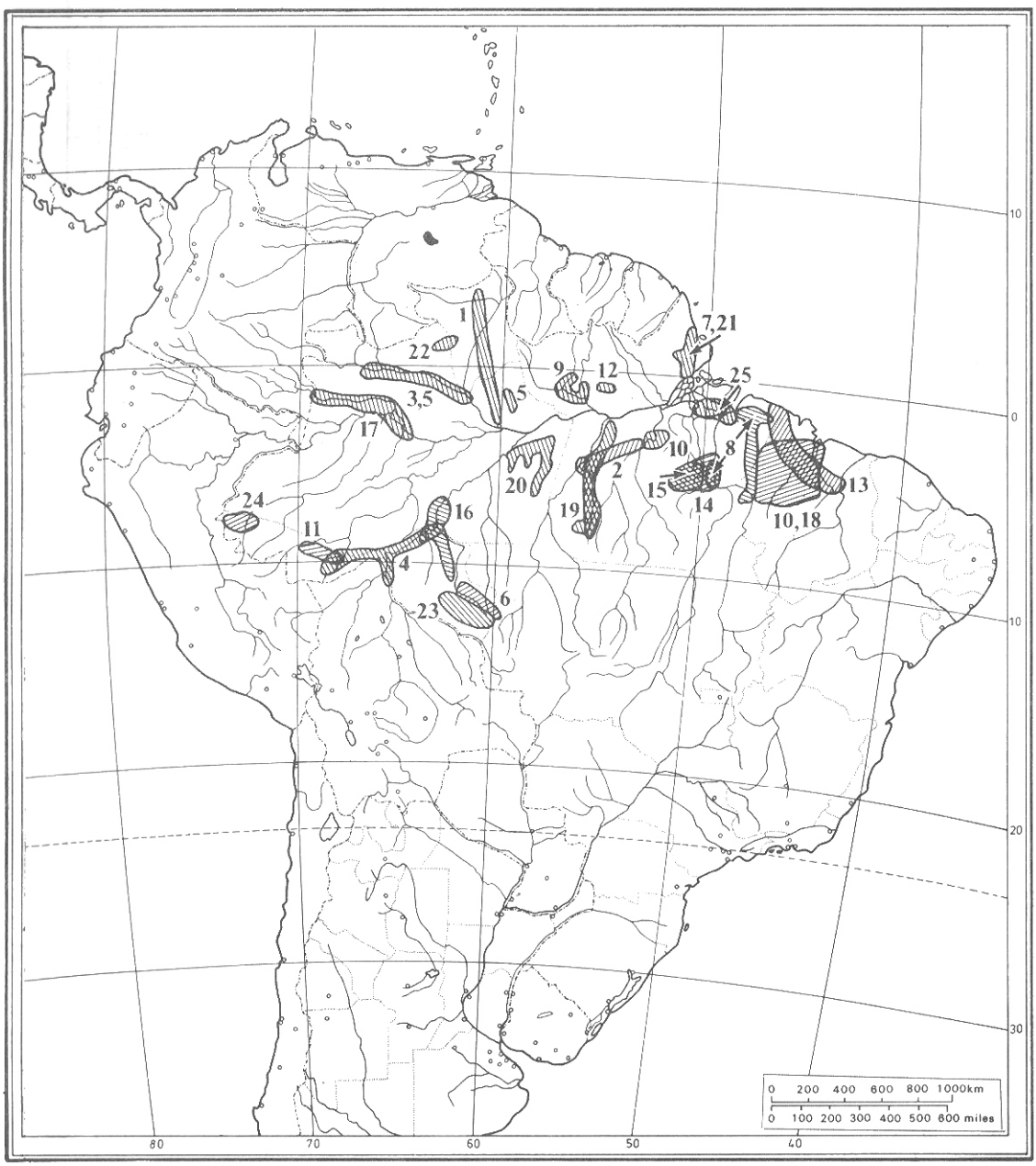

Fig 1. Map of the localities visited by expeditions 1-24 of Projeto Flora Amazônica as described in the text.

