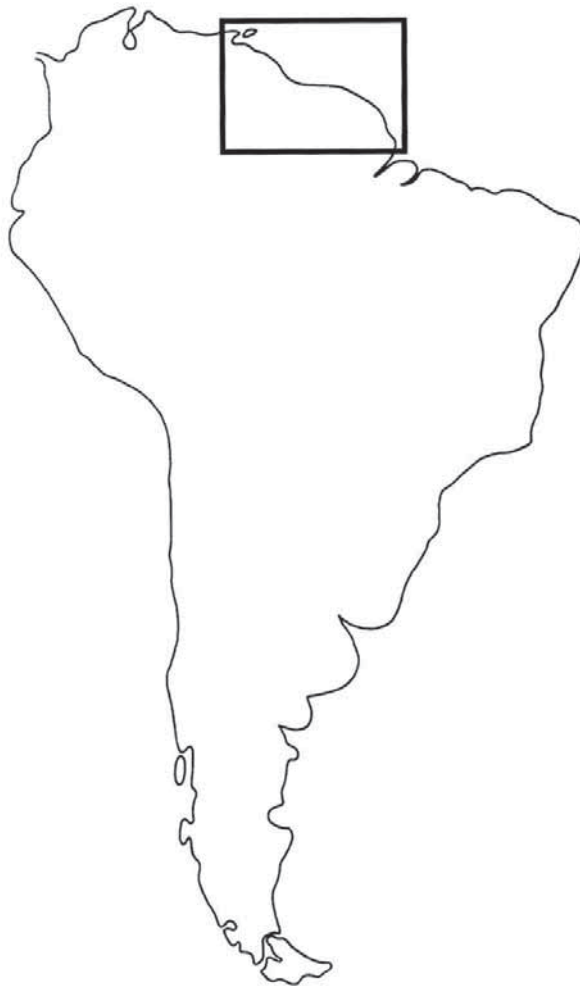


FLORA OF THE GUIANAS

NEWSLETTER N° 19

SPECIAL WORKSHOP ISSUE



Cayenne, October 2015

FLORA OF THE GUIANAS
NEWSLETTER N° 19
SPECIAL WORKSHOP ISSUE

Flora of the Guianas (FOG) Meeting and Seminars
Celebration of the 50th Anniversary of the CAY Herbarium
« The importance of the Herbarium in Plant Sciences »
International Conference

Cayenne, 5–8 October 2015

The Flora of the Guianas is a co-operative programme of: Museu Paraense Emílio Goeldi, *Belém*; Botanischer Garten und Botanisches Museum Berlin-Dahlem, *Berlin*; Institut de Recherche pour le Développement, IRD, Centre de Cayenne, *Cayenne*; Department of Biology, University of Guyana, *Georgetown*; Herbarium, Royal Botanic Gardens, *Kew*; New York Botanical Garden, *New York*; Nationaal Herbarium Suriname, *Paramaribo*; Muséum National d'Histoire Naturelle, *Paris*; Nationaal Herbarium Nederland, Utrecht University branch, *Utrecht*, and Department of Botany, Smithsonian Institution, *Washington, D.C.*

For further information see the website:

<http://portal.cybertaxonomy.org/flora-guianas/>

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Compiled and edited by P.G. Delprete

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1. CONFERENCE PROGRAM

Flora of the Guianas (FOG) Meeting and Seminars Celebration of the 50th Anniversary of the CAY Herbarium « The importance of the Herbarium in Plant Sciences » International Conference (Colloque International)

5–8 October 2015, Cayenne, French Guiana

5 October

Welcome – Flora of the Guianas (FOG) Meeting and 50th Anniversary of the Herbier de Guyane (CAY).
FOG Board members meeting (only board members) – Welcome to the Museu Paraense Emílio Goeldi as a new member of the FOG Consortium
FOG Board members meeting (only board members)
Flora of the Guianas: General Meeting (open to the public)
Flora of the Guianas: Open discussion (open to the public)

6 October

Conference Flora of the Guianas – Seminars on floristic, systematics of large families, reorganization of major herbaria, explorations and historical collections

7 October

50th Anniversary of the l'Herbier IRD de Guyane (CAY) - The Importance of the Herbarium in Plant Sciences – Seminars on Ecology, Ethnobotany, Biodiversity, Biogeography, Plant/Animal Interactions, and Conservation

Closing remarks by the President of the IRD, Mr Jean-Paul Moatti

Official dinner

8 October

Day trip (FOG members and conference speakers)
Field trip: Visit of the French Guiana Botanical Garden (Macouria)

12–16 October

Field trip: Chutes Voltaire

1. PROGRAMME DU COLLOQUE

Réunion et Séminaires « Flore des Guyanes » Célébration du 50^{ème} anniversaire de l'Herbier de Guyane « L'importance de l'Herbier dans les sciences végétales » Colloque International (International Conference)

5–8 Octobre 2015, Cayenne, Guyane Française

5 Octobre

Mot de Bienvenue – Colloque «Flore des Guyanes» et 50^{ème} anniversaire de l'Herbier de Guyane (CAY).

Réunion des membres du bureau de la FOG («Flore des Guyanes») - Bienvenue au Musée Paraense Emilio Goeldi qui intègre le consortium de la FOG (réservé aux membres du bureau de la FOG).

«Flore des Guyanes» - Assemblée générale (ouvert au public)

«Flore des Guyanes» - Discussions ouvertes (ouvert au public)

6 Octobre

Conférence “Flore des Guyanes” – Floristique, Systématique, Réorganisations des Grandes Herbiers, Explorations et Collections historiques

7 Octobre

50^{ème} Anniversaire de l'Herbier IRD de Guyane (CAY) – Importance de l'Herbier dans les sciences végétales – Ecologie, Ethnobotanique, Biogéographie, Interactions Plantes/Animaux et Conservation

Clôture en présence du Président de l'IRD, Mr Jean-Paul Moatti

Dîner officiel

8 Octobre

Journée terrain (réservé aux membres FOG et conférenciers)

Visite du Jardin Botanique de Guyane (Macouria)

12–16 Octobre

Excursion: Chutes Voltaire

2. MINUTES OF THE ADVISORY BOARD MEETING

Present: P. Acevedo, P. Delprete, N. Köster, E. Lucas, S. Mota de Oliveira, O. Poncy, B. Torke, and D. Traag.

2.1. Opening and report on previous meeting in Leiden

Director of IRD welcomed the board of the FOG Consortium and wished us a successful meeting. Piero Delprete opened the meeting presenting the items of the agenda:

- 1. Reports of institutes
- 2. Report of editor
- 3. Publishing issues

2.1.A. Pedro Acevedo (US): Christian Feuillet left the Smithsonian, but he keeps on working on the Boraginaceae. Larry Dorr is working on the Malvaceae. Mark Strong continues working on the Cyperaceae and the treatment might be submitted in 2016. The Program Biodiversity of the Guianas, directed by Vicky Funk, after 30 years of expeditions, is wrapping up specimens, and one of the goals is to process the remaining collections, identify and send duplicates to institutions and specialists. Last expedition in Guyana was made in 2014 to Mount Ayanganna, where were collected a few thousand numbers. Not all botanical publications are submitted to Flora of the Guianas, just some, such as the Sapindaceae. New taxa of Gesneriaceae for the area were published in Phytotaxa. Also, several papers in ecology were published. New hirings: two new researchers as curators: 1 ferns; 1 Fabaceae.

2.1.B. Dorothy Traag (BBS): The herbarium is in a quite dynamic moment. Research is focused on Orchids, and recently on Commelinaceae. Also, a new research assistant, Gunovaino Marjanom (“Guno”), has been added to the team, and he will probably pick a family for the Flora. The Herbarium team is now in Cayenne, at the conference, so we encourage the FOG members to talk to our team to motivate us in our activities. Sabitrie Jairam-Doerga (“Gisla”) is working on a treatment, but it is difficult to combine her work obligations and research. Not many people to go to the field. There have been two RAPs, a lot of specimens collected but not identified – CI did not ask the Herbarium to take part on the work, they prefer to work with people from outside. Although they have to leave specimens at the herbarium, they do not provide labels, so the material is not workable. There is a project “Multiple use management areas” – Suriname governmental project concerning mangroves, focusing on the coastal areas. Herbarium staff studied invasive and introduced species. There is no control of bringing plants in Suriname, which can be harmful (see Dorothy’s presentation, Abstract 3.13). Another project takes place in the South corridor of Suriname with indigenous and Maroons tribes. The staff is also working with carbon credits, and focusing in commercial species. Plots established and focus in commercial trees; the forest department is involved, but not the Herbarium.

2.1.C. Benjamin Torke (NY): NY has much more grants than ever, but is quite focused on projects and does not have institutional support (that is why Ben would not get complete funding to come to Cayenne, which were partially supplied by the IRD and conference organization). They recently received (“temporarily”) the herbarium of the Berkeley Botanical Garden. The main group contributing to the Flora of the Guianas is the Institute of Systematics Botany, which has lost a fair amount of staff. There was some new hiring, but is not enough to cope with what was lost. Michael Nee (Solanaceae and Cucurbitaceae), Scott Mori (Lecythidaceae), Jim Luteyn (Ericaceae), and Jackie Kallunki (Rutaceae) retired, along with other curators. Barbara Thiers is now the Herbarium director and Vice President for all science. Matthew Pace was hired as herbarium curator, not primarily research position; he is interested in orchids, but not a lot of potential candidates

for Flora treatments. Michael Nee (retired) will continue working on the treatments of Solanaceae and Cucurbitaceae. Wait Thomas (Simaroubaceae) and Doug Daly (Burseraceae) are both intending to contribute the treatments, but they are working on other projects. Daly, in the meantime, has been publishing taxonomic revisions. Concerning the Papilionoideae, Ben Torke will not have time for the next years.

2.1.D. Odile Poncy (P): Paris also reorganized and divided groups in themes, like Naturalis, no change concerning potential contributors and probably not in the near future. The herbarium is now managed by new people, with several new hiring. MOU was signed, but what is left to do? Odile herself could not start a new family because she is soon retiring, and she had a meeting with staff from Paris, but nobody is willing to take over her role. As for family treatments: Apocyanaceae - Allorge does not want to review the manuscript; Ochnaceae - Odile thanked for the clear and extensive work on Ochnaceae and is trying to make the “bridge” between Claude Sastre and Sylvia. Other families will not be done, probably, so we should choose other people. The Cyclanthaceae treatment can be accomplished with the collaboration of Eduardo Silva Leal (Universidade Federal Rural da Amazônia, Belém, Pará, Brazil), with Poncy as co-author. Eve Lucas asked whether Odile could stay as representative, even if there is no “production”, and Odile answered that she will consider the possibility.

2.1.E. Nils Köster (B): No major institutional changes. Only retired staff is busy with FOG treatments: Sipman and Hiepko are still very active. Sipman finished the Cladoniaceae in 2013 and will continue with two other lichen families, and he will soon dedicate more efforts to the treatments of this group. Hiepko has been busy with Olacaceae for Flora of Cuba and Flora of Colombia, and the Menispermaceae treatment for FOG will be submitted in winter 2015. Lack is not yet busy with the Asteraceae. Lücking, specialized in Neotropical lichens, started in July 2015, and he will probably work on the Graphidaceae and another lichen family, as he wants to dedicate his efforts to the FOG. Berlin has as the following focal areas: Mediterranean and Caucasus; and Caribbean Region, especially Cuba and Dominican Republic. The institution staff started several collaborations with Mexico, Honduras, Colombia and Cuba.

2.1.F. Eve Lucas (K): Kew is also restructuring. There has been a considerable reduction in people dedicated to taxonomy. The priorities of the institution have shifted from alpha taxonomy to ‘higher impact’ publication. The Americas group of Bente Klitgaard is still focused on Tropical America and is currently focusing on Bolivia. Two new staff have been hired (Alex Monro; Urticaceae & Wolf Eiserhardt; Palms). An integrated monography team lead by Bill Baker (Palms) has some representation in the Neotropics. Flora writing is no longer a priority and study of herbarium specimens is less common. FOG revisions: Meliaceae was finished by Nicky Biggs and Terry Pennington; for Sapotaceae, only *Pouteria* is finished, as the co-author was not encouraged to continue. Lamiaceae can be done by someone else, with Ray Harley maybe helping (Sylvia added: probably Anastasia Stefanaki, in Leiden). *Sloanea* not being done by Pennington anymore, but by a master student of Piero Delprete, working at the Museu Goeldi.

2.1.G. Piero Delprete (CAY): Piero conveyed the greetings from Paul Hiepko, FOG chairman for many years, and from Marion Jansen-Jacobs, FOG Editor and contributor for many years. In the CAY Herbarium, staff continues entering data in the database, because not all specimens were included in Aublet 2. The goal is to enter the label data of all the specimens. An ongoing project has the goal of producing digital images of all the specimens in the herbarium, starting from general specimens, then the types. The herbarium website is complete and available, including a searchable database. Numerous collecting expeditions were accomplished during the last three years, several in French Guiana, one in Sipaliwini, southern Suriname, and another in the surroundings of the Chenapou village, Upper Potaro River, central Guyana. The herbarium staff remains the same, as no new staff was hired and nobody left. Piero is the only plant taxonomist in the

herbarium. About FOG treatments: 1) Ferns and Lycophytes: Boudrie, Cremers and collaborators, are working on what will be 9 FOG fascicles (about 630 species), and a Checklist of the Ferns of the Guiana Shield. 2) Areaceae: J.J. de Granville is retired, and is still the coordinator of the treatment and responsible for a number of genera. Several old collaborators are no longer active, and need to be substituted by active ones. Granville recently published the book "Guide of the palms of French Guiana" where about sixty species are described and illustrated. 3) Humiriaceae: by Daniel Sabatier, a PhD student working in the phylogeny, but no progress as for the FOG treatment. 4) Caryocaraceae: Delprete is contributing with Granville, one genus finished, out of two: *Caryocar* and *Anthodiscus*; ongoing. 5) Rubiaceae: Piero is working with collaborators on 84 genera and ca. 470 species, and he is at the final stage. Many new combinations in *Palicourea* will be published, along with other important taxonomic rearrangements. The Guianan species of *Margaritopsis* have recently been transferred to *Eumachia*, and several new species were recently described. The treatment will be published in three volumes. Also, he recently published an important article on the typification of Aublet's Rubiaceae names in Taxon.

2.1.H. Sylvia Mota de Oliveira (L): Sylvia informed about the latest published volumes (Cladoniaceae and Gentianaceae) and ongoing treatments (Ochnaceae, Quiinaceae, etc., more in editor's report - 2.2). Institutional support for taxonomic work is very limited, as the focus is on high-impact publication. Naturalis is going through reorganization, many groups are already defined, but not systematics. There is no Botany department anymore. Taxonomists (zoologists and botanists) will probably work together in the group "Next generation Biodiversity Discovery", but the group still misses a group leader (department head). Publication at Kew is going through a difficult phase. Sylvia showed a presentation on some pilots aiming to have the Flora available online, which is a strategy to increase the visibility of the Flora of the Guianas, and, as a consequence, to increase the chances of funding for other activities.

The meeting had to be interrupted before the discussion was finished. The board decided to continue the discussion about publishing strategy in the afternoon, open to the public. There was no time to look at the family list together.

2.2. REPORT BY THE EXECUTIVE EDITOR (2013-2015)

During the last three years, since the last meeting of the Flora of the Guianas, two fascicles were published and a third fascicle is almost ready to be sent to Kew Publishing. Out of a total of four grant applications, two were successful. In this report, an overview of these activities is given per year.

2013:

- Publication of Flora of the Guianas, series E (3): Cladoniaceae, by T. Ahti & H.J.M. Sipman. The treatment of the lichen family for the Flora of the Guianas included 48 species, of which 10 were found to be new to science. The original publication of the 10 new species of *Cladonia* can be found in Ahti & Sipman, Phytotaxa 93: 25-39. 2013.
- Grant application within the scheme "NWO-middelgroot" of the Dutch Agency for Science, including funds for Flora activities, online dissemination and editor position. Not successful.
- Start of the preparation of the next Flora fascicle, Gentianaceae.
- Application for the "subsidies" of the Alberta Mennega Foundation, aiming at the continuation of the Flora's editor position for three years (2014-2017). An amount of 150.000€ was granted, to fund a part-time position (24 hours/week) for three years.

2014:

- Publication of Flora of the Guianas series A (30): 139. Gentianaceae, by L. Struwe J. Allogio, L. Cobb, J.R. Grant, M.J. Jansen-Jacobs, M. Kinkade, K.B. Lepis, H. Maas-van de Kamer, P.J.M. Maas & M.I. Palmer. Recent molecular studies of the family caused

changes in the classification, and re-evaluation of some generic and specific circumscriptions. This treatment included 54 species in 19 genera.

- Editorial work for the next Flora fascicle - Dilleniaceae, Vitaceae and Meliaceae, which was in part started by the former editor.

- Grant application to the Alberta Mennega Foundation (The Netherlands) and Pro-Biosphere (EU FP-7 project), for text mark-up and conversion to xml file to be disseminated in an online open data platform. Funds for 45.000€ were granted and the results of this project can be seen at: <http://portal.cybertaxonomy.org/flora-guianas/>

- Grant application, as part of a consortium, within the FP-7 Framework of the European Union. Not successful.

2015:

- Ongoing editorial work on fascicle Dilleniaceae, Vitaceae and Meliaceae. Most of the material prepared, missing some illustrations and last formatting. The fascicle was almost ready by the occasion of the meeting in Cayenne (published in 2016).

- Manuscript on Ochnaceae was sent back to the author, Claude Sastre, with a last review. The idea is to publish a fascicle including Ochnaceae and Quiinaceae, the last recently submitted by Julio Schneider and Georg Zizka. Although these families form the Ochnaceae in the APG3 system, they will be published as separate families because the manuscript preparation was initiated by different authors, before the change of the classification system recommended by the Flora.

Finally, along these three years (2013-2015), the editorial office supported both board members and contributors with scanning of literature that is not accessible either in their institutes or online. Concerning editorial changes, as the U and L herbaria will not be intercalated, although kept within the same institution, they should be cited as different herbaria with their respective acronyms.