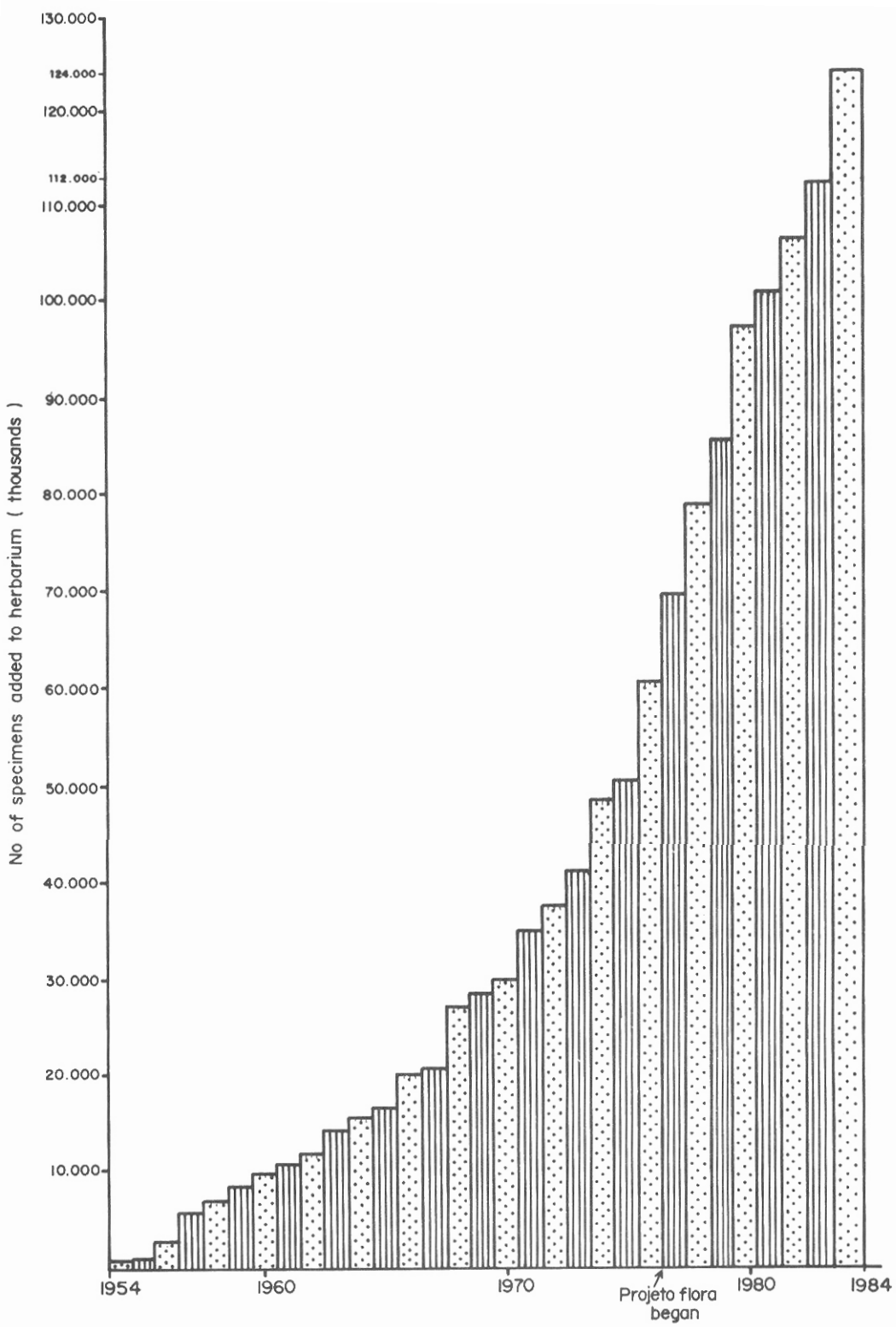

Fig. 2. Bar graph showing growth of the INPA herbarium from its foundation to 1984.

Table 2. Summary of collections made on first 25 expeditions

Phase	Expedition	Vascular Plants	Bryophytes	Fungi & Lichens	Forest inventories (sterile vouchers)
I	1.	250	257	1,929	----------
	2.	1,921	-----	-----	----------
	3.	550	-----	539	----------
	4.	856	1,000	-----	----------
II	5.	2,336	3,006 (incl. fungi)	-----	----------
	6.	1,240	-----	300	----------
	7.	514	-----	-----	----------
	8.	2,505	-----	-----	----------
	9.	2,907	-----	2,008	----------
	10.	1,500	-----	-----	3.5 (1800)
	11.	1,724	-----	1.015	----------
	12.	1,743	-----	-----	----------
	13.	215	-----	-----	----------
III	14.	1,060	-----	-----	2.0 (798)
	15.	1,131	-----	-----	----------
	16.	1,302	723	-----	----------
	17.	2,104	-----	-----	----------
	18.	1,025	-----	-----	----------
	19.	1,027	860	1,913	----------
	20.	1,488	-----	30	----------
	21.	2,213	-----	-----	5.0 (1,500)
	22.	1,730	-----	1,210	4.0 (1,181)
	23.	968	-----	204	----------
	24.	267	-----	1,488 (incl. algae)	3.0 (1,833)
	25.	400	-----	-----	1.17 (182)
TOTALS		32,976	5,846	10,636	18.67 ha (7,294 vouchers)

Table 3. Summary of U.S. Expedition Participants Sponsored by the National Science Foundation and their specialties

Participant	Speciality	Affiliation	Expedition
W. R. Anderson	Malpighiaceae	MICH	04
P. Archibald	Algae	Slippery Rock College	24
D. F. Austin	Convolvulaceae	FAU	07
M. J. Balick	Arecaceae	NY	02, 13
W. Balée	Inventory, ethnobotany	NY	24
C. C. Berg	Moraceae	U	02
L. Brako	Lichens	NY	19
W. R. Buck	Bryophytes	NY	01, 05
R. Callejas	Piperaceae	NY	14
D. G. Campbell	Forest Inventory	NY	10, 21, 24
M. Condon	**Gurania** (Cucurbit.)	TEX	15
A. D. Cress	Phanerogams	MARY	22
D. C. Daly	Burseraceae	NY	10, 14, 21
G. Davidse	Poaceae	MO	08
C Davidson	Piperaceae	LAM	09
E. W. Davis	Ethnobotany	ECON	17
M. J. Dibben	Lichens	MIL	19
K. D. Dumont	Mycology	NY	01
P. Dunn	Mycology	USDA	09
M. L. Farr	Mycology	BPI	03
A. J. Fife	Bryophytes	MICH	16
D. Frame	Phanerogams	NY	23
R. Goos	Mycology	U. of Rhode Island	23
S. R. Hill	Malvaceae	MARY	20
D. R. Hosford	Mycology	ELRG	01
S. R. Lowrie	Malpighiaceae	MICH	11
B. Lowy	Mycology	LSUM	11
K. D. MacFarland	Bryology	TENN	16
G. D. McPherson	Phanerogams	MICH	04
S. A. Mori	Lecythidaceae	NY	21
C. Nauman	Phanerogams	FAU	07
B. W. Nelson	Phanerogams	NY	02, 05, 06, 11, 12, 16, 20
F. Nishida	Mycology	LAM	24
R. W. Petersen	Mycology	TENN	06
J. J. Pipoly III	Myrsinaceae	NY	22
T. Plowman	Erythroxylaceae, **Brunfelsia**	F	08, 17

Participant	Speciality	Affiliation	Expedition
J. M. Poole	Nyctaginaceae	TEX	05
G. T. Prance	Lecy., Chrys., Dich., Cary.	NY	02, 10, 22
T. Rebbeck	Ethnobotany	Northwestern U.	18
W. D. Reese	Musci	LAF	04, 19
D. Reynolds	Mycology	LAM	09
G. Rogers	Phanerogams	MICH	03
G. J. Samuels	Mycology	PDD	01, 22
G. E. Schatz	Annonaceae	WIS	18
R. M. Schuster	Hepaticae	MASS	05
G. L. Sobel	Icacinaceae	NY	12, 25
C. R. Sperling	Basellaceae	GH	15
W. C. Steward	Phanerogams	NY	01, 03
J. J. Strudwick	Arecaceae	NY	12, 25
E. L. Taylor	**Sterculia** (Sterc.)	GH	14, 18
W. C. Taylor	Pteridophytes	MIL	23
C. A. Todzia	**Hedyosmum** (Chloran.)	TEX	20
J. L. Zarucchi	Apocynaceae, Legum.	GH, US, MO	06, 20

Table 4. New and recently described species collected on Projeto Flora Amazônica Expeditions 1-14, as of Jan 1, 1983