2.3. PUBLISHING ISSUES

2.3.1. Data dissemination and publication policy: how do we prepare the future of the Flora of the Guianas?

By Sylvia Mota de Oliveira and Thomas Hamman

Naturalis Biodiversity Center, Leiden, The Netherlands

The Flora of the Guianas has completed 30 years. The long term character of the Flora is affected by two current limitations: funding of taxonomic research and funding of paper copy publication. These circumstances, together with our wish to accelerate the completion of the Flora, led us to explore new ways to increase collaboration, to attract new contributors and funding, and to modernize content dissemination. The first step in this direction is a change in the format of our content, from text document to marked-up text (xml). This mark-up procedure will allow us to make the Flora content available online and to enable links with other relevant databases, collections and literature. Additionally, an online platform is very adequate to the dynamic nature of a Flora, facilitating updates and additions. In order to implement such a change, the adequacy of two mark-up procedures were compared: the software GoldenGATE XML Markup Editor and the FlorML scripts in Perl, both designed to deal specifically with taxonomic literature. We compared time required for training and execution, as well as the costs of extending the approach to the complete content of the Flora of the Guianas. GoldenGate showed greater flexibility to manage taxonomic treatments that arise from different sources with different components and formatting. However, the mark-up is done manually and requires user intervention for the complete text. The semi-automated procedure using FlorML (with adaptations) requires very much consistency in the format of the text, but if this condition is met, a much larger volume of data can be processed at once. The fact that our Flora

has kept the same format across the years makes FlorML scripts highly suitable for a future investment. The results of the first marked-up volumes of the Flora of the Guianas can be found at: <http://portal.cybertaxonomy.org/flora-guianas/node/1>.

The screenshot shows the homepage of the 'Flora of the Guianas Online' website. At the top, there is a banner image with the title 'Flora of the Guianas' overlaid. Below the banner is a navigation menu with links for 'Home', 'The region', 'The programme', 'Contributors', 'Archive', and 'About'. The main content area is divided into two columns. The left column contains a 'Classification' section with a list of plant families, each preceded by a small icon and a plus sign. Below this is a 'Search taxa' section with a search input field, a 'Search' button, and a 'Misapplied names' checkbox. Further down are 'Navigation' links for 'News' and 'About', and a 'User login' section with a 'Username' field. The right column features a 'Welcome to the Flora of the Guianas Online' heading, followed by a paragraph describing the book series and its taxonomic focus. Below the text is an 'Image:' label and two photographs: one of a small plant growing in a forest clearing and another of a close-up of a yellow flower with green leaves.

Flora of the Guianas

Home | The region | The programme | Contributors | Archive | About

Classification

- ✚ Acanthaceae
- ✚ Alismataceae
- ✚ Aristolochiaceae
- ✚ Balanophoraceae
- ✚ Bromellaceae
- ✚ Caryophyllales
- ✚ Casuarinales
- ✚ Celastrales
- ✚ Chloranthaceae
- ✚ Combretaceae
- ✚ Cyrillaceae
- ✚ Dichapetalaceae
- ✚ Gentianaceae
- ✚ Gesneriaceae
- ✚ Haemodoraceae
- ✚ Hamandaceae
- ✚ Iimnorchitaceae

Welcome to the Flora of the Guianas Online

The Flora of the Guianas is a book series dedicated to the taxonomic treatment of all plant species occurring within the borders of French Guiana, Suriname and Guyana. All information available in this dataportal is being compiled from the published fascicles of the Flora, authored by several specialists.

Browse through the taxonomy on the left to find taxa description, distribution, Type references and other content of the Flora

Image:

13

2.4. STATE OF AFFAIRS AT THE PARTICIPANT INSTITUTES (2013-2015)

2.4.1. B. Botanischer Garten und Botanisches Museum Berlin-Dahlem, Berlin

By Nils Köster

General

Since summer 2015, Robert Lücking (formerly at Field Museum, Chicago) is the new herbarium curator for cryptogams (lichens, fungi, and bryophytes). Robert's research focuses on taxonomy and systematics of Neotropical lichens, especially basidiolichens and foliicolous lichens, as well as Gomphillaceae, Graphidaceae, Hygrophoraceae, Lobariaceae, Pilocarpaceae, and Trypetheliaceae. He is interested in contributing his expertise within the framework of the FOG.

Collaborations with partner institutions in Central and South America have been further reinforced and expanded, mainly within the scope of projects on evolution and biogeography in the Caribbean: Cuba (Jardín Botánico Nacional de Cuba, La Habana), Dominican Republic (Jardín Botánico Nacional Dr. Rafael Ma. Moscoso, Santo Domingo), México (Universidad Nacional Autónoma de México, DF, México City), Honduras (Universidad Nacional Autónoma de Honduras, Tegucigalpa), El Salvador (Museo de Historia Natural de El Salvador, San Salvador), Colombia (Jardín Botánico José Celestino Mutis, Bogotá and Universidad del Norte, Barranquilla), and Bolivia (Herbario Nacional de Bolivia, La Paz). Although these projects do not deal with the FOG region s. str., there is hope to rekindle B's research activities in the Guianas as part of the periphery of the Caribbean.

Flora treatments

Cryptogams (Lichens):

- **Cladoniaceae** (T. Ahti & H.J.M. Sipman): Published in 2013 (Fascicle 3 of Series E: Fungi & Lichens).
- **Parmeliaceae & Thelotremaaceae** (H.J.M. Sipman): Not much progress since 2013, but procession of the collections of foliicolous lichens is underway; in 2016 again a stronger focus on FOG.

Phanerogams:

- **Asteraceae** (H.-W. Lack): Inuleae s.l., Tageteae and Lactuceae; status preliminary, no progress since 2012.
- **Menispermaceae** (P. Hiepko): Not much progress in 2014/2015, but first draft of the manuscript scheduled for early 2016.

Publications (2013-2015) – B authors in **bold**.

- Ahti, T. & **H.J.M. Sipman**. 2013: Ten new species of *Cladonia* (Cladoniaceae, Lichenized Fungi) from the Guianas and Venezuela, South America. *Phytotaxa* 93(1): 25-39. doi: 10.11646/phytotaxa.93.1.2.
- Ahti, T. & **H.J.M. Sipman**. 2013: Cladoniaceae. Flora of the Guianas: Series E: Fungi and lichens; Fasc. 3. Kew: Royal Botanic Gardens.
- Aptroot, A., **H.J.M. Sipman** & M.E. da S. Cáceres. 2013: Twenty-one new species of *Pyrenula* from South America, with a note on over-mature ascospores. *The Lichenologist* 45(2): 169-198. doi: 10.1017/S0024282912000734.
- Sipman, H.J.M.** 2014: New species of Graphidaceae from the Neotropics and Southeast Asia. *Phytotaxa* 189(1): 289-311. doi: 10.11646/phytotaxa.189.1.21



Flora of the Guianas Consortium - Board members (from left to right): Eve Lucas (K) Dorothy Traag (BBS), Benjamin Torke (NY), Odile Poncy (P) Piero Delprete (CAY), Sylvia Mota de Oliveira (L), Nils Köster (B), Pedro Acevedo (US). Photo by S. Pinel.

2.4.2. BBS. National Herbarium of Suriname, Paramaribo

By Dorothy Traag

General

From 2013 to 2015 the team of the National Herbarium of Suriname worked on improving the quality of the collections and focusing on capacity building. This resulted in change in the physical accessibility and increase of the number of specimen in our collection, good registration of our botanical documentation and strengthening of the herbarium team on scientific and technical level. Writing protocols and processes to ensure the continuation of our institute has been one important goal of our mission.

Collections and research

Catching up with processing the large backlog of collected dried specimen; mounting and inserting, and repairing damaged vouchers. In 2015 we started with the physical reorganization of the collection through categorizing the specimen by country; Suriname, Guyana, French Guyana, and others.

From 2013 we were empowered to participate more than before in botanical field research. From that time on, we supported the expedition with geologists in the vicinity of Kwamalasamutu, Sipaliwini in southern Suriname; here the focus was on observation of different vegetation on rocky areas. During a second expedition, we collected, among other families, numerous Rubiaceae specimens with Piero Delprete.

From 2014 through 2015 we conducted research focused on Invasive Alien species in the Coastal areas. With the Medical Faculty we signed an agreement in which the Herbarium, following a specific protocol, will collect specimen for pharmaceutical extraction.

Trough collaboration with other institutes we participated at the National Forest Monitoring Project, carried out by the Foundation for Forest Management and Production Control (SBB). The Herbarium had the opportunity to focus on collecting Macrofungi, a group not incorporated in the National Forest Inventory (NFI) protocols.

Sabitrie Jairam-Doerga, studied Aquatic macrophytes in northern Suriname for her Master degree in Conservation Biology.

Documentation and dissemination of information

In collaboration with the Library of the University of Suriname, the botanical documentation (Monographs) is digitized and some new botanical monographs were purchased. Outreach and developing knowledge about the importance of the Herbarium is reinforced trough training and supervision of students and visiting groups.

Capacity of the team

We were able to extend our staff with an assistant researcher to support us with fieldwork. The herbarium team has been increased by the three persons, covering technical and scientific management of the collection, projects, research and collecting, organization and use of the botanical documentation. Motivating the technical staff and improving the management of the conservation of the specimens through participating in a Management and Conservation Course of museum collections. Two herbarium assistants participated in this course and another one has been trained to give courses on conservation of wood and organic material (plants and animals).

In memoriam: Marga Werkhoven (1946-2013)

On 1th of July 2013, Marga Werkhoven, our former Curator of the National herbarium of Suriname for 30 years, died at the age of 67. On the 5th of July we had the sad task to carry her to her final resting place.

Thank you Marga for everything we have learned from you. You are the 'futu ston' of the National Herbarium of Suriname and we stand on your shoulders. We will continue the herbarium work that you started with dedication and love.



Dr. Margaretha C. M. Werkhoven - Board member of the Flora of the Guianas and Curator of the National Herbarium of Suriname, Anton de Kom University of Suriname, from 1st of March 1980 – 1st of July 2010.

Marga was born on 17th of June 1946, in Driebergen-Rijsenburg, Netherlands. She studied botany at the University of Utrecht. After obtaining a Master Degree on the 9th of June 1969, she left for Suriname on the 8th of October of the same year. She joined the Forest Service of Suriname on the 1st of July 1975, and on the 1st of March 1980 started her employment as Curator of the National Herbarium of Suriname, at the AdeK University of Suriname. She set the foundation for a scientific plant collection and has contributed many publications. The best known is the book "Orchids of Suriname". Two plants are named after her: *Hirtella margae* Prance and *Philodendron werkhoveniae* Croat.

2.4.3. BRG. Guyana National Herbarium, Georgetown

Not received.

2.4.4. CAY. Herbier IRD de Guyane, Cayenne

By Piero Delprete

General

The Herbarium of French Guiana (Herbier IRD de Guyane, CAY) is part of the IRD (Institut de Recherche pour le Développement) and the UMR AMAP (Unité Mixte de Recherche - botanique et bio-inforMatique de l'Architecture des Plantes, CIRAD - CNRS - INRA - IRD

- UM). The support of the IRD for the activities and maintenance of the herbarium has been constant. Delprete continues his research, with several ongoing projects, mostly on Neotropical Rubiaceae (systematics, taxonomy, and floristics), floristic study of the coastal Savannas of French Guiana, as well as several floristic projects in the Neotropics, and the coordination of a Franco-Brazilian network (GAP Network). We received regular visits for field and herbarium work by J.-F. Molino and D. Sabatier (AMAP colleagues), who are doing field work mostly related to forest biodiversity, through permanent plots.

The herbarium staff continues with the project of producing digital images of all herbarium specimens at CAY. The herbarium contains approximately 200,000 specimens and, as of February 2017, about one third of them were imaged. One task that slowed down this project is that not all the specimens were barcoded and the data from their labels needed to be included in the herbarium database, which required considerable working time before the specimens could be photographed.

After a long period of gestation, the website of the Herbier IRD de Guyane (CAY) is now up and running (http://publish.plantnet-project.org/project/caypub_en). In this site is possible to access and search the herbarium database, developed by the PI@ntNet Team (www.plantnet-project.org).

The CAY herbarium also serves as local reference for plant identifications, source of data about geographical and ecological distribution, and conservation status of the species occurring in the Guianas. Many visitors are frequently consulting the herbarium. In 2013 CAY received about 350 visits, in 2014 about 245 visits, and in 2015 about 250 visits, mostly by local personnel identifying specimens for environmental impact assessments in French Guiana.

Considerable funding for research and field work in the Guianas has been provided by the Labex CEBA (Centre d'Etude de la Biodiversité Amazonienne, French Government), "an "Investissement d'Avenir" through a grant managed by Agence Nationale de la Recherche (ANR-10-LABX-0025).

Collecting expeditions:

2013

French Guiana:

- Coastal savannas (Delprete).
- Regina-Saint Georges (Sabatier; Piste de Belizon, Savane roche Virginie etc.)

2014

French Guiana:

- Coastal savannas (Delprete).
- Upper Oyapock River, surroundings of Camopi Village (February; Delprete, Gonzalez et al.).
- Mount Itoupé, Crique Waki (Sabatier, Molino, Gonzalez et al.)

Surinam:

- Expedition to Sipaliwini (Southern Surinam, 16 April – 1 May; Delprete et al.; see Abstract by Marjonom & Delprete, below).

French Guiana:

- Mount Itoupé (November; Molino, Sabatier, Gonzalez et al.)

2015

French Guiana:

- Coastal savannas (Delprete).
- Tumuc-Humac Mountains, Crique Alama (Molino, Sabatier, et al.).
- Chutes Voltaire (13-15 October, FOG Participants).
- Savane roche Virginie and Trinité Mountains (November, Molino, Sabatier, et al.).

Flora treatments

FERNS & LYCOPHYTES - Coord. G. Cremers (P) with M. Boudrie, 12 contributors, 9 fascicles, 630 taxa - No new fascicle has been published since the last meeting. The 6 fascicles still to be published are:

- **Fasc. 1** (Generalities, Dicksoniaceae, Marattiaceae, Ophioglossaceae). Marattiaceae: Revision of the genus *Danaea* by H. Tuomisto (TUR) still in progress. Ophioglossaceae: study in progress with M. Boudrie (CAY) and W. Hauk (DEN).
- **Fasc. 2** (Anemiaceae, Cyatheaceae, Gleicheniaceae, Lygodiaceae, Marsileaceae, Metaxiaceae, Schizaeaceae). Anemiaceae and Metaxiaceae currently under revision respectively by J.T. Mickel (NYBG) and the TUR team. Other families are completed.
- **Fasc. 5** (Pteridaceae): In progress. Several new *Adiantum* species to be described by M. Boudrie and J. Prado (SP), and the genus *Adiantopsis* is still under revision by M. Link-Perez (AASU).
- **Fasc. 7** (Aspleniaceae, Blechnaceae, Elaphoglossaceae, Lomariopsidaceae): All families are almost completed (drawings in progress) by M. Boudrie and G. Cremers. Elaphoglossaceae will be included within Dryopteridaceae. A few issues remain to be solved in the *Blechnum* group.
- **Fasc. 8** (Grammitidaceae, Polypodiaceae): Grammitidaceae (now included within Polypodiaceae) : manuscript completed by C. Kelloff (US), drawings in progress. Polypodiaceae in progress, to be shortly completed.
- **Fasc. 9** (Azollaceae, Isoetaceae, Lycopodiaceae, Psilotaceae, Salviniaceae, Selaginellaceae): Isoetaceae: Under current revision by M. Boudrie and W.C. Taylor (US) for the Guianas. Other families still to be carried out.
- An addendum will give the new taxa related from families already published in the previous fascicles, as well as the new classification, with correspondence with the previous one.

Other work in progress:

- Revision of the "Checklist of the Ferns & Lycophytes of the Guiana Shield" (Funk et al., 2007) by M. Boudrie & G. Cremers.
- Studies on *Isoetes* (M. Boudrie & W.C. Taylor) and *Ophioglossum* (M. Boudrie & W. Hauk).
- Preparation of description of new *Adiantum* taxa (M. Boudrie & J. Prado).
- Revision of the *Triplophyllum* of the Guianas (M. Boudrie, R.C. Moran & J. Prado).

Arecaceae (21 gen. 95 ssp): J.-J. de Granville (Coordinator) has the responsibility of the treatment of *Acrocomia*, *Asterogyne*, *Bactris*, *Chamaedorea*, *Elaeis*, *Lepidocaryum*, *Mauritia*, *Mauritiella*, *Syagrus*. He will also contribute to the treatment of *Astrocaryum* which F. Kahn promised to do a long time ago, but the manuscript was never received. The manuscripts of *Attalea*, *Dictyocaryum*, *Hyospathe*, *Iriartella*, *Oenocarpus*, *Socratea*, *Syagrus*, *Geonoma* and *Desmoncus* were received several years ago by different contributors but the two latter must be updated from the recent revisions by A. Henderson. The manuscript of *Attalea* in which S. Glassman described too many new species must be evaluated. The period from 2012 to 2014 was consacrated exclusively to complete the book "Guide des Palmiers de Guyane", which was published by the ONF (Office National des Forêts). This illustrated field guide treats of all the palm species native to French Guiana, known to date. Sixty specific and infraspecific taxa are described, which is to say nearly two thirds of all the taxa occurring in the Guianas. This work, carried out during 3 years, was a good opportunity for updating nomenclature and clarifying taxonomic problems. Consequently, it constitutes an important step and an excellent stimulus for the treatment of the Arecaceae for the Flora of the Guianas. However, among the 16 genera treated in the guide, some persisting problems must be resolved in *Geonoma* (2 species not yet identified) and especially in the acaulescent species of *Attalea* for which the

contribution of L. Noblick is highly desirable; this specialist already started studying this genus and realized his first field trip in French Guiana in 2012.

Humiriaceae: D. Sabatier. – A collaboration was started with Léa Baron (doctoral student, with Jerome Chave as thesis director, Toulouse University) on the phylogeny of the family Humiriaceae. This study is now finished, although no articles were published. As for the FOG treatment, this phylogenetic study partially clarify some taxonomic problems, as, for example, the separation of the genus *Schistostemon* and the position of a new species of *Vantanea*, similar to *V. parviflora*, collected in French Guiana by Molino & Sabatier.

Hugoniaceae and Ixonanthaceae: D. Sabatier. – No progress.

Caryocaraceae (2 gen. 6 ssp): P.G. Delprete, D. Frame & J.-J. de Granville. – J.-J. de Granville provided an exhaustive list of specimens he studied at B, BBS, BR, BRG, CAY, FDG, G, M and US. He produced keys to genera and species and made line drawings of 4 species. Delprete and Frame are responsible to write the treatment and the descriptions.