Expeditions 1 & 3	W. C. Steward - 264 determinations, 2 new species - 0.75%	
88	**Licania stewardii** Prance	G. T. Prance, 1980
--	**Iryanthera campinae** W. Rodrigues	W. A. Rodrigues, 1982
Expedition 2	G. T. Prance - 648 determinations, 13 new taxa - 2.0%	
24727	**Talisia mollis** var. **marleneane** G. G. Neto	G. Guarim Neto, 1979
24825	**Nautilocalyx** sp. nov.	H. Wiehler, 1978
24948	**Miconia** sp. (perhaps undescribed)	J. J. Wurdack, 1978
25047	**Polygala** undescr.	J. J. Wurdack, 1978
25209	**Turnera** sp. nov.	Sarmiento, 1979
25282	**Banisteriopsis cachimbensis** B. Gates	B. Gates, 1979
25419	**Gustavia erythrocarpa** Mori	S. A. Mori, 1978
25539	**Guarea humaitensis** Penn.	T. D. Pennington, 1981
22578	**Trichilia areolata** Penn.	T. D. Pennington, 1981
25652	**Licania anneae** Prance	G. T. Prance, 1979
25747	**Trichilia micropetala** Penn.	T. D. Pennington, 1979
25856	**Trichilia** sp. nov.	T. D. Pennington, 1979
25891	**Memora velutina** Gentry	A. Gentry, 1982
	C. C. Berg - 152 determinations, 1 new species - 0.66%	
454	**Miconia** sp nov.	J. J. Wurdack, 1978
	A. S. Silva - 119 determinations, 2 new species - 1.68%	
121	**Cupania** sp. nov.	R. Liesner, 1981
251	**Monotagma** sp. nov.?	H. Kennedy, 1979
Expedition 4	W. R. Anderson - 257 determinations, 3 new species - 1.1%	
11847, 11915	**Costus** sp. nov. aff. **C. claviger** R. Ben	P. J. Maas, 1980
12071	**Miconia** sp. (undescribed)	J. J. Wurdack, 1979
12144	**Guarea juglandiformis** Penn.	T. D. Pennington, 1979
	J. U. Santos - 159 determinations, 2 species - 1.26%	
23	**Hyptis** sp. nov.	R. M. Harley, 1981
43	**Costus** sp. nov.	P. J. Maas, 1981
	B. Albuquerque - 1 new taxon	
1282	**Cleome spinosa** Jacq. ssp. **longicarpa** Iltis ined.	H. Iltis, 1981
Expedition 5	J. M. Poole - 315 determinations, 1 new species - 0.32%	
2001	**Loreya** n. sp.	J. J. Wurdack, 1979
	L. Alencar - 346 determinations, 2 new species - 0.58%	
358	**Dioclea elliptica** Maxwell ined.	Maxwell, 1982
435	**Buchenavia** sp. nov.?	C. A. Stace, 1981
	C. A. Cid - 500 determinations, 7 new taxa - 1.4%	
158	**Hibiscus** sp. nov.?	P. Fryxell, 1982
261	**Blepharandra heteropetala** W. Anderson	W. R. Anderson, 1982
275	**Siphanthera uatumensis** Wurdack (paratype)	J. J. Wurdack, 1982
648	**Hypolytrum stemonifolium** T. Koyama	T. Koyama, 1983
783	**Trichilia** sp. nov.?	T. D. Pennington, 1982
851	**Securidaca** aff. **longifolia** P. & E. (at least var. distinct)	J. J. Wurdack, 1982
941	**Lecythis barnebyi** Mori	S. Mori, 1981

Expedition 6 J. Zarucchi - 127 determinations, 1 new species - 0.79%

2542 **Dicymbe** sp. nov.? R. S. Cowan, 1982

G. Vieira - 668 determinations, 7 new taxa - 1.05%

185 **Acmanthera minima** W. R. Anderson, 1980
325 **Trichilia** sp. nov. T. D. Pennington, 1981
395 **Costus** sp. nov. P. J. Maas, 1981
429 **Capparis flexuosa** (L.)L. ssp. **amazonica** Iltis ined. J. Iltis, 1981
626 **Miconia** n. sp. aff. M. **puberula** Cogn. J. J. Wurdack, 1980
722 **Guarea** ? sp. nov. T. D. Pennington, 1981
958 **Hyptis** sp. nov. R. Harley, 1981

Expedition 7 D. Austin - 323 determinations, 0 new taxa

Expedition 8 G. Davidse - 305 determinations, 1 new taxa - 0.33%

17961 **Erythroxylum** sp. nov. T. Plowman, 1980

T. Plowman - 1029 determinations, 8 new taxa - 0.78%

8243 **Begonia** sp. nov?
8337 **Cybianthus** subg. **Cybianthus** sp. nov. J. Pipoly, 1982
8795 **Icthyothere davidsei** H. Robinson (paratype) H. Robinson, 1981
9051 **Siparuna** sp. nov. J. Jangoux, 1980
9063 **Apuleia**, prob. sp. nov. R. S. Cowan, 1981
9148 **Stylosanthes** prob. sp. nov. Mannetje, 1982
9164 **Arachis burchellii** Krap. & Greg. ined. A. Krapovickas, 1981
9525 **Amasonia hirta** var. **paraensis** Mold. H. Moldenke, 1981

Expedition 9 G. Davidson - 241 determinations, 0 new taxa

C. A. Cid - 812 determinations, 8 new taxa - 0.98%

1068 **Schickia orinocensis** (HBK) Meissn. ssp. **sylvestris** Maas & Stoel. ined. P. J. Maas, 1981

1419 **Eperua** prob. sp. nov. R. Cowan, 1982
1481 **Petraea longifolia** Mold. H. Moldenke, 1981
1484 **Swartzia** sp. nov. R. Cowan, 1982
1750 **Guarea** sp. nov. T. D. Pennington, 1982
1865 **Arrabidaea lobata** A. Gentry A. Gentry, 1981
2161 **Couepia cidiana** Prance G. T. Prance
2534 **Licania caudata** Prance G. T. Prance

G. Martinelli - 305 determinations, 0 new taxa

Expedition 10 D. Daly - 339 determinations, 3 new taxa - 0.88%

515 **Capparis lineata** Pers. ssp. **glabrescens** Iltis ssp. nov. ined. H. Iltis, 1981
557 **Ephedranthus** sp. nov. J. van Rooden, 1981
695 **Habranthus maranensis** Ravenna sp. nov. P. Ravenna, 1981

G. T. Prance - 85 determinations, 0 new taxa

Expedition 11 S. Lowrie - 363 determinations, 3 new species - 0.83%

320 **Cassia midas** I&B sp. nov. R. Barneby, 1982
438 **Trichilia** sp. nov. T. D. Pennington, 1982
724 **Swartzia** sp. nov. R. Cowan

C. A. Cid - 242 determinations, 0 new taxa

B. Lowy - 3 new species

Dacriopinax maxidorii Lowy B. Lowy, 1981
Two other spp. (undescribed) B. Lowy, 1981

B. Nelson - 132 determinations, 1 new species - 0.76%

388 **Dyckia** sp. nov.? L. B. Smith, 1983

Expedition 14 D. Daly - 330 determinations, 12 new taxa - 3.64%

991	**Pleonotoma** sp. nov.	A. Gentry, 1982
1092	**Erythroxylum tucuruiense** T. Plowman	T. Plowman, 1984
1112	**Davilla** sp. nov.	K. Kubitzki, 1983
1150	**Swartzia** sp. nov.?	R. Cowan, 1983
1341	**Capparis amazonica** Iltis n. sp.	H. Iltis, 1983
1702	**Miconia** sp. aff. M. **heliotropoides** but distinct	J. J. Wurdack, 1983
1716	**Anemopaegma carajasense** A. Gentry	A. Gentry, 1983
1719	**Erythroxylum nelson-rosae** T. Plowman	T. Plowman, 1983
1725	**Erythroxylum** sp. nov. ("pedunculatum")	T. Plowman, 1983
1754	**Mimosa acutistipula** (Mart.) Benth. var. **ferrea** Barneby	
1987	**Dyckia** sp. nov.?	L. B. Smith, 1983

B. Inventory

In addition to the traditional collecting of herbarium material, Phase III has included five expeditions which have carried out quantitative phytosociological inventories of areas of forest. In these areas all trees of 10 cm diameter and above were measured in one hectare or larger plots. Voucher collections were usually made from many trees in the study sites, making accurate specific identification possible so that results will not be based on local names as has been done on most previous tropical forest inventories. Computer programs to analyse the data have been written by Dr. David G. Campbell of the New York Botanical Garden. The results of the 3-1/2 hectare study in the Xingu River area are now completely analyzed and have been submitted for publication. The computer program calculates various measures of frequency and dominance, timber volume, crown area, basal area of tree, etc. as well as plotting graphs such as tree height against tree diameter. The data from the other two inventories will also be analyzed in this way. It is hoped future expeditions will gather further quantitative data.

C. Education

Since training and information exchange are important parts of the Projeto Flora program advanced U.S. expedition participants are expected to give seminars in Manaus or Belém. During the last two years a large number of seminars have been presented on a wide range of topics. In addition, the U.S. coordinator, Ghillean T. Prance has regularly taught courses in Economic Botany in the Manaus graduate program. During the course of the project, Brazilian botanists and students have been offered facilities and assistance for study-visits to the New York Botanical Garden. The following people from the collaborating institutions in Manaus and Belém have visited have visited New York:

Maria Elizabeth van den Berg, Museu Goeldi, Belém: Labiatae, Guttiferae

Germano Guarim Neto, University of Mato Grosso: Sapindaceae

Antonio Mesquita, Technological University of Manaus: Mimosaceae

William A. Rodrigues, INPA, Manaus: Myristicaceae

Ricardo Secco, Museu Goeldi, Belém: Euphorbiaceae

Marlene F. da Silva, INPA, Caesalpiniaceae

João Murça Pires, EMBRAPA, Belém: Quiinaceae, Sapotaceae

Material from U.S. and European herbaria is borrowed by New York to enable Brazilian collaborators to work on the final stages of their monographic work. The results of the study-visit by Dr. M. F. da Silva have already been submitted to Flora Neotropica as a monograph of **Dimorphandra**, which will be published shortly.

E. Publications

Table 5 presents a list of some of the publications which have resulted from the program prior to the present series of papers.

Table 5. Partial list of publications which have resulted directly from work carried out on Projeto Flora Amazônica expeditions

1978 - Prance, G. T. and H. O. R. Schubart. Notes on the vegetation of Amazônia I. A preliminary note on the origin of the open, white-sand campinas of the lower Rio Negro. **Brittonia** 30: 60-63.

1978 - Samuels, G. J. and E. Müller. Life history studies of Brazilian Ascomycetes 1: Two new genera of the Sphaericaceae having, respectively, **Sporoschisma** - like and **Codinaea** anamorphs. **Sydowia, Ann. Mycol.** Ser II. 31: 126-136.