Rubiaceae: P.G. Delprete (Coordinator & main contributor). – The project is now arrived to the study of the last, most difficult genera: *Palicourea*, *Psychotria* Complex (*Margaritopsis*, *Notopleura*, *Carapichea*, etc) and *Spermacoce*. *Palicourea* in the traditional sense is now completed. However, all the species of *Psychotria* subgenus *Heteropsychotria*, about 100 species in the Guianas, need to be transferred to *Palicourea* (published in 2016). In addition, the conclusion of the treatment has been slowed down by several taxonomical rearrangements in *Chomelia* and *Stenostomum* (Delprete et al. 2010), and several recent discoveries, as the presence of *Vangueria* (cultivated), the newly record *Carapichea adinantha*, and a new species of *Sipanea*, and the study of the little-known *Octavia sessiliflora* and *Mussaenda glomerata*, which revealed to be synonymous to previously described taxa (Delprete & Persson, 2012). Following recent phylogenetic and nomenclatural re-arrangement, *Margaritopsis* was recently transferred to *Eumachia* (Delprete & Kirkbride, 2015) with 13 new combinations, and *Diodella* was transferred to *Hexasepalum* (Kirkbride & Delprete, 2015) with 10 new combinations. As of today, this study detected 84 genera and 465 species of Rubiaceae in the Guianas. The treatment will be published in three volumes: 1) Volume 1, with key to genera and genera A to L (230 species); Volume 2, with genera M to L (253 species), and 3) Volume 3 (with I. Poole, J. Koek-Noorman & L. Westra), with wood anatomy of woody genera, compared with the family phylogeny. The project will probably be finished in 2017.

• **Typification of the RUBIACEAE described by Aublet:** Delprete visited P-JJR (Paris) in 2009 and 2014, and BM and LINN-SM (London) in 2012, for the typification of the 56 taxa of Rubiaceae described by Aublet. It has traditionally been thought that the best set of Aublet's collections is at BM (and often erroneously cited as "holotype"). However, this study revealed that the specimens at P-JJR and LINN-SM are the only one with labels handwritten by Aublet. Most importantly, the publication of Lanjouw & Uittien (1940) provided many overlooked lectotypifications of Aublet's names. The article on this subject was published in **Taxon** 64(3): 595–624. 2015. See Abstract of presentation, below (see 3.3).

• **Index of French Guiana Collectors** - M. Hoff (Université Louis Pasteur, Strasbourg) & P.G. Delprete: Delprete has contributed a considerable amount of work during the last 5 years, mostly updating the manuscript, and including new collectors. In progress, to be probably submitted in 2018.

Publications (2013-2015) – CAY authors in **bold**.

Delprete, P.G. & C. Feuillet. 2013. Marie-Françoise Prévost "Fanchon". *Taxon* 62(2): 419.

- Delprete, P.G.** & C. Persson. 2013. *Sphinctanthus fluvii-dulcis* (Rubiaceae: Gardenieae), a new species from the Rio Doce Valley, Atlantic forest of Minas Gerais, Brazil, with detailed observations on ovary morphology. *Kew Bulletin* 68(1): 173-177.
- Delprete, P.G.**, C. Persson, E.B. Souza, R.M. Salas, E. Cabral & C.B. Costa. 2013 ["2012"]. Rubiaceae. In: T.B. Cavalcanti & E.B. A. Dias (Eds.), *Flora do Distrito Federal, Brasil*. Vol. 10. Embrapa, Brasília. 340 pp.
- Delprete, P.G.** 2014. *Ombrophytum guayanensis*, the first record of subfamily Lophophytoideae (Balanophoraceae) in the Guayana Shield. *Phytotaxa* 175: 263-269.
- Delprete, P.G.** 2014. *Utricularia julianae* (Lentibulariaceae), a new species from the savannas of the Oyapock River, French Guiana. *Phytotaxa* 156: 74-78.
- Delprete, P.G.** 2015. Timothy J. Motley (4 June 1965–28 March 2013) and his passion for Ethnobotany and Pacific Islands flora. *Phytotaxa* 206: 5-13.
- Delprete, P.G.** 2015. Revision of *Neobertiera* (Rubiaceae, Sipaneeae) with observations on distyly, and three new species from the Guianas. *Phytotaxa* 206: 118-132.
- Delprete, P.G.** & S. Dessein (Editors). 2015. Festschrift volume dedicated to Timothy Motley (1966–2013). *Phytotaxa* 206: 1-132.
- Delprete, P.G.** 2015. Typification and etymology of Aublet's Rubiaceae names. *Taxon* 64: 595-624.
- Delprete, P.G.** & J.H. Kirkbride. 2015. New combinations in *Eumachia* (Rubiaceae) for species occurring on the Guiana Shield. *Journal of the Botanical Research of Texas* 9: 75-79.
- Freitas, C.S. de, L. Kato, C.M.A. de Oliveira, L.H.K. Queiroz, M.J. Santana, I.T. Schuquel, **P.G. Delprete**, R.A. da Silva, G.O. Quintino, B.R. da Silva Neto, C.M.A. Soares & M. Pereira. 2014. β -Carboline alkaloids from *Galianthe ramosa* inhibit Malate Synthase from *Paracoccidioides* spp. *Planta Medica* 80: 1746-1752.
- Guitet, S., **Sabatier, D.**, Brunaux, O., Hérault, B., Aubry-Kientz, M., **Molino, J.-F.** & Baraloto, C. 2014. Estimating tropical tree diversity indices from forestry surveys: A method to integrate taxonomic uncertainty. *Forest Ecology and Management* 328: 270-281. doi: 10.1016/j.foreco.2014.05.045.
- Guitet, S., Pélissier, R., Brunaux, O., Jaouen, G. & **Sabatier, D.** 2015. Geomorphological landscape features explain floristic patterns in French Guiana rainforest. *Biodiversity and Conservation* 24: 1215-1237. doi: 10.1007/s10531-014-0854-8
- Kirkbride, J.H. & **P.G. Delprete**. 2015. New combinations in *Hexasepalum* (Rubiaceae, Spermaceae). *Journal of the Botanical Research of Texas* 9: 103-106.
- Paudyal, S.K., **P.G. Delprete** & T.J. Motley. 2014. Using molecular, morphological, and palynological evidence to transfer *Strumpfia maritima* to the monotypic tribe Strumpfiaceae (Cinchonoideae, Rubiaceae), and a re-delimitation of the tribe Chiococceae. *Systematic Botany* 39: 1197-1203.
- Pos, E., Guevara Andino, J.E., **Sabatier, D.**, **Molino J.-F.**, Pitman, N., Mogollón, H., Neill, D., Cerón, C., Rivas, G., Di Fiore, A., Thomas, R., Tirado, M., Young, K.R., Wang, O., Sierra, R., García-Villacorta, R., Zagt, R., Palacios, W., Aulestia, M. & Steege, H. ter. 2014. Are all species necessary to reveal ecologically important patterns? *Ecology and Evolution* 4: 4626-4636. doi: 10.1002/ece3.1246.
- Roggy, J.-C., Schimann, H., **Sabatier, D.**, **Molino J.-F.**, Freycon, V. & Domenach, A.-M. 2014. Complementary N uptake strategies between tree species in tropical rainforest. *International Scholarly Research Notices* 2014 Article ID 427194. doi: 10.1155/2014/427194.
- Steege, H. ter, Pitman N.C.A., **Sabatier, D.**, [...], **Molino, J.-F.**, [...] & Silman, M.R. [121 authors]. 2013. Hyperdominance in the Amazonian Tree Flora. *Science* 342(6156): 1243092. doi: 10.1126/science.1243092.
- Steege, H. ter, [...], **Molino, J.-F.**, **Sabatier, D.**, [...] & Gamarra, L.V. [158 authors] 2015. Estimating the global conservation status of more than 15,000 Amazonian tree species. *Science Advances* 1(10): 6 pp. doi: 10.1126/sciadv.1500936

2.4.5. K. Royal Botanic Gardens, Kew

By Eve Lucas

General

The RBG Kew Science underwent radical restructure during 2012-2015 with challenging results for classical taxonomy and less incentive for floristic works. The new head of the Americas team is Dr. Bente Klitgaard. Dr. Alex Munro was appointed to the Americas team. Dr. Daniela Zappi left to take up the position of Director of Science at the Rio de Janeiro Botanical Garden (Currently with MBEV Fellowship of the Instituto Tecnológico Vale (ITV), and based at the Museu Paraense Emílio Goeldi). Kew Publishing continues with the agreement to publish one fascicle of the Flora of the Guianas per year but does not know for how long this can be sustained. Eve Lucas has been Chair of the board of the Flora of the Guianas now for ten years; she would be pleased to hand over to someone who can dedicate more time to the role.

Flora treatments

The status of the following families is as follows (but if there is someone realistic and ready to act on anything, they are free to go ahead):

Labiatae - R.M. Harley – Will not continue.

Elaeocarpaceae - T.D.Pennington – Will not continue.

Meliaceae - N. Biggs, T.D.Pennington – Published!

Sapotaceae - S. Edwards, T.D. Pennington – *Pouteria* is finished. Terry Pennington will not continue

Myrtaceae - E. Lucas et al. - Discussion with Bruce Holst but both are over-committed. A multi-authored contribution would be most likely at this point.

Maarten Christenhusz (University of Helsinki), currently based part time at Kew, is contributing:

Caricaceae: Completed; Sylvia suggests it may go with Passifloraceae if possible.

Euphorbiaceae: *Euphorbia* complete. Also *Haematostemon*, *Omphalea*, *Pera*, *Plukenetia* and *Tragia*, prepared by Lynn J. Gillespie. Christenhusz cannot commit to completing the family and suggests Hajo Esser to coordinate.

Marattiaceae: Completed, requires formatting.

Publication at Kew - Since the last FoG meeting:

Series A: Fascicle 31, Dilleniaceae, Vitaceae, Meliaceae; published in 2016.

Publishing affairs

The University of Chicago Press distributes for K in United States, Canada and Mexico (since 2009).

Kew Publishing (KP) is more and more focused on profit than previously but maintains original science is its main product.

Flora of the Guianas publication is reduced to single fascicle per year. Sells and approaches breaking even but still operates at a small loss.

Other Floras published by Kew either cover larger areas and make profit (e.g. FTEA) or cover comparable areas (FZ) and are subsidised.

Flora Zambesiaca is subsidised by Kew's Bentham-Moxon Trust, i.e. it pays production costs (£1.5-5K) and splits the profits with KP.

KP products will be reviewed in the short to medium term; there is not strong optimism that FOG will be maintained. The current situation works well for no-one, it is time to find a new publication process.

Kew Science

At the end of 2014 the Jodrell laboratory, Millennium Seedbank and Herbarium restructured into four new teams:

- 1) Comparative Plant and Fungal Biology
- 2) Collections
- 3) Plant Identification & Naming
- 4) Sustainable use

There was an overall reduction in Taxonomic posts with most dedicated taxonomists now 'Integrated Monographers' within Comparative Plant and Fungal Biology. There is a general shift away from pure taxonomy to 'higher impact' studies with potential to generate income.

Within 'Plant Identification and Naming' the tropical Americas Team previously led by William Milliken (Ethnobotany, Brazil & Amazon focus) is now the Americas Team led by Bente Klitgaard (Leguminosae & Bolivia focus). This team has two dedicated researchers (Nicholas Hind – Compositae, Alex Monro – Urticaceae) and some contracted early career researchers.

Within 'Comparative Plant and Fungal Biology' there are dedicated researchers/'Integrated Monographers': Gwilym Lewis – Leguminosae; Maria Vorontsova – Graminae, Africa & Madagascar; Wolf Eiserhart & William Baker – Palms, worldwide but with focus on Madagascar; Eve Lucas – Myrtaceae. There are also contracted early career researchers.

Flora writing is not a current priority, and no researchers (IM) have a curatorial remit.

2.4.6. L. Nationaal Herbarium Nederland, Leiden

By Tinde van Andel

General

The former National Herbarium of The Netherlands is now part of Naturalis Biodiversity Center (www.naturalis.nl). The collections, including the former Utrecht branch, have their new address at the Nieuwenhuizenweg 19, located near the Lammenschans station in Leiden. The entire herbarium collection is digitized and available from the Naturalis Biportal (<http://biportal.naturalis.nl>).

In 2016, the renovation of their main office, museum and zoological collections of the the Naturalis building was started. The herbarium collections will remain available for research.

Paul Maas and contributors published the revision of the Neotropical genus *Gutteria* (see below). The Annonaceae manuscript for FOG is ready, apart from *Annona*, to be prepared by Rainer Heimo (Naturhistorisches Museum Wien).

Charlotte van't Klooster is now working on a Ph.D. thesis on traditional plant use of Saramaccan Maroons in Pikin Slee, Suriname River.

Tinde van Andel received a grant of the National Geographic Society's Science and Exploration Europe for a fieldwork study in 2017 on traditional rice landraces grown by Maroons in French Guiana.

Chequita Bhikhi received a grant from the Alberta Mennega Foundation to prepare a new version of the 'Bomenboek voor Suriname' by Mennega et al. from the 1960s. The full colour illustrated field guide with wood descriptions and photographs has been printed with the title "Timber Trees of Suriname" (LM Publishers, Volendam).

Taxonomic research for Flora of the Guianas

During the last three years, there has been very little taxonomic research focusing on the Neotropics. The appointment of the editor is to be dedicated mostly to fund raising activities (3/4 of the contractual hours), which also hampers the efforts of performing taxonomic research. Paul Maas, Hiltje Maas and Lubbert Westra are the only ones performing taxonomic research in the Guianas, as guest researchers.

Expeditions:

In May 2014, Sylvia Mota de Oliveira, Anastasia Stefanaki and Piotr Pisarek (Naturalis Biodiversity Center) spent two weeks in French Guiana, in order to have a first impression of the forest in French Guiana and to work in the Herbarium, studying the families Lamiaceae (A. Stefanaki) and Myristicaceae (P. Pisarek). The group has visited Montagnes Tortue and Savane Roche Virginie, staying respectively at the IRD and ONF bases "Grillon" and "Toulori". A. Stefanaki and P. Pisarek have also visited the surroundings of Kourou and stayed at Piste de St. Elie.

Publications – NHN-authors in bold.

Andel, T.R. van and L.G. Carvalheiro. 2013. Why urban citizens in development countries use herbal medicine: the case of Suriname. *Evidence-Based Complementary and Alternative Medicine*. Article ID 687197, 1-13.

Andel, T.R. van et al. 2016. Tracing ancestor rice of Suriname Maroons back to its African origin. *Nature Plants* 2 (10) 16149.

Andel, T.R. van, van der Velden, A. & Reijers, M. 2016. The 'Botanical gardens of the Dispossessed' revisited: Diversity and Significance of Old World Crops grown by Suriname Maroons. *Genetic Resources and Crop Evolution* 63 (4): 695-710.

Andel, T.R. van. 2015. African names for American Plants. *American Scientist* 103 (4), 268-275

Andel, T.R. van. 2015. The reinvention of household medicine by enslaved Africans in Suriname. In: H. Marland, R. Bivins (eds.), Special Issue: *Social History of Medicine*, "Histories of Medicine in the Household". hkv014

Andel, T.R. van, C.I.E.A. van 't Klooster, Quiroz, D.K., Towns, A.M., M. van den Berg. 2014. Local plant names reveal that enslaved Africans recognized substantial parts of the New World flora. *PNAS* 111 (50), E5346–E5353.

Andel, T.R. van & Maas, P.J.M. 2016. Botanical identifications of the plants depicted in the Metamorphosis Insectorum Surinamensis. In: van Delft, M. and Mulder, H. (eds.) Edited version and Complete facsimile of the Metamorphosis Insectorum Surinamensis of Maria Sybilla Merian (1705). Lannoo Publishers, Tielt, Belgium.

Maas, P.J.M., Westra, L.Y.T., Guerrero, S. Arias, Lobão, A.Q., Scharf, U., Zamora, N.A. & Erkens, R.H.J. 2015. Confronting a morphological nightmare: revision of the Neotropical genus *Guatteria* (Annonaceae). *Blumea* 60: 1–219.
<http://www.ingentaconnect.com/content/nhn/blumea/2015/00000060/F0030001/art00001>

Mota de Oliveira S., Steege H. ter 2015. Bryophyte communities in the Amazon forest are regulated by height on the host tree and site elevation. *Journal of Ecology* 103: 441-450.

- van't Klooster, C.I.E.A.**, Reis, R. and **Andel, T.R. van**. 2016. Patterns in medicinal plant knowledge and use in a Maroon village in Suriname. *Journal of Ethnopharmacology* 189, 319-330.
- Vossen, T.E., Towns, A.M., Ruyschaert, S., Quiroz, D. and **T.R. van Andel**. 2014. Consequences of the trans-Atlantic slave trade on medicinal plant selection: Plant use for cultural bound syndromes affecting children in Suriname and Western Africa. *Plos ONE* 9 (11), e112345.
- Steege, H. ter, Pitman, N.C.A., Baraloto, C. ...**T.R. van Andel**... et al.. 2013. Hyperdominance in the Amazonian Tree Flora. *Science* 342, 18 October 2013, 1243092.
- Steege H. ter, Vaessen R.W., Cardenas D., Sabatier D., Antonelli A., **Mota de Oliveira S.**, Pitman N., Jørgensen P.M., Salomão R.P. 2016. The discovery of the Amazonian tree flora with an updated checklist of all known tree taxa. *Scientific Reports* 6: 29549.

2.43.7. MG. Museu Paraense Emílio Goeldi, Belém

By Anna Luiza Ilkiu-Borges

General

The initial FOG representative for the Museu Paraense Emílio Goeldi (MG), Pedro Viana, has been replaced by Anna Luiza Ilkiu-Borges. The MG is situated in Belém, state of Pará, northern Brazil. In 2016, this natural history museum became 150 years old. It is the second scientific museum founded in Brazil, and the first founded in the Brazilian Amazon. Currently it houses 18 collections, with ca. 4.5 million registered items. Its herbarium (MG) houses over 225,000 specimens, including 3,231 type specimens. The label data of about 139,600 specimens is registered in the herbarium database. Digital images of 2,793 of types and historical specimens are available at the Museu Goeldi Portal at: <http://marte.museu-goeldi.br/herbario/catalogo/?modo=avancada>.

Besides the herbarium, the institution offers other facilities for the development of scientific projects, such as: 1) the laboratories of Plant Taxonomy, Molecular Biology, Plant Anatomy, and Phytochemistry, 2) the Graduate programs in Biological Sciences – Tropical Botany in cooperation with the Federal Rural University of Amazonia (UFRA) for master's degree, and in Biodiversity and Evolution for doctoral and master's degrees.

The staff of the Botany Department of the Museu Goeldi is composed of 18 researchers, 13 technicians, 6 assistants of Science and Technology, and 112 fellows composed by doctors, masters with long- or short-term fellowship, as well as doctoral, master, and undergraduate students.