1978 - Samuels, G. J. and E. Müller. Life history studies of Brazilian Ascomycetes 2: A new species of **Thaxteriella** and its helicosporous anamorph. **Sydowia, Ann. Mycol.** Ser II. 31: 137-141.

1978 - Samuels, G. J. and E. Müller. Life history studies of Brazilian Ascomycetes 3: **Melanomma radicans** sp. nov. and its **Aposphaeria** anamorph, **Trematosphaeria perrumpens** sp. nov. and **Berlesiella fungicola** sp. nov. and its **Ramichloridium** anamorph. **Sydowia, Ann. Mycol.** Ser II. 31: 142-156.

1978 - Samuels, G. J. and E. Müller. Life history studies of Brazilian Ascomycetes 4: Three species of **Herpotrichia** and their **Pyrenochaeta**-like anamorphs. **Sydowia, Ann. Mycol.** Ser II. 31: 157-168.

1978 - Samuels, G. J. and E. Müller. Life history studies of Brazilian Ascomycetes 5: Two new species of **Ophiostoma** and their **Sporothrix** anamorphs. **Sydowia, Ann. Mycol.** Ser II. 31: 169-179.

1978 - Samuels, G. J. and E. Müller. Life history studies of Brazilian Ascomycetes 6: Three species of **Tubeufia** with, respectively, dictyosporous/pycnidial and helicosporous anamorphs. **Sydowia, Ann. Mycol.** Ser II. 31: 180-193.

1979 - Keel, S. M. and G. T. Prance. Studies of the vegetation of a white-sand, black -water igapó (Rio Negro, Brasil). **Acta Amazonica**, Manaus, 9(4): 645-655.

1979 - Prance, G. T. New and interesting Chrysobalanaceae. **Acta Amazonica**, Manaus, 8(4): 577-589.

1979 - Prance, G. T. Notes on the vegetation of Amazonia III: The terminology of Amazon forest types subject to inundation. **Brittonia** 31: 26-38.

1979 - Reese, W. D. New records of Calymperaceae in the Americas. **Lindbergia** 5: 96-98.

1979 - Samuels, G. J. and E. Müller. Life history studies of Brazilian Ascomycetes 7: **Rhytidhisteron rufulum** and the genus **Eutryblidiella**. **Sydowia, Ann. Micol. Ser** II. 32. 277-292.

1980 - Anderson, W. R. A new species of **Acmanthera** (Malpighiaceae). **Syst. Bot.** 5: 438-441.

1980 - Buck, W. R. Bryology in Projeto Flora Amazônica. **Taxon** 29 (2/3): 375-376.

1980 - Buck, W. R. and R. A. Pursell. **Fissidens brachypus**: A moss restricted to a freshwater Amazonian sponge. **Amazoniana** 7(1): 81-85.

1980 - Farr, M. L. A new species of **Cryptophiale** from Amazonas. **Mycotaxon** 11: 177 -181.

1980 - Krukoff, B. A. Supplementary notes on the American species of **Strychnos**, XIX, **Phytologia**: 46-74.

1980 - Plowman, T. Letters from Brazil. **Bull. Field. Museum Nat. Hist.** 51: 24-25.

1980 - Prance, G. T. A terminologia dos tipos de florestas amazônicas sujeitas a inundação. **Acta Amazonica**, Manaus, 10: 494-504.

1980 - Reese, W. D. Calymperaceae (Musci) from western Amazonia: Brazil and Bolivia. **The Bryologist** 82: 559-563.

1980 - Samuels, G. J. and E. Müller. Life history studies of Brazilian Ascomycetes 8: **Thamnomyces chordalis** (Anom.: **Nodulisporium**) and **Chamillea bacillum** (Anom.: **Geniculosporium**) with notes on taxonomy of Xylariaceae. **Sydowia, Ann. Mycol.** Ser II. 33: 274-280.

1980 - Samuels, G. J. and E. Müller. Life history studies of Brazilian Ascomycetes 9: **Fluviostroma wrightii** gen. et sp. nov. (Syn. **Sphaerostilbe wrightii** nom illegit.) and its synnematous anamorph (**Stromatostilbella** gen. nov.). **Sydowia, Ann. Mycol.** Ser II. 33: 282-288.

1980 - Zarucchi, J. L. **Ibapichuna**: an edible **Dacryodes** (Burseraceae) from the northwest Amazon. **Bot. Mus. Leaflets.** 28(1): 81-85.

1981 - Austin, D. F. Novidades nas Convolulaceae da flora amazônica. **Acta Amazonica**, Manaus, 11(2): 291-296.

1981 - Lowy, B. A new species of **Dacriopinax** from Brazil. **Mycotaxon** 13. 428-430.