Since October 2015 the Museu Goeldi has the honor of being part of the Consortium Flora das Guianas, after the approval of the FOG Consortium. However, the interest of working in the Flora of the Guianas is older. The area with boundary between Brazil and the Guianas are still poorly known and it is of great interest of our research to access these sites and study their biodiversity. The states Pará and Amapá are part of the Guiana Shield, and their flora has many species in common with the Guianas.

Starting from 2014, master dissertations on plant families occurring in the states of Pará and Amapá and in the Guianas are carried out by master students of the graduation program Biological Sciences – Tropical Botany (see below).

Taxonomic research for the Flora of the Guianas

During the last few years, the staff of the Museu Goeldi initiated the taxonomic research focusing on the Guianas and areas below the boundary between Brazil and the countries of the Guianas, enclosing areas from Pará and Amapá states. Two master students, with Piero Delprete (CAY) either as Director or Co-Director, have been working on FOG family treatments:

1) **Lisandra Teixeira** worked on the project “Elaeocarpaceae in the Guianas and in the states of Amapá and Pará (Brazil)”. The project aims at a taxonomic study of the species of Elaeocarpaceae occurring in the Guianas (Guyana, Surinam, and French Guiana) and the states of Amapá and Pará, studying the specimens from the MG, IAN, INPA, HAMAB, RB, CAY, and BRG herbaria. The taxonomic treatment includes a key, generic and specific descriptions, illustrations, taxonomic comments, notes on the geographic distribution for all species, and list of exsiccatae for all studied specimens. The treatment includes 27 species of the genus *Sloanea* L. (the sole genus of the family present in the region).

2) **Camille Lopes** worked on the project “Ericaceae in the Guianas and in the states of Amapá and Pará (Brazil)”. The taxonomic treatment includes 15 genera and 30 species, based on the specimens of the MG, CAY, HAMAB, RB, and INPA herbaria. It includes a key to genera and species, morphological description, illustrations, comments geographic distribution, besides the list of all consulted exsiccatae.

2.4.8. NY. New York Botanical Garden, New York

By Benjamin Torke

General

Since the meeting in Leiden in 2012, there have been several relevant staff changes at the New York Botanical Garden. The following staff retired or will retire before the end of 2015: Michael Nee (Neotropical Solanaceae and Cucurbitaceae), Scott Mori (Lecythidaceae), Jackie Kallunki (Assistant Director of the Herbarium, Neotropical Rutaceae) and Thomas Zanoni (Senior Curatorial Assistant, expert on the Caribbean flora). In addition, Paola Pedraza (Neotropical Ericaceae, Andean-Chocoan flora) resigned her position at the Garden, and Jim Miller (Vice President for Science) left the Garden and is now director of research at Missouri Botanical Garden. New hires include Matthew Pace (Assistant Curator of the Herbarium, research on *Spiranthes*) and James Lendemer (lichens, especially northeastern North America). Barbara Thiers has become the new Vice President for Science.

NYBG received grants from the Alfred P. Sloan Foundation and from Google, Inc. for the development of the World Flora Online. This multi-institutional initiative aims to produce a complete online flora for all plants by 2020, one of the goals of the Global Strategy for Plant Conservation. In addition, NYBG curators Wayt Thomas and Fabián Michelangeli are part of a National Science Foundation (NSF)-funded Dimensions of Biodiversity grant investigating the assembly and evolution of the Atlantic Coastal Forest biota of Brazil, while Scott Mori and Barbara Thiers are part of a similarly focused NSF grant in Amazonian Brazil. Douglas Daly received a grant from the Moore Foundation to address native forest management issues in Amazonian Brazil. Benjamin Torke received funding from NSF to carry out intensive floristic inventories of two large protected areas in the Brazilian Amazon, Tapajós National Forest and Amazônia National Park.

NYBG made significant advances in the ongoing digitization of its herbarium collections, adding approximately 500,000 specimens to the Virtual Herbarium each year. Completed cataloguing projects cover all vascular plants from Brazil, all plant and fungi from the Caribbean, and all legume groups monographed by Rupert Barneby. Ongoing projects will result in the digitization of all micro and macro-fungi collections. For a full list of electronic catalogues at NYBG, see:

<http://sciweb.nybg.org/science2/VirtualHerbarium.asp>

Field work in Suriname

Fabián Michelangeli participated in a World Wildlife Fund expedition to Mount Tafelberg in Suriname in 2014.

Flora treatments

Simaroubaceae (including Picramniaceae): Wayt Thomas: Not actively working on a manuscript, but says he intends to do it.

Burseraceae - Douglas Daly: Not actively working on a manuscript, but says he intends to do it.

Solanaceae and **Cucurbitaceae** - Mike Nee: Actively working on treatments; retired from NYBG staff in 2013. He will continue, although no date given.

Benjamin Torke: At the last meeting (Leiden 2012) I agreed to explore the possibility to organize a multi-authored treatment of the Leguminosae subfamily Papilionoideae. Due to other commitments, I decided not to coordinate a treatment of Papilionoideae at this time, although I would like to treat *Ormosia* and update the treatment of *Swartzia* for the Flora. I also offered to explore the possibility of hosting the next FOG meeting at NYBG. I will make a decision about the meeting and will report it to the Board by the end of 2016 [the meeting will take place in November 2017 at NYBG – Ed.].

2.4.8. P. Muséum National d'Histoire Naturelle, Paris

By Odile Poncy

General

The general situation at P is contradictory. Thanks to the renovation program (2008-2013), the Herbarium re-opened with highly improved working conditions for access to one of the most important amount of specimens and data hosted and curated; however, the taxonomic activity of its scientific staff is decreasing year after year. There is less and less hope to hire additional staff for taxonomic research in the Guianas.

The situation of the project and the future participation of P in the FOG consortium have become uncertain since nobody is willing/available to become the P representative after Odile Poncy retirement in mid 2016. However, the Herbarium is now accurately managed and both the present Keeper (M. Jeanson) and the Scientific Head of the Herbarium (Prof. S. Müller) support the idea that P should be part of the consortium in the forthcoming years.

Field work in French Guiana (OP)

2013. Reserve naturelle "La Trinité"

2015. Participation in the "La Planète revisitée" expedition in Alama River and inselberg Mitaraka, southern French Guiana.

Flora treatments:

Ochnaceae - C. Sastre: significant progress since Sylvia Mota de Oliveira has revised the entire ms and sent comments and suggestion to P by July 2015. The author started updating and correcting the ms. Expected by mid 2016 (unless the author did not give precise plans).

Apocynaceae - L. Allorge: No advance in terms of editorial process. The author did not want to update the ms according to recent phylogenetic issues and referees suggestions. She posted her version as it was on a website (dedicated to biodiversity in Madagascar) with free access:

<http://www.ilerouge.org/documents/Flore%20des%20trois%20Guyanes.pdf>

Monimiaceae - M. Pignal & J. Jérémie: No progress. The authors gave up with the project (although the ms was almost completed more than 10 years ago).

Cyclanthaceae - L. Barrabé & O. Poncy: Treatment almost completed (format and English corrections to be incorporated; one new species to publish). No progress. Eduardo Silva Leal (Universidade Federal Rural da Amazonia, Belém, Pará, Brazil), is willing to collaborate and get this contribution completed. This was discussed during the meeting.

2.4.9. US. United States National Herbarium, Washington

By Pedro Acevedo Rodriguez

General

The Smithsonian Institution continues its commitment of collaboration with the Consortium of Flora of the Guianas by participating in the organizational meetings and providing treatments for various families of vascular plants. Funding for the Program for the Biodiversity of the Guiana Shield (BDGSP) will cease by the end of 2017. During this period BDGSP will finish processing the remaining collections from Guyana and making them available for ongoing and future studies; and will continue updating the online flora of the Guianas's specimen database. Christian Feuillet who has been a strong supporter of the consortium, recently retired and moved to the state of Washington. Nevertheless he will continue this work in order to complete various family treatments assigned to him.

Flora treatments:

Araliaceae - J. Wen: Will do a treatment of the family, no dateline has yet been set.

Cyperaceae - coordinated by Mark T. Strong: Treatments for the following genera will be prepared as follows: *Eleocharis* (E.H. Roalson); *Everardia* and *Lagenocarpus* (M.T. Strong); *Hypolytrum* and *Mapania* (D.A. Simpson).

Boraginaceae - C. Feuillet: Treatment is nearly finished, manuscript will be submitted in 2017.

Commelinaceae - B. Faden: Work on a treatment for this family continues.

Malvaceae - L.J. Dorr: Progress in completing treatment continues, although at a slower pace due to the increased work demands of becoming Chairman of the Department of Botany.

Passifloraceae - C. Feuillet: Treatment nearly finished, manuscript will be submitted in 2017.

Publications since last meeting (2013-2016):

Aymard C., Gerardo A. & Kelloff C.A. 2016. Flora of the Guianas Fasc. 31. Dilleniaceae. 1-40. Royal Botanic Garden, Kew.

Feuillet, C. 2016. Two new combinations in *Euploca* Nutt. (Heliotropiaceae, Boraginales) and a conspectus of the species of the Guiana Shield area. *PhytoKeys*, 61: 101-124. doi: 10.3897/phytokeys.61.6260

Henkel, T.W., Kelloff, C.L., Alexander, S.N. & Funk, V.A. 2016. Smithsonian Plant Collections, Guyana: 1992–2014, Terry W. Henkel. *Smithsonian Contributions to Botany* 104: vi-206. doi: 10.5479/si.1938-2812.104

Strong, M.T. 2016. Three New Cyperaceae from the Cuyuni-Mazaruni Region of Guyana (South America). *Novon* 24(4): 401-407. doi:10.3417/2015032

- Skog, L.E. & Clark, J.L. 2015. Novae Gesneriaceae Neotropicarum XIX: A third, new species of the elusive *Anetanthus* found in Guyana. *Phytotaxa* 218(2): 177-183. doi:10.11646/phytotaxa.218.2.8
- Hoffman, B., DaSilva, P., Funk, V.A., Kelloff, C.L. 2015. The biology and use of Nibbi *Heteropsis flexuosa* (Araceae): the source of an aerial root fiber product in Guyana. Centre for the Study of Biological Diversity, University of Guyana, Faculty of Natural Sciences.
- Alexander, S.N., Hoffman, B., Kelloff, C.L. & Funk, V.A. 2014. Smithsonian Plant Collections, the Guianas: 1991-1993 and 1995-2000, Bruce Hoffman. *Smithsonian Contributions to Botany* 101: 1-188. doi: 10.5479/si.19382812.101.



International Conference “Flora of the Guianas (FOG) Meeting and Seminars - Celebration of the 50th Anniversary of the CAY Herbarium”
Conference Participants. Photo by Serge Pinel.

3. ABSTRACTS OF SEMINARS / RESUMÉS DES SEMINAIRES

3.1. The Botany Section of the Museu Paraense Emílio Goeldi

3.1. La section Botanique du Musée Paraense Emílio Goeldi

Pedro Viana (absent, presented by Piero Delprete)

Botany Department, Museu Paraense Emílio Goeldi, Belém, Pará, Brazil

The first attempt to create a museum of natural history in Belém was made in 1861; however, due to some bureaucratic complications, it was officially founded in 1866 as the “Philomatic Society of Pará” and its first Director was Domingos Soares Ferreira Penna (1818-1888). The institution was later renamed “Museu Paraense de História Natural e Etnografia”. It took the final name “Museu Paraense Emílio Goeldi” in 1871, in honor of the Swiss naturalist Emílio Augusto Goeldi (1859-1917), and is currently part of the Ministry of Science, Technology and Innovation (Brazilian Government). Since the beginning, botany has been one of the most important sections of the Museum. The MG herbarium, part the Botany Department, was founded in 1896 by the Swiss botanist Jacques Huber (1867-1914). It was the second herbarium founded in Brazil, and is the oldest in Brazilian Amazon. Currently, the herbarium holds 3,231 types and over 225,000 specimens, especially Angiosperms, but also Gymnosperms, and a large collections of Ferns, Mosses and Fungi. The Department of Botany or the “Coordination of Botany” (CBO) of the Emílio Goeldi Museum has as the Mission Statement “to plan, to coordinate, to encourage, and to promote studies and research on: 1. Plant Systematics and Mycology; 2. Plant Morphology and Anatomy; 3. Plant Ecology, conservation and management; 4. Economic botany, ethnobotany and phytochemistry.” The Coordination of Botany today includes as permanent staff 12 researchers, 2 technologists, 14 technicians and 4 science & technology assistants. More than 70 fellowship holders (of several modalities) and 4 visiting researchers also develop projects and studies at the CBO. Two graduate programs with CBO staff members are based in the Emílio Goeldi Museum, in cooperation with the Federal Rural University of Amazonia (UFRA): the Graduate Program in Biological Sciences – Tropical Botany (Master degree), and the recently founded Graduate Program in Biodiversity and Evolution (Master and Doctoral degree). In 2014, CBO staff published 65 articles, collaborated in 62 ongoing projects (23 with financial support); 11 students obtained a master’s degree and 24 undergraduate students concluded their scientific initiation projects. Since 2013, students of the Graduate Program in Biological Sciences – Tropical Botany (MPEG/Federal Rural University of the Amazon-UFRA) began to develop their Master Thesis related to Flora of the Guianas. Since 2015 the Emílio Goeldi Museum it officially part of the Flora of the Guianas Consortium. The MG Herbarium facilities provide plenty of conditions for the development of studies on this approach.

3.2. The Paris Herbarium has entered in the 21th century

3.2. L’Herbier de Paris est entré dans le 21^{me} siècle

Odile Poncy

Herbier National, Muséum National d’Histoire Naturelle, 16 Rue Buffon, Case Postal 39, 75231 Paris Cedex 05, France

The collections of the Paris Herbarium have long been regarded as one of the richest as well as one of the least well stored. Although the large building is less than 80 years old, our storage capacity was already facing saturation more than 20 years ago. A complete renovation (building and collections) was undertaken within the existing building. The herbarium staff was involved in the preparation of the project. The architects met the required specifications in terms of need for storage capacity (doubling it!), environmental control, technical areas, and a new library. Renovating the collections themselves consisted in two distinct and complementary operations. Firstly, the huge backlog was prepared for incorporation into the collections. The herbarium staff has been involved in preliminary sorting, distributing duplicates, verifying labels... then selected specimens were mounted, with a 4-year contract by a private company with a team that averaged 15 people. The cooperation with the company was fruitful to set an efficient protocol and choose the best materials and supplies. The second step was handled by another contractor and was carried out in a large warehouse-like space located at 20 km from the Museum. It involved processing the entire general collection of vascular plants, with the triple objective of: 1) reconditioning, in order to facilitate the switch from the strapped bundles historically used in Paris to standard genus covers arranged in smaller pigeonholes; 2) mass-digitization, to produce more than 5 million images at 300 dpi resolution; 3) re-ordering all the holdings: this included both filing the sheets mounted as part of the backlog project and completing a new arrangement for the angiosperms, following the APG3 sequence. The process was completed in less than three years. In 2013, the Herbarium began a new life, the staff adapted to the renewed and easier working uses, including the curation of both the real and the virtual herbarium, for the benefit of the botanical community worldwide.

3.3. Aublet in French Guiana and his collections

3.3. Aublet en Guyane Française et ses collections

Piero G. Delprete

Herbier IRD de Guyane, UMR AMAP, Institut de Recherche pour le Développement (IRD), B.P. 90165, 97323 Cayenne Cédex, French Guiana (France)

Jean Baptiste Christian Aublet (or “Fusée Aublet”) was born in Salon de Provence (southern France) in November 1720. He arrived at Cayenne on the 21 July 1762, as “King’s botanist and apothecary”. At the beginning of his stay he was hosted by the Jesuit community at Loyola, near Cayenne. From July 1762 through April 1763 he collected in the vicinity of Cayenne. On 13 April 1763 he left Cayenne by canoe and traveled up the Tour de l’Ile River, then the Oyak River (or Comté River) canoeing upstream, and finally entered Galibi Creek during the first week of May 1763. In March 1764 he traveled by canoe up the Orapu River and then walked in the “Caux” Mountain range [now Kaw Mountains], and canoed upstream on Timoutou Creek, near the Tour de l’Ile River. His last long trip was from Cayenne to Kourou (then a small village), and from there, by boat, for a short visit on the Iles du Salut. After a short stay in Haiti, he arrived in Paris in 1765, and began the descriptions of the plants he collected, with the help of Bernard de Jussieu. Aublet described 576 genera and 1,241 species of plants in his *Histoire de la Guyane Française*. Aublet’s herbarium, original drawings, and notes were purchased by Sir Joseph Banks, and are now preserved at the Natural History Museum of London (BM). However, Aublet specimens are present in other herbaria. The main set is in BM; however, this set is incomplete. As Banks shared specimens with Linnaeus filius, a small set of Aublet specimens is now housed in the Smith Herbarium (LINN-SM) of the Linnean Society, London. Another important set of Aublet specimens is included in the Rousseau Herbarium (P-JJR), which is now preserved at the *Muséum National d’Histoire Naturelle*, Paris. All the specimens at P-JJR and most of the specimens at LINN-SM have a label

handwritten by Aublet. In 1940 Lanjou & Huittien published the discovery of previously overlooked Aublet collections in the herbarium of Jean-Jacques Rousseau. They presented a detailed history of the Rousseau and Aublet herbaria, and how they came together. This ensemble is currently known as the Rousseau Herbarium (P-JJR). In Section 6 of their article, entitled “*Types de genre ou d’espèce de Fusée Aublet dans l’herbier de Jean Jacques Rousseau en possession de M. Henri Denaiffe à Carignan (Ardennes), France*” [Types of genera and species of *Fusée* Aublet in the herbarium of Jean Jacques Rousseau in possession of Henri Denaiffe at Carignan (Ardennes), France], they listed all the Aublet specimens found in this herbarium. Aside from being a full report of the Aublet specimens in P-JJR, the importance of this article is that the authors stated that the specimens listed were to be considered the “types” (i.e., nomenclatural types) of Aublet’s names. Indeed a clear statement to this effect was included in Section 3 of their article. According to Article 9.9 of the *Code*, the citations of the “types” of names in Section 6 of Lanjou & Huittien (1940) must be recognized as lectotypifications. (Delprete, *Taxon* 64: 595-624. 2015).



Map of French Guiana in 1729. Carte de la Guïane Française ou du Gouvernement de Caïenne depuis de Cape Nord jusqu'à la Riviere de Maroni inclusivement. Par le Sr. D'Anville, Géographe Ordre du Roi. Septembre 1729.

3.4. Fifty years of plant hunting in the Neotropics

3.4. Cinquante ans de chasse aux plantes dans les Néotropiques

Paul J.M. Maas

Naturalis Biodiversity Center, Botany Section, Vondellaan 55, 2332 AA Leiden, The Netherlands

More than 50 years ago, in 1964, I started my tropical career with a long visit of almost one year to Suriname. The aim of that visit was joining some botanical collecting expeditions and to do some ecological studies on forests in western Suriname. During the many years to follow, I started, at the Utrecht Herbarium, taxonomic research on several plant families, the most important being Annonaceae (the Soursop family) and Zingiberaceae (the ginger family). This research was done mainly in the framework of Flora Neotropica and various local Floras (like Flora of the Guianas, of course). In this presentation I will give a historical survey of my career, showing some aspects of field work, collecting, teaching, various herbaria, and to end some nice and puzzling photographs of some Guianan plants.



Paul Maas with his team of collectors and tree plotter John Tawjoeran (bottom left) during an expedition to the Bakhuis Mts. (Sipaliwini District, Suriname, 1965). Photo by P.A. Florschütz.



Paul Maas and Hiltje Maas-van de Kamer plant pressing during their first Annonaceae expedition (Peru, 1984). Photo by L. Westra.

3.5. Aquatic macrophytes of Suriname

3.5. Macrophytes aquatiques du Suriname

Sabitrie Jairam-Doerga

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Aquatic plants are important components of the aquatic ecosystems. There have several life forms, as they may be submerged, emerged or free floating. The main objective of this research is to document the aquatic macrophytes in northern Suriname. This was carried out in 90 plots of 2 x 2 meter that were established in the following water body categories: running water, stagnant open water, wetlands and disturbed area. These water bodies are found in the Young Coastal Plain, Old Coastal Plain and the Savanna Belt of Suriname. As a result, 50 species of aquatic macrophytes were found in the 90 plots, including 3 new records for Suriname. The species distribution in the geographical zones showed 30 species occurring in the Young Coastal Plain, 26 species in the Old Coastal Plain, and 9 species in the Savanna belt. The 50 plants were categorized according to Hutchinson's five plant types (Emergent Vegetation, Rooted Floating Vegetation, Algae, Non-Rooted Floating Vegetation, Submerged Vegetation). The highest diversity was found in the stagnant open water category, in the Saramacca District.



Mayaca fluviatilis Aubl. (Mayacaceae). Suriname River, Suriname. Photo by S. Jairam-Doerga.

3.6. A re-examination of Paullinieae (Sapindaceae)

3.6. Une ré-examination des Paullinieae (Sapindaceae)

Pedro Acevedo-Rodriguez and collaborators.

Department of Botany, Smithsonian Institution, National Museum of Natural History, NHB-166, Washington, DC 20560, USA

Morphological evidence suggests that the tribe Paullinieae is monophyletic yet nested within the Thouinieae tribe calling for an in depth analysis of their constituent genera in order to produce a natural classification of this group. Based on molecular phylogenetic analyses of ITS and the *trnL* intron, along with a critical evaluation of morphology, both tribes are placed in a supertribe here called Paulliniodae. This supertribe is morphologically characterized by zygomorphic flowers, thyrses with lateral cincinni, corolla of 4 petals, and alternate leaves with a well-developed distal leaflet, and contains four subclades designated as tribes Athyaneae, Bridgesieae, Thouinieae, and Paullinieae. The first two are here designated as new tribes following the topology of the maximum likelihood consensus tree produced through our analyses. The tribe Bridgesieae solely contains the monospecific tree genus *Bridgesia* with ex-stipulate, simple leaves, and isopolar, spherical, tricolporate pollen grains. Tribe Athyaneae is created to accommodate the second clade that contains *Athyana* and *Diatenopteryx*, and is composed of small trees with ex-stipulate pinnately compound leaves, and isopolar, oblate to spherical, porate pollen grains. Tribe Thouinieae containing *Thouinia*, *Allophylastrum*, and *Allophylus* is resurrected and amended to include genera having ex-stipulate trees or shrubs with trifoliolate or unifoliolate leaves. The tribe Paullinieae, which includes *Thinouia*, *Lophostigma*, *Serjania*, *Cardiospermum*, *Urvillea* and *Paullinia*, is characterized by stipulate climbers or climber-derived shrubs with a pair of inflorescence tendrils. *Guindillia* previously considered a member of the Thouinieae, is here excluded from the Paulliniodae based on phylogenetic evidence and morphology. The small genera *Balsas* and *Houssayanthus* have phylogenetic positions deeply nested within *Serjania* and are thus not recognized to allow a monophyletic circumscription for *Serjania*. *Cardiospermum* is re-circumscribed with many species transferred to *Serjania* or *Urvillea*.

3.7. Neotropical Myrtaceae phylo-systematics and biogeography

3.7. Phylo-systématique et biogéographie des Myrtaceae Néotropicales

Eve Lucas

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Neotropical Myrtaceae are emerging from a period of taxonomic turmoil. Myrtaceae is one of the most taxonomically difficult families in south America due to 1) high levels of morphological similarity and plasticity, 2) the existence of two very large genera: *Eugenia* and *Myrcia* s.l. (ca. 1000 and 700 species respectively). *Myrcia* s.l. encompasses three other traditionally accepted genera, many species of which are gradually being transferred to *Myrcia*. *Myrcia* s.l. is of immense ecological importance in the Atlantic forests and cerrado savanna of Eastern Brazil and is diverse in other threatened tropical rainforest biomes such as in the Amazon and Caribbean. A monograph of the group is long overdue and will be supported by a new sub-generic classification currently in preparation. Before a new classification of the group is published, these clades are tested using morphological and phylogenetic data to show that they are diagnosable natural groups. Clade by clade, researchers are increasing the sample of species included in DNA-based phylogenies, testing for monophyly and identifying species relationships. Clade by clade, (often) the same researchers are monographing the species, providing descriptions, establishing the nomenclature and generating baseline distribution data upon which other studies relating the taxonomic work to ecology and evolution can be built. These subsequent morphological, anatomical, biogeographical, evolutionary and ecological investigations then feedback into *Myrcia* s.l. systematics and bring taxonomic control and a user friendly classification tantalizingly close.

3.8. Pteridophytes and Lycophytes from the Guianas – Progress and update

3.8. Fougères et Lycophytes des Guyanes – Progrès et mise à jour

Michel Boudrie¹ & Georges Cremers²

¹Cayenne, French Guiana (France)

²[ex Institut de Recherche pour le Développement (IRD)] Muséum National d'Histoire Naturelle, Département Systématique et Evolution, USM 7205 OSEB, Case Postale 39, 57 rue Cuvier, F-75231 Paris cedex 05, France

As of October 2015, the number of Ferns and Lycophytes taxa for the three Guianas was established to a total of 652 (343 for French Guiana, 336 for Suriname, 577 for Guyana). Since the publication of the three first fascicles (3, 4, 6) of the Flora of the Guianas in 1991, 1993 and 1994, numerous studies, taxonomic revisions and molecular phylogenies were produced. This led to many taxonomic changes in families, genera and species, and to a new classification in 2011. These changes have a strong implication in the arrangement of the FOG families as proposed in 1991. This is one of the reasons why the preparation of the next six fascicles was postponed. Fascicle 1 is waiting for the revision of *Danaea*. Fascicle 2 is waiting for the revision (in progress) of *Metaxya* and *Anemia*. Fascicle 3 needs an update according to the revision of Hymenophyllaceae completed in 2006. Fascicle 4 also needs an update of *Hypolepis* of a 2012 revision. The Pteridaceae, Fascicle 5, is currently in progress with the future description of several *Adiantum* species. Fascicle 6 will be updated with the new arrangement in Dryopteridaceae (genera previously in this family, such as *Cyclopeltis*, *Diplazium*, *Hemidictyum*, *Tectaria*, *Triplophyllum*, etc., now transferred to other families). The text of Fascicle 7

(Lomariopsidaceae, Blechnaceae, Aspleniaceae) is the most advanced, despite a few issues to be solved in *Blechnum* species from Guyana. Fascicle 8 is also well advanced (ex-Grammitidaceae transferred into Polypodiaceae, and recently fully revised and segregated in several genera; Polypodiaceae). Fascicle 9, Lycopodiaceae, is almost completed, although Isoetaceae are currently under revision. Finally, we also mention the discovery of several new records for French Guiana during the last five years, such as *Pseudolycopodiella tatei*, *Phlegmariurus acerosus*, *Serpocaulon wagneri*, *Stenogrammitis limula* and *Vittaria graminifolia*. Beside the preparation of the above mentioned fascicles for the FOG and the studies in progress, we also intend to complete an updated checklist of the Pteridophytes of the Guianas.



Stenogrammitis limula (H. Christ) Labiak. Itoupé Mt., French Guiana. Photo by O. Tostain ©.

3.9. Presentation of the book « Guide des Palmiers de Guyane » (Guide to the Palms of French Guiana)

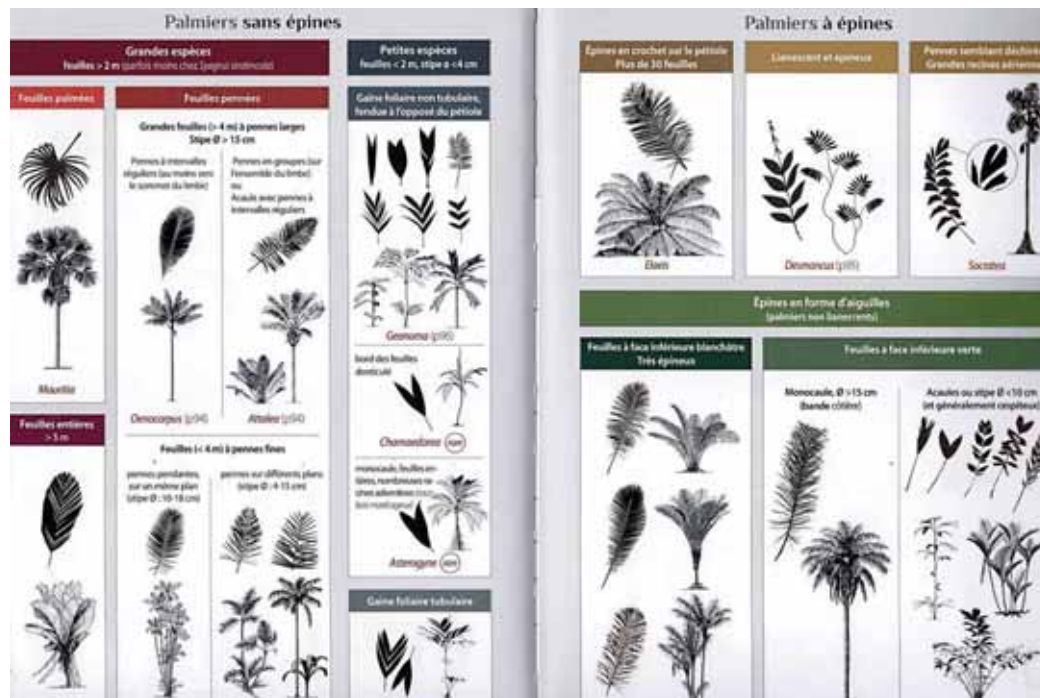
3.9. Présentation de l'ouvrage « Guide des Palmiers de Guyane »

Jean-Jacques de Granville

Cayenne, French Guiana (France)

Le "Guide des palmiers de Guyane" est un projet de l'Office National des Forêts (ONF), avec les financements FEDER, paru en 2014. Le Guide, dont la coordination éditoriale revient à Marc Gayot (ONF), est un ouvrage collaboratif auquel ont participé une dizaine de scientifiques de l'Institut de Recherche pour le Développement (IRD), du Muséum National d'Histoire Naturelle (MNHN), du Centre National de Recherche Scientifique (CNRS), de l'Institut National de la Recherche Agronomique (INRA) de l'ONF et de diverses associations. Richement illustré, accessible à tous, basé sur les connaissances les plus récentes et la nomenclature actualisée, il comporte deux parties principales. Après une brève présentation de la Guyane, de son histoire géologique, du climat et des milieux naturels que l'on y rencontre, les palmiers font l'objet de chapitres de généralités sur leur morphologie, leur histoire évolutive et leur écologie (habitats, répartition,

pollinisation, dispersion...). Une importante partie est consacrée aux usages alimentaires, médicinaux, techniques et artisanaux, aussi bien dans les Guyanes et dans l'ensemble du bassin amazonien. La partie maîtresse de l'ouvrage concerne l'aide à l'identification de la totalité des 59 espèces, réparties en 16 genres, recensées à ce jour sur le territoire. Le « mode d'emploi » du guide est suivi d'un glossaire illustrant de façon quasi exhaustive les modèles architecturaux, la forme de la couronne, les différentes morphologies foliaires, les racines et rhizomes, les types d'épines, les inflorescences et leur position par rapport à la couronne, les fruits. Suivent des clés d'identification des genres, puis des espèces, présentées sous forme de tableaux illustrés basés uniquement sur les caractères végétatifs faciles à observer à toutes les époques de l'année. Enfin, chaque genre et chaque espèce font l'objet d'une fiche descriptive sur deux pages, illustrée d'un dessin au trait et de photos des différents éléments essentiels pour la reconnaissance du taxon concerné. En outre, chaque fiche présente des cartes de répartition de l'espèce sur le continent américain (à partir de la bibliographie disponible) et en Guyane (à partir des collections de l'Herbier IRD de Guyane). La dernière partie du guide comporte une série de fiches consacrées aux 18 espèces de palmiers introduites, sélectionnées parmi les plus fréquemment rencontrées dans les jardins et les lieux publics.



Guide des palmiers de Guyane [Guide to the Palms of French Guiana]. Example of illustrated key to genera.

The “Guide des palmiers de Guyane” [Guide to the Palms of French Guiana] is a project of the Office National des Forêts (ONF), supported by FEDER funds, published in 2014. The Guide, coordinated by Marc Gayot (ONF), is co-authored by ca. 12 authors of the Institut de Recherche pour le Développement (IRD), the Muséum National d'Histoire Naturelle (MNHN), Centre National de Recherche Scientifique (CNRS), Institut National de la Recherche Agronomique (INRA), ONF and several associations. It is amply illustrated, accessible to the general public, and up-to-date with current botanical nomenclature, and composed of two main parts. The first part includes a presentation of French Guiana, its geological history, climate and natural environments where palms are found, their morphology, evolutionary history, ecology (habitats, distribution, pollinization, and dispersion), and their common usage as food, medicine, and artcraft, in French Guiana and in the Amazon Basin. The second part is the aid to the identification of the 59 species, distributed in 16 genera, reported in the area studied, with dichotomous keys,

including user-friendly tables with vegetative characters. Each genus is described and illustrated with color plates and line drawings. For each species is included a map with the distribution in French Guiana and in the Neotropics. The last portion includes pages dedicated to the 18 introduced species, frequently found in public places. Finally, it also includes a glossary illustrating the architectural models, leaf and root morphology, types of thorns, inflorescences, flowers and fruits.

3.10. PI@ntNet, a collaborative platform dedicated to botanical identification and data aggregation

3.10. PI@ntnet, une plateforme collaborative dédié a l'identification botanique et aggregation de données

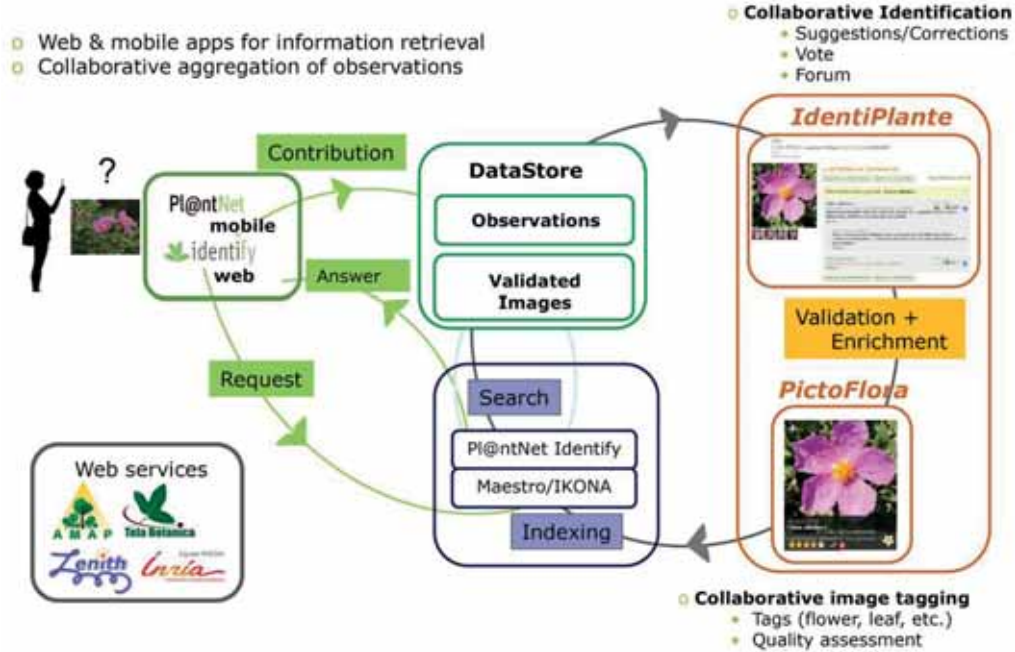
Antoine Affouard¹ & Jean-François Molino²

¹INRIA, ZENITH, Montpellier, France

²IRD, AMAP, Herbar de Guyane, Montpellier & Cayenne & the PI@ntNet Team, France

Accurate knowledge of the identity, distribution and uses of plants is essential for biodiversity conservation. However, with more than 350,000 flowering plant species recorded on Earth, plant identification is a difficult and critical task, particularly in tropical regions. In the framework of a partnership between several French research institutes (CIRAD, INRA, INRIA, IRD) and the Tela Botanica association, the PI@ntNet initiative has therefore developed an innovative platform designed to facilitate the accumulation of basic data on plants, while simultaneously providing an easy and efficient access to plant identification. This platform has been developed through the use of (i) an image-based plant identification application (available on the web as well as on mobile devices [IOS and Android], see: <http://identify.plantnet-project.org/>), (ii) two collaborative validation systems dedicated to taxonomic validation and image quality evaluation. Since its launch in 2013 on the European flora, the PI@ntNet mobile identification app has enjoyed a huge success and a quasi-exponential growing (2 million downloads and 15000-20000 daily end-users by the end of 2015). The PI@ntNet approach illustrates the attractiveness of such a collaborative workflow in the field of botany. We present here the originality, efficiency and perspectives of this solution, in terms of (i) capacity building, (ii) data aggregation and dissemination, and (iii) framework deployment. The PI@ntNet solution is currently being evaluated for its use on the floras of the Indian Ocean and South America. Besides, part of the available data has been mobilized since 2011 for the purpose of the international evaluation challenges called ImageCLEF & LifeCLEF (<http://www.imageclef.org/lifeclef/2015>). These challenges are dedicated to the assessment of plant identification tools based on multimedia analysis techniques. PI@ntNet is the first flagship project of Agropolis Foundation, and it aims at complementing other international initiatives on plant biodiversity and taxonomy.