1981 - Prance, G. T. Three new species of **Couratari** (Lecythidaceae). **Brittonia** 31: 15-21

1981 - Rabelo, B. V. Contribuição ao conhecimento do cerrado amapaense. **Programa e Resumos do XXXII Congresso Nacional de Botânica da Sociedade Botânica do Brasil**, p. 58, Teresina, PI.

1981 - Reese, W. D. Refinements on American **Syrropodon** (Musci; Calymperaceae). **Bryologist** 84: 244-248.

1981 - Teixeira, A. R. Proposta a criação de um Instituto Nacional de Ecologia e Conservação da Natureza, a ser sediado em Brasília. **Programa e Resumos do XXXII Congresso Nacional de Botânica da Sociedade Botânica do Brasil**, pp. 66-67, Teresina, PI.

1982 - Austin, D. F. e P. B. Cavalcante. **Convolvuláceas da Amazônia**. Belém, Museu Paraense Emílio Goeldi. 134 p. ilus. (Pub. Avulsas, 36).

1982 - Balick, M. J., A. B. Anderson and M. R. da Silva. Palm Taxonomy in Brazilian Amazonia: the state of systematic collections in regional herbaria. **Brittonia** 34(4): 463-477.

1982 - Cowgill, U. M. and G. T. Prance. Changes in the chemical composition during

the growth stages of **Victoria amazonica** (Poepp.) Sowerby (**V. regia** auctt.) Nymphaeaceae. **Int. Rev. Ges. Hydrobiol.** 67: 234-244.

1982 - Krukoff, B. A. Supplementary notes on American Menispermaceae. XVII. Neotropical Triclisieae and Anomospermeae. **Phytologia** 50(2): 80-111.

1982 - Krukoff, B. A. Supplementary notes on the American species of **Strychnos**, XX. **Phytologia** 50(2): 73-77.

1982 - Nelson, B. W. Polinização de **Byrsonima chrysophylla** (Malpighiaceae). **Resumos do XXXIII Congresso Nacional de Botânica da Sociedade Botânica do Brasil**, p. 164, Maceió, AL.

1982 - Nelson, B. W., C. A. C. Ferreira, S. R. Lowry e B. Lowy. Plantas constituentes do Santo Daime, Colônia Cinco Mil, Acre. **Resumos do XXXIII Congresso Nacional de Botânica da Sociedade Botânica do Brasil**, p. 79, Maceió, AL.

1982 - Prance, G. T. Forest refuges: evidence from woody Angiosperms. pp. 137-157 in G. T. Prance (ed) **Biological Diversification in the Tropics**. Columbia Univ. Press.

1982 - Reynolds, D. **Veralucia**, a new genus of Fungus from Brazil. **Mycologia** 74: 854-857.

1983 - Lleras, E. Situação atual e perspectivas do Babaçu. **Programa e Resumos do XXXIV Congresso Nacional de Botânica da Sociedade Botânica do Brasil**, p. 99, Porto Alegre, RS.

1983 - Plowman, T. Collecting in the Upper Amazon. **Bull. Field Museum Nat. Hist.** 54 (3): 8-13.

1983 - Prance, G. T. Pesquisas botânicas e a conservação da floresta amazônica. **Anais do XXXIV Congresso Nacional de Botânica da Sociedade Botânica do Brasil**, Volume 1 - Simpósios, pp. 63-72, Porto Alegre, RS.

1983 - Prance, G. T. Implicações para a conservação da polinização da "castanha-do-brasil" e espécies aliadas. **Resumos da 35ª Reunião Anual da Sociedade Brasileira para o Progresso da Ciência**, Belém, PA.

1983 - Secco, R. S. e A. L. Mesquita. 1983. Notas sobre a vegetação de canga da Serra Norte - 1. **Bol. Mus. Goeldi, Nov. Ser: Botânica**, Belém (59): 1-13.

1984 - Ferreira, C. A. C., B. W. Nelson, J. L. Zarucchi, S. R. Hill, e C. A. Todzia. Nota sobre a distribuição de **Polygonanthus amazonicus** Ducke (Rhizophoraceae). **Programa e Resumos do XXXV Congresso Nacional de Botânica da Sociedade Botânica do Brasil**, p. 129, Manaus, AM.

1984 - Freitas, J. A. de. Estudo anatômico das madeiras dos gêneros **Anisophylla** R. Brown ex Sabine e **Polygonanthus** Ducke (Rhizophoraceae). **Programa e Resumos do XXXV Congresso Nacional de Botânica da Sociedade Botânica do Brasil**, p. 39, Manaus, AM.

1984 - Pires, J. M. Aspectos da flora da região norte e prioridades para a preservação de germoplasma: Palestra do Simpósio "Ecossistema Amazônico". **Programa e Resumos do XXXV Congresso Nacional de Botânica da Sociedade Botânica do Brasil**, p. 18, Manaus, AM.