Pl@ntNet identification system



3.11. The three Guianas, an Eldorado for saprophytes

3.11. Les trois Guyanes, un Eldorado pour les saprophytes

Hiltje Maas-van de Kamer

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In 1976 a multidisciplinary research on Neotropical mycoheterotrophic plants (so-called "saprophytes") was started in the Utrecht Herbarium. This was a follow-up of a research by the late Utrecht colleague Prof. F.P. Jonker. He published in 1938 his thesis on the family of Burmanniaceae. Our research included various families, viz. Burmanniaceae, Gentianaceae, Thismiaceae, and Triuridaceae. The study was executed by me, my husband Paul Maas, several specialists from all over the world, and also various Utrecht master students. It covered: herbarium work, collecting in the field, studies of embryology and pollen of the families concerned, and a detailed microscopical study of seeds. The results were presented in 1986 as 3 volumes (volumes 40-42) of *Flora Neotropica*. From this study it appeared that the three Guianas were very, very rich in "saps", and a real Eldorado (hence the title of the presentation). Recently several exciting specimens of the genus *Voyria* (Gentianaceae) have been collected in French Guiana, which may be new to science. Pictures of these specimens will be shown and discussed. In this presentation I will give a survey of our research, illustrated with various nice photographs, some of which are highly exciting!



Hiltje Maas-van de Kamer observing *Thismia saulensis* H. Maas & Maas (P.J.M. Maas et al. 8091), Saul, French Guiana (February 1993). Photo by P.J.M. Maas.

3.12. Sipaliwini collecting expedition (Suriname)

3.12. L'expédition de collecte à Sipaliwini (Surinam)

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² Herbar de Guyane, UMR AMAP, Institut de Recherche pour le Développement (IRD), B.P. 90165, 97323 Cayenne Cédex, French Guiana (France)

A botanical expedition in the surroundings of the village of Sipaliwini (southern Surinam) was made during 16 April – 1 May 2014. The botanical collections at the Sipaliwini region, were of general interest due to the remote area, botanically poorly known. The collections were most made in the savannas and in the forests in a radius of 3-10 km from the Sipaliwini village. Only one day of collection was made in the Sipaliwini Great Savanna. In total were made 271 collections, corresponding to 534 specimens. Most collections (collection number) were made with an average of 3-5 duplicates. The collections were concentrated on two families, which were the focus of the project Phyloguianas (Labex CEBA): 1) Rubiaceae. This is the family more collected, with 68 collections. Many collections were concentrated on the tribe Sipaneeae. Within the Rubiaceae, were collected the genera: *Chomelia*, *Diodia*, *Isertia*, *Mitracarpus*, *Oldenlandia*, *Palicourea*, *Perama*, *Psychotria*, *Sabicea*, *Sipanea*, *Spermacoce*, *Sphinctanthus*, and *Uncaria*. 2) Chrysobalanaceae. This family was not very well represented in the region. In total, were made 6 collections, all of the genus *Hirtella*. As for the general collections, it was gathered a total of 56 plant families, among them the ones that were collected with higher number of collections were: Rubiaceae (68 collections), Cyperaceae (18 collections), Lentibulariaceae (10 collections), Leguminosae (8 collections), Asteraceae (8 collections), Polygalaceae (7 collections), Xyridaceae (7 collections), Lamiaceae (7 collections), Chrysobalanaceae (6 collections), and Eriocaulaceae (6 collections).



Sipaliwini Region, southern Suriname. Savanna with trees and shrubs. Photo by G. Marjonom.

3.13. Invasive alien species in Suriname

3.13. Les espèces exotiques invasives au Surinam

Dorothy Traag

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Invasive alien species (IAS) are, next to habitat loss, worldwide considered one of the most important threats to biodiversity. The mangrove ecosystems are important to coastal Suriname protection strategy. It is therefore important to know if introduced plants are threatening these vital ecosystems. The Ministry of Physical Planning, Land and Forest Management (Min. RGB) has a leading role in the management of mangrove ecosystems in our coastal Multiple Use Management Areas (MUMA) in Suriname. The National Herbarium of Suriname has been approached to conduct a baseline study on IAS in North Suriname, as a part of the Suriname Coastal Protected Area Management (SCPAM) project 2011-2015. It is the first time that research focused on IAS of plants has been carried out in Suriname, and this activity can be considered as a pilot for studying a system to monitor IAS plants in the country. The research has been carried out in 2014 – 2015 during the wet and the dry seasons. Specific data sets have been collected on pre-defined site locations in a way that they can be quantified with previous and future data. Introduced species and their character of invasiveness have been determined. Inventory, field observation and interviews made it clear that the general public and the government are not aware of the treats of introduced plants. Especially two species, introduced by the ministry of Agriculture, *Tithonia diversifolia* and *Leucaena leucocephala* appear to be invasive. They are a threat, especially in the Multiple Use Management Areas of Nickerie, Coronie and Saramacca (three of the six coastal districts in Suriname). Furthermore the research resulted in a monitoring plan to enable the Min. of RGB to make informed

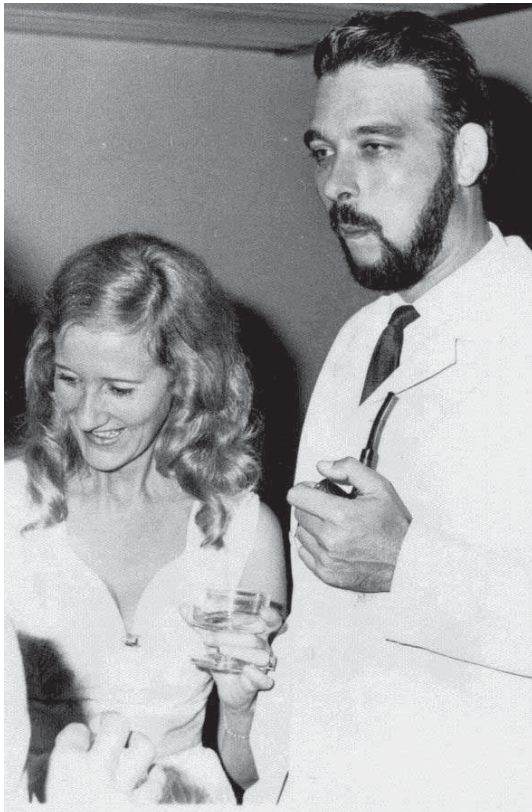
management decisions to on introduced plant species in the mangrove ecosystems and swamps in the coastal MUMA's.

3.14. The Herbarium of French Guiana is 50 years old

By Sophie Gonzalez & Piero G. Delprete

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In 1965, Roelof A.A. Oldeman was affected to the ORSTOM [now IRD] Center of Cayenne, French Guiana. In those days, two floristic accounts were available for this region: "Flore de la Guyane Française", published in four volumes by J.B. Aublet in 1775; and "Flore de la Guyane Française", also in four volumes, published by Albert Lemée between 1952 and 1956. However, when Oldeman arrived the herbaria of reference for the local flora were in Europe, and the botanists in Cayenne did not have any specimen for direct consultation. Therefore, he decided to establish, with the collaboration of his wife, Wilhelmine (known as "Will") Oldeman, the "Herbier de Guyane". The main goals of the herbarium were (and still are): documenting local species, knowing the regional flora, study the architecture of trees and forests, and compile a local reference for direct consultation.



Roelof Oldeman and his wife, Wilhelmina Oldeman, known as "Will". Evening at the ORSTOM center (now IRD) in June 1970. - Archives of J.-J. de Granville (author unknown).

Roelof Oldeman et sa femme, Wilhelmina Oldeman, connue sous le surnom de « Will ». Soirée au Centre ORSTOM (maintenant IRD) en juin 1970. – Fonds Jean-Jacques de Granville (auteur inconnue).

The 2000 specimens collected by J. Hoock from 1955 to 1965, mostly from coastal savannas, and the 1500 specimens compiled by Mr. Bena, herbarium curator of the Bureau des Eaux et Forêts (Bureau of Water and Forestry) between 1948 and 1958, mostly from lowland forests, constituted the first collections of the CAY herbarium. In addition, Oldeman started a program of general collections and organized numerous expeditions, mostly in the central and eastern regions of the Approuague and Oyapock River Basins, taking into considerations that the Maroni River Basin was already fairly well

collected by Paul Antoine Sagot (1821-1888) and François M.R. Leprieur (1799-1870). Oldeman's studies on the architecture of trees and forests, in collaboration with Francis Hallé, offered the pathway towards the understanding of forests dynamics in the region. He also established a card index of plants vernacular names, which was continuously updated.

In 1969, Jean-Jacques de Granville was hired at the ORSTOM [now IRD] Center of Cayenne to strengthen the Botany team. He pursued floristic prospection, studied pneumatophores and ecology of palms, as well as the distribution of Monocotyledons in French Guiana. His taxonomic specialty is the palm family (Arecaceae), and his long labor culminated in 2014 with of the book "Guide des Palmiers de Guyane" [Guide to the Palms of French Guiana, co-authored with M. Gayot].

Starting from 1973, the team of the "Laboratoire de Botanique" was increased by the arrival of numerous botanists, among them, J.-P. Lescure, Y. Veyret, G. Cremers, M.-F. Prévost, C. Feuillet, D.Y. Alexandre, P. Grenand, M. Hoff, H. Jacquemin, C. Moretti and A. Fournet. During the following two decades, the herbarium collections became richer and more diverse as a result of the numerous expeditions dedicated to general collections realized by local and international botanists. These collecting expeditions were mostly made by canoe along the main rivers of French Guiana, and were accomplished by large teams composed by hunters, trail cutters, porters, canoe drivers, cooks and collectors.



Roelof Oldeman, Joseph Kong (Hydrologue, known as "Ti-jo") and Jean-Marie Bruguière (Director of the ORSTOM Center of Cayenne), in the old twin-engine airplane "Dragon" going to Régina, in 1965. In those days there was no road from Cayenne to Régina. - Archives of J.-J. de Granville (author unknown).

Roelof Oldeman, Joseph Kong (Hydrologue, aussi appelé « Ti-Jo ») et Jean-Marie Bruguière (Directeur du Centre Orstom de Cayenne), dans le vieux biplan « Dragon » en route pour Régina, en 1965. A cette époque, il n'y avait pas de route reliant Cayenne à Régina. – Fonds Jean-Jacques de Granville (auteur inconnue).

In 1973, Pierre Grenand, anthropologist at the IRD, began a long-term ethnobotanical study of several indigenous groups in French Guiana. He contributed numerous specimens to the CAY herbarium and added numerous entries to the card index of plants vernacular names initiated by Oldeman (still preserved at CAY), and corrected the spelling of vernacular names according the languages of the indigenous groups; this information was included in the book "Pharmacopées Traditionnelles en Guyane" [Traditional Pharmacopoeia of French Guiana], published in 2004 by P. Grenand, C. Moretti, H. Jacquemin and M.F. Prévost.

In 1976, after the departure of Oldeman, George Cremers became the CAY Herbarium Curator and resident botanist. He contributed to the international importance

of the herbarium by sending numerous specimens to various specialists worldwide, and by contributing several publications on local flora. He eventually retired and returned to Paris in 1998 and became associated botanist of the Museum of Natural History of Paris, continuing his research on Pteridophytes, in collaboration with Michel Boudrie. Shortly before his departure, Cremers coordinated the transfer of holotype specimens from CAY to P, and in exchange of the transfer of the corresponding isotypes from P to CAY. This operation was later explained as follows: "Due to the uncertain future of CAY, the scientific authority at ORSTOM (now IRD), and that of the Museum National d'Histoire Naturelle [Museum of Natural History of Paris] have strongly recommended that holotypes be deposited in the French National Herbarium (P), so that the scientific community will still have access to these reference specimens" (Cremers, *Taxon* 50: 293-296. 2001).

In 1976 Marie-Françoise Prévost, commonly known as "Fanchon", also moved to Cayenne. During the 1980s she started working on forest regeneration in the multidisciplinary program ECEREX (Piste de Saint-Élie Research Station) along with hydrologists, soil scientists, ecologists, zoologists, and botanists. Then, she went on working as a botanist at the IRD, devoting her time to field and herbarium work, and helping many colleagues identifying herbarium specimens. She continued her activities after her retirement (in 2006), until she passed away on January 2013 (Delprete & Feuillet, *Taxon* 62: 419. 2013).

From 1982 to 1988, Christian Feuillet was resident botanist at CAY. His main research is devoted to the families Passifloraceae, Gesneriaceae, Boraginaceae, and Aristolochiaceae, which are planned to be contributed to the Flora of the Guianas. During this period he also gathered significant collections that were deposited at CAY and sent off to various international herbaria.

In the 1980s, the project "Flora of Saül" was initiated, under the coordination of S. Mori (NY), and numerous annual field expeditions were accomplished in this locality. After more than two decades of field and herbarium work, and the collaboration of more than 80 botanists, the project culminated with the 4-volume publication "Guide to the Plants of Central French Guiana", published in 1997, 2002, 2003 and 2009.

In 1984 the international program "Flora of the Guianas" was launched with the creation of a consortium of nine institutions (NY, MO, P, U, BBS, BRG, CAY, B, K). The herbarium saw a considerable increase of specimens, mostly from Surinam and Guyana, due to the important exchanges stimulated by the FOG Consortium.

In 1986, as it was necessary to organize the label data of the specimens at CAY in a searchable database, the AUBLET database was constructed. And, as the collections continued to arrive, more space was necessary to store them. Dealing with this shortcomings, on 1st of February 1996 was inaugurated a new herbarium building, where the entire collection was transferred, and where it is still stored nowadays. However, due to the continuous addition of specimens, the herbarium space is currently insufficient for the storage of new collections.

During the 1980s and 1990s the herbarium staff was strengthened by the presence of two plant ecologists: Daniel Sabatier, who was at CAY during 1985-1992, and Jean-François Molino, who was at CAY during 1994-1996. Their projects have been dealing with forest ecology, biodiversity and modelling, thorough the establishment of forest permanent plots of the GUYADIV long-term project, initiated in 1987 by D. Sabatier, where they study mostly trees. Their field work in French Guiana continued after their return to the IRD Center of Montpellier, the headquarters of the UMR AMAP (which includes the CAY Herbarium staff), and their gatherings are important for the representation of tree specimens in the herbarium.

In 1998, Jean-Jacques de Granville took the position of Herbarium Curator and resident botanist, continuing his research mostly devoted to palms, and by being in charge of the administration of the herbarium. He remained in this position until 2008, when he retired. The same year, Sophie Gonzalez took the position of Herbarium Curator, and she is currently in charge of its maintenance and of the administrative duties entailed in its regular functioning, along with floristic studies on understory and wetland plants.

In 2009, Piero Delprete arrived at CAY as resident botanist. His research deals mostly with Neotropical Rubiaceae (and Balanophoraceae), as well as floristic assessment of the savannas of French Guiana. His international interactions include the supervision of Master and Doctoral students, collaborations with botanists of Brazilian institutions, and the coordination of a Franco-Brazilian network for the study of the vegetation of French Guiana, and the Brazilian states of Amapá and Pará (GAP Network).

Currently the herbarium includes about 200,000 specimens, and an average of about 2000 specimens is added each year. The herbarium is mostly focused on the flora of the Guiana Shield, and is composed of approximately 78% of specimens from French Guiana, 3% from Surinam, 10% from Guyana, 6% from Brazil, and 3% from other Neotropical countries. Therefore, the specimens at CAY constitute an inestimable tool for the knowledge and conservation of the flora of the Guiana Shield. Specimens from Guyana and Surinam were mostly acquired through the exchange program stimulated by the Flora of the Guianas Consortium. The label data of all the specimens at CAY are continuing to be inserted in a searchable database (AUBLET2), available at: http://publish.plantnet-project.org/project/caypub_en

An ongoing eReColNat project has the goal of producing digital images for all the specimens preserved at CAY, and will eventually be available on the internet; at the moment (May 2017) about one third of the specimens have been photographed. In 2015, the Botany Section (including the herbarium) of the Museu Paraense Emílio Goeldi (MG) became the 10th member of the Flora of the Guianas Consortium: A new page in the history of the CAY herbarium to be written.

3.14 L'Herbier de Guyane a 50 ans

Sophie Gonzalez & Piero Delprete

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En 1965, Roelof A.A. Oldeman est affecté au Centre ORSTOM (aujourd'hui IRD) de Cayenne, en Guyane française. A cette époque, deux contributions majeures documentent la Flore de cette région : La « Flore de la Guyane Française », publiée en quatre volumes par J.B. Aublet en 1775 ; et la « Flore de la Guyane Française », également en quatre volumes, publiée par Albert Lemée entre 1952 et 1956. Cependant, lorsque Oldeman arrive, les herbiers de référence pour la flore locale sont en Europe, et les botanistes à Cayenne ne disposent d'aucun spécimen pour la consultation. Il décide donc de créer l'Herbier de Guyane, en collaboration avec sa femme Wilhelmine Oldeman (aussi appelée « Will »). Les principaux objectifs de l'Herbier sont aujourd'hui toujours identiques à ceux qu'ils étaient lors de sa création : documenter les espèces locales, connaître la flore au niveau régional, étudier l'architecture des arbres ainsi que la composition du peuplement forestier, enfin constituer une collection de référence pour la consultation. Les 2000 spécimens collectés par J. Hoock de 1955 à 1965, principalement dans les savanes côtières, ainsi que les 1500 specimens collectés par Mr. Bena, Conservateur de l'Herbier du Bureau des Eaux et Forêts, entre 1948 et 1958, principalement dans les forêts de plaines, constituent les premières collections de l'Herbier CAY. Afin de les enrichir, Oldeman démarra un programme de collecte générale et organisa de nombreuses expéditions, principalement dans les régions du centre et de l'est de la Guyane, dans les bassins de l'Approuague et de l'Oyapock, considérant que le bassin du Maroni avait été déjà bien collecté par Paul Antoine Sagot (1821-1888) et François M.R. Leprieur (1799-1870). Les travaux d'Oldeman sur l'architecture des arbres et des forêts, en collaboration avec Francis Hallé, a ouvert la voie à la compréhension de la dynamique forestière de la région. Il a également établi un fichier des noms vernaculaires des plantes, qui fut ensuite continuellement mis à jour.

En 1969, Jean-Jacques de Granville vient renforcer l'équipe de botanistes du Centre ORSTOM (devenu IRD) de Cayenne. Il poursuit la prospection floristique, étudie la biologie et la morphologie des pneumatophores, l'écologie des palmiers, ainsi que la distribution des Monocotylédones en Guyane française. Spécialiste de la taxonomie des palmiers (famille des Arecaceae), il est l'auteur de nombreuses publications sur la flore de Guyane et publie en 2014 avec M. Gayot l'ouvrage « Guide des Palmiers de Guyane française ».

A partir de 1973, l'équipe du « Laboratoire de Botanique » est renforcée avec l'arrivée de nombreux botanistes, parmi lesquels J.P. Lescure, Y. Veyret, G. Cremers, M.-F. Prévost, C. Feuillet, D.Y. Alexandre, P. Grenand, M. Hoff, H. Jacquemin, C. Moretti et A. Fournet. Au cours des vingt années suivantes, les nombreuses expéditions de collecte généraliste menées par les botanistes locaux et internationaux ont permis d'enrichir les collections. Ces expéditions étaient menées le plus souvent au moyens de pirogues, au long des principales rivières de Guyane, et mobilisaient de larges équipes composées de chasseurs, layonneurs, porteurs, piroguiers, cuisiniers et collecteurs.

En 1973, Pierre Grenand, anthropologue à l'IRD, entame un travail à forte composante ethnobotanique, aux côtés de différents groupes amérindiens de Guyane. Il enrichit l'herbier de nombreux échantillons et également le fichier des noms vernaculaires des plantes initié par Oldeman (encore conservé à l'Herbier CAY), et corrige l'orthographe des noms vernaculaires, en accord avec les différentes langues parlées par différentes ethnies de Guyane ; cette information est restituée dans l'ouvrage « Pharmacopées Traditionnelles en Guyane », publié en 2004 par P. Grenand, C. Moretti, H. Jacquemin et M.F. Prévost.

En 1976, après le départ d'Oldeman, Georges Cremers devient le Conservateur de l'Herbier CAY. Il contribue à l'importance internationale de l'herbier en envoyant de nombreux spécimens à différents spécialistes dans le monde entier, et en contribuant à de multiples publications sur la flore locale, notamment la flore des zones côtières. Il prend sa retraite et quitte la Guyane en 1998, tout en continuant à produire des publications sur les Ptéridophytes de Guyane en collaboration avec Michel Boudrie. Peu de temps avant son départ, Cremers a organisé le transfert des spécimens holotypes de CAY à P, en échange du transfert des isotypes correspondants de P à CAY. Cette opération fut ensuite expliquée comme suit (traduit de l'anglais) : « Du fait du futur incertain de CAY, les autorités scientifiques de l'ORSTOM (maintenant IRD), et celles du Museum National d'Histoire Naturelle ont fortement recommandé que les holotypes soient déposés dans l'Herbier National Français (P), afin que la communauté scientifique puisse encore avoir accès à ces spécimens de référence » (Cremers, Taxon 50 :293-296. 2001).

En 1976 Marie-Françoise Prévost, aussi appelée « Fanchon », arrive aussi en poste à Cayenne. Durant les années quatre vingt, elle commence à travailler sur la régénération forestière dans le cadre du programme multidisciplinaire ECEREX (Station de Recherche de la Piste de Saint Elie) qui rassemble des hydrologistes, pédologues, écologues, zoologistes et botanistes. En tant que botaniste à l'IRD, elle passa beaucoup de temps sur le terrain et à l'Herbier, et aida de nombreux collègues à identifier leurs collectes. Elle continua ses activités après son départ en retraite (en 2006), jusqu'à son décès en Janvier 2013 (Delprete & Feuillet, Taxon 62: 419. 2013).



Team of porters, hunters, and trail cutters. Mountains Bellevue de l'Inini, August 1985. From left to right: Bernardin, known as "Canada", Linné, Desmo, Georges Elfort, Stéphane Galimo, and Mika. - Archives of J.-J. de Granville (author unknown).

Equipe des porteurs, chasseurs et layonneurs. Montagnes Bellevue de l'Inini, Août 1985. De gauche à droite: Bernardin, appelé aussi « Canada », Linné, Desmo Betian, Georges Elfort, Stéphane Galimo et Mika. – Fonds Jean-Jacques de Granville (auteur inconnue).

De 1982 à 1988, le botaniste Christian Feuillet est en poste à Cayenne. Ses recherches concernant principalement les familles des Passifloraceae, Gesneriaceae, Boraginaceae et Aristolochiaceae, en vue de leur traitement taxinomique dans le cadre de la Flore des Guyanes. Durant cette période il a collecté d'importantes collections, déposées à CAY et envoyées dans divers herbiers internationaux.

Au début des années 1980, le projet « Flore de Saül » est initié, coordonné par Scott Mori (NY), et donne lieu année après année à de nombreuses expéditions de terrain dans cette localité. Ce programme a donné lieu à plus de vingt ans de travail de terrain et d'herbier, avec la collaboration de plus de 80 botanistes, pour aboutir à la publication en quatre volumes du «Guide to the Plants of Central French Guiana» publié en 1997, 2002, 2003 et 2009.

En 1984, le programme international « Flora of the Guianas » est lancé avec la création d'un Consortium réunissant 9 institutions (NY, MO, P, U, BBS, BRG, CAY, B, K). Ce Consortium a permis de nombreux échanges, ce qui a permis d'enrichir considérablement les collections avec des spécimens provenant principalement du Surinam et du Guyana.

En 1986, la création de la base de données AUBLET répond à la nécessité d'informatiser les données de l'Herbier CAY. Avec le nombre croissant de spécimens, il faut davantage d'espace pour les stocker. Pour répondre à ce besoin, la collection entière est transférée dans un nouveau bâtiment, inauguré le 1^{er} février 1996, et dans lequel elle se trouve encore. Cependant, du fait de l'accroissement continu du nombre de spécimens, l'Herbier arrive à saturation et une extension est désormais envisagée.

Au milieu des années 80 et 90, l'équipe de l'Herbier est renforcée par l'arrivée successive de deux chercheurs botanistes écologues : Daniel Sabatier, affecté au centre ORSTOM de 1985 à 1992 puis de 2002 à 2005, et Jean-François Molino, affecté au Centre ORSTOM de 1994 à 1996. Leurs travaux portent sur l'écologie forestière, la biodiversité et la modélisation des écosystèmes, à travers une longue série d'inventaires quantitatifs des arbres, initiée dès 1987 par Daniel Sabatier, et la création du réseau de placettes permanentes GUYADIV, dont l'inventaire se poursuit chaque année. Les

collectes réalisées tout au long de ces travaux de terrain, représentent la majorité des collectes d'arbres dans l'Herbier.

En 1998, Jean-Jacques de Granville devient Conservateur de l'Herbier et en assure la charge administrative tout en continuant ses recherches, principalement sur les palmiers. Il prend sa retraite en 2008, date à laquelle il quitte l'Herbier. En 2006, Sophie Gonzalez obtient le poste de Conservatrice de l'Herbier, dont elle a actuellement la charge administrative, tout en menant des études sur les plantes de sous-bois et les plantes des zones humides.

En 2009, le botaniste Piero Delprete est affecté à CAY. Ses recherches portent principalement sur les Rubiaceae (et Balanophoraceae) Neotropicales, ainsi que l'étude floristique des savanes de Guyane française. Au niveau international, il encadre des étudiants en Master et Doctorat, développe des collaborations avec les botanistes des institutions brésiliennes, et la coordination d'un réseau franco-brésilien pour l'étude de la végétation de Guyane française et les états brésiliens de l'Amapá et du Pará (Réseau GAP).

Actuellement, l'Herbier compte environ 200 000 spécimens et s'enrichit d'environ 2 000 échantillons chaque année. Il est principalement dédié sur la flore du Bouclier Guyanais, avec approximativement 78% d'échantillons de Guyane française, 3% du Surinam, 10% du Guyana, 6% du Brésil, et 3% provenant d'autres pays de la zone Néotropicale. Ainsi, les spécimens déposés à CAY constituent un outil d'une valeur inestimable pour la connaissance et la conservation de la flore du Bouclier Guyanais. Les échantillons du Guyana et du Surinam ont été acquis principalement grâce au programme d'échanges initié par le Consortium de la Flore des Guyanes. Les données portées sur les étiquettes des planches sont journalièrement ajoutées et mises à jour dans la base de données AUBLET2, consultable à l'adresse suivante: http://publish.plantnet-project.org/project/caypub_en

Le projet eReColNat, actuellement en cours, a pour objectif la numérisation et la mise en ligne de tous les spécimens préservés à CAY ; actuellement (mai 2017), un tiers environ des spécimens a été photographié. En 2015, la Section Botanique (incluant l'Herbier) du Museu Paraense Emilio Goeldi (MG) est devenue le 10^{ème} membre du Consortium de la Flore des Guyanes : une nouvelle page de l'Herbier CAY à écrire.

3.15. Traditional ecological knowledge in the Oyapock basin: how ethnobotany is a provider of botanical material for the CAY Herbarium

3.15. Connaissances écologiques traditionnelles dans le bassin de l'Oyapock: comment l'ethnobotanique enrichit-elle les collections de l'Herbier de Guyane (CAY)

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Since its foundation, the Cayenne Herbarium (CAY) has been different than most herbaria. Due to the rich traditional ecological knowledge of the French Guianese people, a close relationship between ethnobotany and botany has always existed. The Oyapock River basin is shared by Brazil and French Guiana and hosts, along with a rich biodiversity, an impressive cultural diversity: Wayãpi, Teko, Palikur or Karipuna Indigenous People lives along its banks, as well as Saramaka maroons and Créoles. Out of the 14,980 herbarium specimens collected in the Oyapock area and deposited in CAY, at least 2937 (19.6 %) of them are related to ethnobotanical works, most of them collected by Pierre Grenand (> 2200 specimens). We reviewed some of the published works related to these vouchers: Davy (2007), Grenand (1980), Grenand & Haxaire (1977), Grenand et al. (2004), Odonne

et al. (2011), Vigneron et al. (2005). Lastly, an overview of our team's ongoing work is summarized. The Teko ethnoecology project, funded by Labex CEBA and the Direction des Affaires Culturelles, started in 2013, aims at documenting the plant knowledge of the Teko Indigenous People and already allowed the documentation of more than 500 specimens and ethnobotanical information related. A project on historical ecology, started in 2014, currently funded by Labex CEBA under the name LongTime, aims at understanding the long-term impact of pre-Columbian settlements on the Guianese forests and already counts on 700 identified trees and 200 herbarium vouchers. Lastly, the Ph.D. project of Clémence Ogeron, funded by Labex DRIHM, is focused on ethno-technological knowledge of construction wood used by the Palikur Indigenous people in the lower Oyapock region, linking traditional uses and wood properties from tree species and counts on more than 350 ethnobotanical vouchers.

3.16. Uncertainty in species delimitation in the genus *Cecropia*: role of hybridization and morphological modifications during ontogenesis

3.16. Incertitudes dans la délimitation des espèces au sein du genre *Cecropia* : étude de l'hybridation et des gradients morphogénétiques en tant que source de variabilité phénotypique

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Cecropia trees represent an important component of Neotropical forests. Despite a long-term interest on this genus in numerous fields of science, the ability to identify *Cecropia* species remains problematic. As concluded in the last generic revision, it remains a challenge to “understand the extent of the morphological variation, to evaluate the nature of morphological differences, and to comprehend the reality of disjunctions.” In the last monographic treatment, 61 species and 2 subspecies of *Cecropia* were recognized in the Neotropics, distributed from southern Mexico and the West Indies to northern Argentina. In order to elucidate the morphological variability present in the species, we tested several hypotheses: (i) poor understanding of the variation range of morphological characters in the last monographic treatment, due to bias induced by working mostly with herbarium specimens (e.g., reduced number of specimens per species, reduced organs size, juvenile stage underrepresented), (ii) presence of hybrids (iii), incorrect recognition of synonyms, and (iv) presence of unrecognized new species. To address these shortcomings in north-eastern South America, we sampled 7 morpho-species and 630 individuals at different ontogenetic stage in four regions of French Guiana. We developed and applied neutral molecular markers (SSR) to quantify genetic relatedness and apply morphological markers across contrasting ontogenetic stages to quantify the impacts of ontogeny on morphology. We demonstrated the presence of hybrids at high proportions (up to 12 % in a single site) with numerous combinations of characters among the seven species. Hybrids have an intermediate morphology according to parental phenotypes either through a mixture of characters or by the expression of intermediate characters.

Occasionally, characters absent in parental species can be expressed in following generations. Moreover, strong morphological gradients are expressed during ontogeny, making species difficult to discern at certain stages. This work demonstrated the importance of not considering certain species as currently delimited as discrete taxonomic units for phylogenetic studies, and the need to further investigate species delimitations and the role of hybridization in the speciation process.



Cecropia silvae C.C. Berg. (Urticaceae). Photo by P. Heuret.

3.17. Patterns of plant diversity on inselbergs of French Guiana

3.17. Patrons de diversité des plantes sur les inselbergs de Guyane

Corinne Sarthou (absent, presented by Odile Poncy)

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In French Guiana, inselbergs are isolated or disposed in archipelagos of rocky outcrops, made of Precambrian granite. They constitute terrestrial xeric island surrounding a forest matrix. Vascular plant species compositional patterns were studied on 22 inselbergs. In total, 391 species of Ferns and Angiosperms were recorded. Orchidaceae, Bromeliaceae, Poaceae, Melastomataceae and Cyperaceae are the dominant families. Cluster analysis and principal components analysis (PCA) were applied and geographical coordinates, environmental and biogeographical indicators and plant traits were added as additional variables in the PCA. The inselbergs are classified in three groups located in the North-East, in the South-West and in the South of French Guiana, along the watershed with the Amazonian basin, respectively. The third group is characterized by original floristic components. Species patterns were linked to a gradient of aridity associated with a geographic gradient. Other features such as geology and the cover forest in the matrix around are associated with these gradients. Among environmental data, the number of habitats and the species richness were remarkably high on the two inselbergs along the

watershed with Amazonian basin, together with high altitude making them an exception among French Guianan inselbergs. Plant traits linked to drought adaptation such as succulence, suffrutescence, chamaephyte growth habit, dry indehiscent fruits and Crassulacean Acid Metabolism (CAM) characterize south-western inselbergs according to the gradient of aridity. The vegetation is marked by well-developed shrubby and prairie communities on south-western inselberg, while the vegetation is characterized by Bromeliaceae mats, herbaceous communities, and well-developed *Clusia* thickets on north-eastern outcrops. A high French Guianan endemism level characterizes north-eastern outcrops. Another variable such as possible human use is associated with the south-eastern inselbergs.

3.18. Importance of botanical identification in ecological and biochemical studies: the case of *Himatanthus sucuuba* complex (Apocynaceae) in the Peruvian Amazon

3.18. Importance de l'identification botanique dans une étude écologique-biochimique: le cas de "*Himatanthus sucuuba* complex" (Apocynaceae) en Amazonie péruvienne

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Au Pérou, le complexe d'espèces *Himatanthus sucuuba* (Apocynaceae) est utilisée dans la médecine traditionnelle des communautés rurales et autochtones de la région Amazonienne pour traiter plusieurs maladies (ex. leishmaniose, ulcères, infections, processus inflammatoires, tumeurs). Des travaux phyto-chimiques sur cette espèce ont permis d'isoler et d'identifier le métabolite secondaire pluméricine ayant des propriétés médicinales. L'importance de cette plante dans l'ethnobotanique et son potentiel pharmacologique ont motivés le développement du projet de thèse « Étude écologique et biochimique de *Himatanthus tarapotensis* (Apocynaceae) en Amazonie péruvienne: rôle de la pluméricine dans la relation défense chimique – herbivorie et spécialisation d'habitat d'un arbre amazonien » orienté à évaluer intégralement aspects écologiques et biochimiques de la production de la pluméricine, informations qui pourrait fournir des connaissances sur des patrons de production de ce composé. Au cours de ce projet, l'identification taxonomique de la plante cible a permis de remarquer quelques changements de la délimitation taxonomique des espèces du genre *Himatanthus*, ce qui a mis en évidence des ambiguïtés sur l'identité de la plante cible. Initialement la plante évaluée avait été identifiée comme *H. sucuuba*, mais en suivant les clés et description de la dernière révision taxonomique du genre *Himatanthus* et en recevant la collaboration directe de l'auteur de cette travaille, les spécimens de la plante cible ont été identifiés comme *H. tarapotensis*. Dans ce projet, l'identité de la plante étudié est particulièrement importante puisque la qualité et reproductibilité des études phyto-chimiques et pharmacologiques dépendent de la correcte identité taxonomique de la plante source. Ça permet d'avoir des données comparable avec d'autres études, en évitant l'ambiguïté de l'identification qui pourrait invalider les résultats des études, car simplement il serait impossible d'établir l'identité de l'organisme évalué. De même, l'identification des spécimens nous a permis de connaître quelques patrons de distribution géographique de cette espèce, qui suggèrent un succès reproductrice de *H. tarapotensis*, dû sa capacité de pousser sur différents types habitats. Finalement, il est évoqué l'importance de l'utilisation précise et appropriée de la taxonomie et de la nomenclature botanique scientifique au cours des projets de recherche qu'implique l'étude des plantes.

In Peru, the *Himatanthus sucuuba* species complex (Apocynaceae) is used in traditional medicine of rural and autoctonous communities. Phytochemical studies permitted to isolate the methabolite plumericine, which has bioactive properties. The ethnobotanical

importance of this species complex stimulated the thesis project “Ecological and biochemical study of *Himatanthus tarapotensis* (Apocynaceae) in Peruvian Amazon: the role of plumericin in the chemical defense against herbivory and habitat specialization of an Amazonian tree.” During the realization of the project, the identification of species showed a certain ambiguity as to which name should be used and which species delimitation should be adopted in Peru. The species studied was identified as *H. tarapotensis*, while *H. sucuuba* does not occur in Peru. The identification of the specimens allowed us to infer the geographical distribution of the species studied, which also showed a considerable adaptation to different habitats and soil types.