1984 - Prance, G. T. Características florísticas da Amazônia: Palestra do Simpósio "Ecossistema Amazônico". **Programa e Resumos do XXXV Congresso Nacional de Botânica da Sociedade Botânica do Brasil**, p. 19, Manaus, AM.

1984 - Prance, G. T. As regiões fitogeográficas dos trópicos da América do Sul. **Programa e Resumos do XXXV Congresso Nacional de Botânica da Sociedade Botânica do Brasil**, p. 151, Manaus, AM.

1984 - Prance, G. T. New taxa of Amazonian Chrysobalanaceae. **Acta Amazonica** 13(1): 21-36, (1983).

1984 - Prance, G. T. 1984. Projeto Flora Expedition to Aracá, Brazil. **Explorers J.** 62: 174-177.

1984 - Samuels, G. J. Fungos toxicogênicos como Ascomicetos. **Programa e Resumos do XXXV Congresso Nacional de Botânica da Sociedade Botânica do Brasil**, p. 75, Manaus, AM.

1984 - Thomas, W. Wayt. A new species of **Simaba** (Simaroubaceae) from Pará with a key to the species north of the Amazon River. **Brittonia** 36(3): 244-247.

1985 - Anderson, A. B., M. J. Balick and C. U. B. Pinheiro. What is Babassu? (in preparation)

1985 - Balick, M. J., C. U. B. Pinheiro and A. B. Anderson. Hybridization in the babassu palm: **Orbignya phalerata** x **O. eichleiri**. (in preparation)

1985 - Balick, M. J., L. Forero, and A. B. Anderson. Hybridization in the babassu palm: **Orbignya phalarata** x **Maxmiliana maripa**. (in preparation)

1985 - Nelson, B. W. and G. T. Prance. Notes on the pollination of **Rhabdodendron macrophyllum** (Spr. ex Benth.) Hub. **Acta Amazonica**, in press.

The above list of some of the publications resulting from Projeto Flora Amazônica is far from complete. In addition to short papers like the above, PFA collections have already been of crucial importance in large monographic works such as the volumes of **Flora Neotropica**. The collections have been frequently used in our phytogeographic studies and for the identification of centers of endemism within Amazônia.

OTHER RESULTS

In addition to the collecting and educational results given above, the project has been able to help Amazonian botany in many other ways. The growth of the regional herbaria has been spectacular as a result of both the binational expeditions and local collecting efforts. As an example, this can be illustrated by Figure 2, the growth of the INPA herbarium in Manaus. Apart from such growth at the major Amazonian herbaria, the project has been able to collaborate with smaller herbaria such as those of Macapá in Amapá and Rio Branco in Acre. These smaller collections are now well underway to becoming important regional resources.

Another service that the project has performed is to supply a large quantity of photocopies of botanical literature, such as the original descriptions of species. Many North American participants have travelled to Brazil with a case full of copies for researchers and students at the Amazonian institutions. We have also been able to carry out a considerable number of scanning electron microscope studies for workers at the Amazonian harbaria.

A more recent development has been to increase the recruitment of expedition participants from institutions in southern Brazil. In 1985 the participation of several is planned.

CONCLUSION

The results presented show that Projeto Flora Amazônica is achieving many of its initial goals. The expeditions have greatly increased our knowledge of Amazonian plants both through the provision of more herbarium material and through quantitative, botanically accurate forest inventory. It has also increased awareness of the opportunities for binational cooperation and for the training of both Brazilian and U.S. students. The success so far encourages us to continue into Phase IV of this program which is planned for 1985-1987.

RESUMO

Apresentamos um histórico e resultados dos primeiros oito anos de pesquisas do Projeto Flora Amazônica. Este programa binacional de coleta de plantas amazônicas, patrocinado pelo CNPq e o National Science Foundation, possibilitou 25 expedições em numerosas regiões da Amazônia brasileira. As expedições visitaram tanto áreas ameaçadas de desmatamento extensivo, como áreas longínquas pouco conhecidas botanicamente. Os resultados incluem a coleta de 32.976 números de plantas superiores, 16.482 criptógamas e inventário quantitativo de 18,67 hectares de floresta, envolvendo a coleta de 7.294 exsicatas estéreis. As coletas feitas para herborização foram realizadas com 10 a 13 duplicatas, quando possível, e divididas igualmente entre instituições brasileiras e dos EUA. Até o final de 1984 tomaram parte 55 botânicos convidados de diversas instituições estrangeiras em diversas áreas de especialização, junto com 36 botânicos brasileiros. O material coletado está na fase inicial de identificação e estudo pelos especialistas. Entretanto, muitas espécies novas e novos registros geográficos já foram reconhecidos, e novo material de espécies tidas como raras está sendo incorporado nos acervos dos herbários.