3.19. Plant-insect-microorganism interactions promoting plant protection and nutrition

3.19. Les interactions plantes-insectes-microorganismes améliorent la protection et la nutrition des plantes

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Plants often rely on external, mutualistic partners to survive and reproduce in resource-limited environments or for protection from enemies. Such interactions, including mycorrhizal symbioses and ant-plant associations, are widespread and play an important role at the ecosystem and community levels. Ant-plants are interesting model systems of protective mutualisms in which the associated ants are assimilated as agents of constitutive indirect defense. The plants provide ants with nesting space and food in exchange for indirect benefits such as protection against herbivores, competitors and pathogens. The outcomes of the relationship might, however, vary according to the behaviour of the interacting ant partners and/or to the presence of additional partners, thus differently influencing plant fitness. In this talk is explored this framework by focusing in two different plant species each associated with two ant species and with either a fungus or aquatic organisms as additional partners. In addition, it is here presented how behavioral ecology (e.g. predation strategies) and/or ecological preferences (e.g. light environment) of these ant species affect the additional patterns of ant-plant interactions and its cascading effect on the host-plant morphology and performance. Altogether, these model systems show how multiple, co-occurring symbiont species and their traits influence plant performance by modulating their context-dependent outcomes.

Les plantes dépendent d'autres organismes pour se reproduire, survivre dans des environnements pauvres en nutriments ou encore pour se protéger des phytophages. Les interactions mutualistes, comme par exemple les symbioses mycorrhiziennes ou les associations entre plantes et fourmis, sont très répandues et jouent un rôle majeur à l'échelle des communautés et des écosystèmes. Les associations entre les plantes et les fourmis sont des modèles fascinant formant un mutualisme de protection dans lesquels les fourmis sont assimilées à des agents de protection indirecte pour les plantes. Les plantes à fourmis, ou myrmécophytes, présentent des structures creuses, sur les tiges ou les feuilles, et secrètent, pour certaines d'entre elles, des substances nutritives utilisées par les fourmis pour se loger et se nourrir. Les fourmis de par leur comportement prédateur apportent à la plante des avantages indirects tels que la protection contre les phytophages, les pathogènes ou autres compétiteurs. L'issue de cette interaction pourrait, toutefois, varier en fonction de l'espèce de fourmi associée et de son comportement, et/ou de la présence de partenaires additionnels, influençant ainsi différemment les

performances et la fitness des plantes. Dans cet exposé, j'explorerai ce cadre conceptuel en mettant l'accent sur deux espèces de plante associées chacune d'entre elles à deux espèces de fourmis et avec soit un champignon, soit des organismes aquatiques, comme partenaires additionnels. Je présenterai comment le comportement (e.g. stratégie de prédation) et/ou les préférences écologiques (e.g. environnement lumineux) des fourmis affectent les partenaires additionnels associés et par des effets en cascade la morphologie et les performances des plantes. Dans l'ensemble, ces systèmes d'étude démontrent l'importance de prendre en compte l'ensemble des partenaires pour comprendre les variations dans les bénéfices perçus par les plantes modulant ainsi leurs performances.

3.20. How can plant defenses lead to valuable products? Inspiration from plant complexity in phytochemistry

3.20. Des molécules de défense des plantes à la découverte de molécules d'intérêt: s'inspirer de la complexité des plantes en phytochimie

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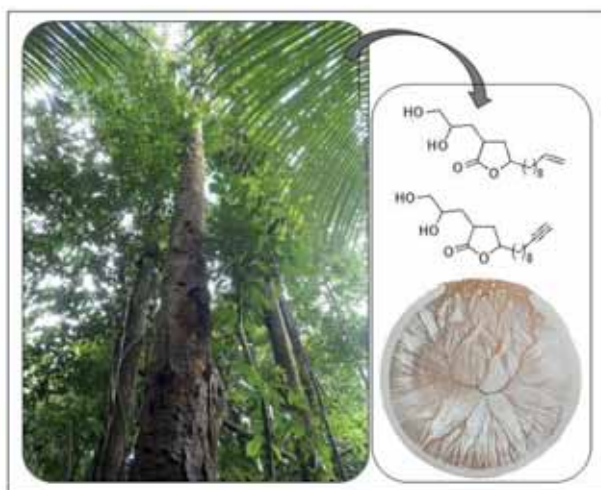
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Plants have been known for centuries to be a valuable source of molecules, yet complexity remains, and can open up numerous perspectives. Plants have indeed evolved a wide range of secondary metabolites as defense, competition or attraction compounds. Moreover, the exceptional biodiversity encountered in the tropics, along with the presence of various pathogens and a strong herbivory especially linked to a rich entomofauna, leads to a promising chemodiversity, due to the constant and dynamic interactions between plants and their environment. Taking into account the role and "raison d'être" of natural products, and the fact that all these molecules work together, as complex mixtures, can therefore lead to a new point of view. In particular, we will discuss the role of volatile organic compounds (VOCs) emitted by trees from French Guiana and illustrate that, inspired by their ecological functions and taking into account synergistic interactions, some therapeutic applications can be found for these versatile mixtures of compounds. Likewise, if shifting from the "magic bullet" classical approach to "herbal shotgun" studies is widely discussed in phytomedicine, applying this concept in the field of vector control could lead

to valuable solutions in the context of resistance development. To conclude, we will show through the example of *Sextonia rubra* (Mez) Van der Werff (Lauraceae) that bioinspiration can lead to chemically surprising valuable molecules, but also to new questions on tree growth and development.



From tree to laboratory: chemical structure and crystals of the compounds rubrenolide (top) and rubrynilide (bottom) isolated from *Sextonia rubra* (Mez.) Van der Werff (Lauraceae)

3.21. Biogeography of the Guayanian-centered taxa of the subfamily Ixoroideae (Rubiaceae)

3.21. Biogéographie des espèces de la sous-famille des Ixoroideae (Rubiaceae) centrées sur la région des Guyanes

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White-sand soils of the Guayana Region in Northern South America are extremely low-nutrient, and are considered one of the poorest soils of the tropics, which are mainly responsible of the high levels of endemism. Subfamily Ixoroideae, one of the three main lineages of the Rubiaceae, harbours most of the Guayanian-centered taxa of the family such as the tribes Henriquezieae, Sipaneeae, and Retiniphyllae. Previous phylogenetic analyses showed the two first tribes nested with tribe Posoquerieae, in a clade mostly Neotropical, while tribe Retiniphyllae was placed at the base of a mostly Palearctic clade. Consequently, these four tribes represent a good sample to test hypotheses on the origin and diversification of Guayanian-centered taxa. The biogeographical analyses used data from the *tmL-F* spacer and the *rps16* intron. A relaxed molecular clock approach was implemented with the BEAST program to infer phylogeny in parallel with diversification time, and the RASP program was used to reconstruct ancestral distributions. Results indicate that tribe Sipaneeae originated in the middle Eocene (~38 Ma), while the Henriquezieae and Posoquerieae arose much later in the early Miocene (~20 and ~17 Ma). On the other hand, tribe Retiniphyllae split from the core Ixoroideae in the mid Eocene (~40 Ma), but began to diversify much later in the late Miocene (~11 Ma). Tribes Sipaneeae, Henriquezieae and Posoquerieae originated in the Guayana Region from

Guayanan ancestors, and although most genera diversified *in situ*, some of them (e.g. *Sipanea*, *Posoqueria*) could colonize habitats outside the Guayana Region. Although tribe Retiniphyllae originated in the Guayana Region, its ancestor lived in the Paleotropics. The shift of the major source of sediments in the Northwest Amazon Basin, in the Early Miocene, due to the rise of the Andes, could have had an important effect on the diversification history of the four tribes despite their different biogeographic histories.



Piedra del Cocuy, near triple border of Brazil-Venezuela-Colombia. Photo by R. Cortés-Ballén.

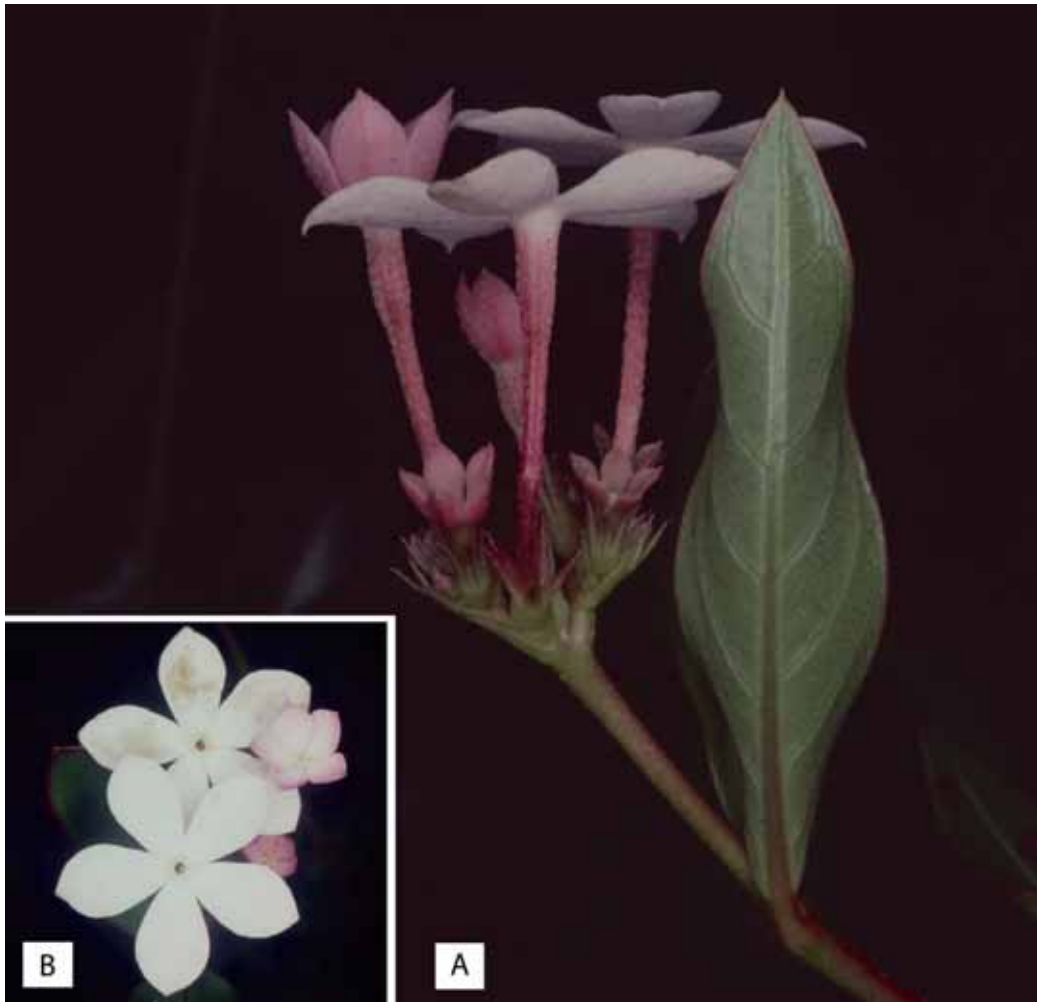
3.22. Systematics and biogeography of the tribe Sipaneeae (Rubiaceae), a group centered in the Guiana Shield

3.22. Systématique et biogéographie de la tribu des Sipaneeae (Rubiaceae), un groupe centré sur le Bouclier Guyanais

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According to recent molecular phylogenies, the tribe Sipaneeae is recognized as a separate monophyletic group, and positioned within the subfamily Ixoroideae. The Sipaneeae, as here delimited, include the genera *Chalepophyllum*, *Dendrosipanea*, *Limnosipanea*, *Maguireothamnus*, *Neblinathamnus*, *Neobertiera*, *Pteridocalyx*, *Sipanea*, *Sipaneopsis* and *Steyermarkia* (with a total of about 50 species). Several genera of this group are small shrubs, and the woody habit is shown to be basal in the Sipaneeae. *Sipanea* and *Limnosipanea* were shown to be monophyletic and not sister taxa, indicating that the herbaceous habit evolved at least two times in the tribe. The tribe has its main center of diversity in the Guayana Shield, with 9 genera and 47 species, with a few species in Central America (3 genera and 3 species), and a few species on the Brazilian Shield (2 genera and 5 species). Following these results, three projects are currently in progress: 1) a complete monographic treatment, with key, generic and specific descriptions, and specimens cited; 2) a complete phylogenetic study including all the genera of the tribe; 3) a biogeographic study that will hopefully indicate the center of origin and the patterns of dispersal in the Neotropics. Field and herbarium study are ongoing, two new species of *Neobertiera* have recently been published, the presence of heterostyly in a few species of *Sipanea*, and in all the species of *Neobertiera* have recently been newly reported, and a unique flowering modality was recently discovered in *Sipaneopsis*.



Sipaneopsis maguirei Steyerl. (Rubiaceae). **A.** Inflorescence with flowers at different stages of anthesis, side view. **B.** Same inflorescence, top view. Venezuela, Amazonas, Mun. San Fernando de Atabapo (7 Jan 2001, *Delprete et al.* 7452). Photos by P.G. Delprete.

3.23. Preliminary systematic and biogeographical investigations in the trans-Pacific tropical tree genus *Ormosia* (Fabaceae)

3.23. Etudes préliminaires de systématique et biogéographie du genre tropical trans-Pacifique *Ormosia* (Fabaceae)

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Comprising approximately 150 species of trees and shrubs evenly divided between the Asian and American Tropics, *Ormosia* is one of the most understudied large genera of Fabaceae. In addition to its unusual distribution pattern, *Ormosia* displays a remarkable

array of morphological innovations, particularly in the reproductive structures. The flowers vary greatly in size, color, the degree of exertion of the stamens and style, and in the form of the stigma. The fruits range from thin papery dehiscent legumes to thick, woody, sometimes indehiscent, pods. The seeds, which are typically very hard and brightly colored, also vary greatly in size and shape and in the length of the hilum. In a few species the testa is fleshy. Most strikingly, the majority of Neotropical species and a few Asian species have strikingly bi-colored seeds. Phylogenetic analysis of new and pre-existing chloroplast and nuclear sequence data (*matK*, *trnL-F*, and ITS) supports the monophyly of *Ormosia* and a clade containing the sampled New World species of the genus. These data also suggest that the existing infrageneric classification is in need of comprehensive revision. Sequence divergences are compatible with a hypothesis of oceanic dispersal between Asia and America during the early Miocene, thus postdating possible overland connections via the Eocene-era Boreotropics. Most of the morphological innovations in *Ormosia* have arisen in parallel in distinct subclades of the genus.



Ormosia lewisii. D.B.O.S. Cardoso, C.H. Stirt. & Torke (Fabaceae). Photo by D. Cardoso.

3.24. Ethnobotanical and traditional knowledge: Wayana handcraft on Maroni River, French Guiana

3.24. Ethnobotanique et connaissances traditionnelles: l'artisanat Wayana sur la rivière Maroni, Guyane

Marie Fleury

Antenne du Museum Nationale d'Histoire Naturelle, Cayenne, French Guiana

Les Wayana, Amérindiens de famille linguistique karib, vivent sur le haut Maroni en Guyane française, sur le Tapanahoni au Suriname, et sur le Paru de Leste au Brésil. Nous

avons travaillé en Guyane française (haut-Maroni), sur les savoir-faire traditionnels et l'ethnobotanique liés à l'artisanat traditionnel. Après une définition de l'ethnobotanique, et une présentation du contexte culturel, nous abordons la méthode utilisée pour décrire les savoir-faire traditionnels, avec l'utilisation de supports vidéo et photographiques, mais aussi la confection d'échantillons d'herbier. En effet, la description des matériaux utilisés, en particulier les végétaux a pris une place particulière dans notre travail dévoilant l'usage de 84 taxons botaniques appartenant à 32 familles différentes. La famille la plus exploitée est celle des palmiers (Arecacées) avec 15 espèces différentes utilisées, puis les Fabacées (8 espèces), les Lécythidacées (6 espèces), les Poacées (5 espèces), les Annonacées (5 espèces), les Caesalpiniacées (4 espèces) et les Mimosacées (4 espèces). La grande famille des Légumineuses regroupe donc 16 espèces utilisées dans l'artisanat traditionnel. Du point de vue biologique, ce sont 47 arbres, 15 palmiers, 10 herbacées, 7 arbustes et 5 lianes et épiphytes qui sont utilisés. Sur ces 84 espèces, 6 seulement sont cultivées, 78 (soit 93%) sont donc des espèces sylvestres sauvages. Cet usage important des espèces forestières souligne le lien très fort de ces populations à la forêt, lien fortement fragilisé par la scolarisation des enfants en dehors du village, et du milieu naturel et culturel. La question de la sauvegarde des savoir-faire traditionnels est donc posée, avec la fragilisation des cultures amérindiennes parfois mises à mal dans leur existence même (question cruciale de l'orpaillage clandestin y compris dans les aires « protégées » du Parc Amazonien de Guyane). Différentes initiatives ont toutefois été prises dans l'objectif de conserver, valoriser, et transmettre ces connaissances traditionnelles en Guyane.

The Wayana is an indigenous tribe of Carib Language, which lives on the Upper Maroni River basin in French Guiana, on the Tapanahoni River basin in Suriname, and on the Paru de Leste River Basin, Pará, in Brazil. This study took place in French Guiana and address their traditional knowledge and ethnobotany, connected with their traditional handicraft. This study has been documented with the aid of photographic and animated material, and the preparation of herbarium specimens. Among the material used by the Wayana, we detected 84 species belonging to 32 plant families. The most frequently used plant groups are the Arecaceae (palms, 15 spp.), Faboideae (Leguminoseae, 8 spp.), Lecythidaceae (6 spp.), Poaceae (5 spp.), Annonaceae (5 spp.), Caesalpinioideae (Leguminoseae, 4 spp.) and Mimosoideae (Leguminoseae, 4 spp.). Therefore the family Leguminoseae includes 16 species utilized by this ethnic group. The 84 species are composed of 47 species of trees, 15 palms, 10 herbs, 7 shrubs, and 5 lianas and epiphytes; only 6 of them are cultivated. This important use of forest species shows the strong connection of this population with the forest. This connection has been weakened by the scholarisation of childrens outside of their villages and therefore outside their cultural and natural environment. The preservation of traditional knowledge is here questioned, as it is influenced by the fragilisation of indigenous cultures, often hampered by external factors (e.g., the crucial situation of illegal goldmining, including within the « protected » areas within the French Guiana Amazonian Park). Several initiatives have been undertaken with the objective of preserving and highlighting the traditional knowledge in French Guiana.



Confection de sonnailles de danses en graines de Kawai (*Thevetia peruviana* (Pers.) K. Schum.) et coton (*Gossypium barbadense* L.), chez les Wayana du haut Maroni. Photo: © M. Fleury.

Member of the Wayana tribe making a dance rattle with Kawai seeds (*Thevetia peruviana* (Pers.) K. Schum.) and cotton (*Gossypium barbadense* L.), Upper Maroni River. Photo: © M. Fleury.

3.25. Mutualism between tropical ecology, natural history museums and systematics: evidence from 30 years of research on French Guianan forest tree communities

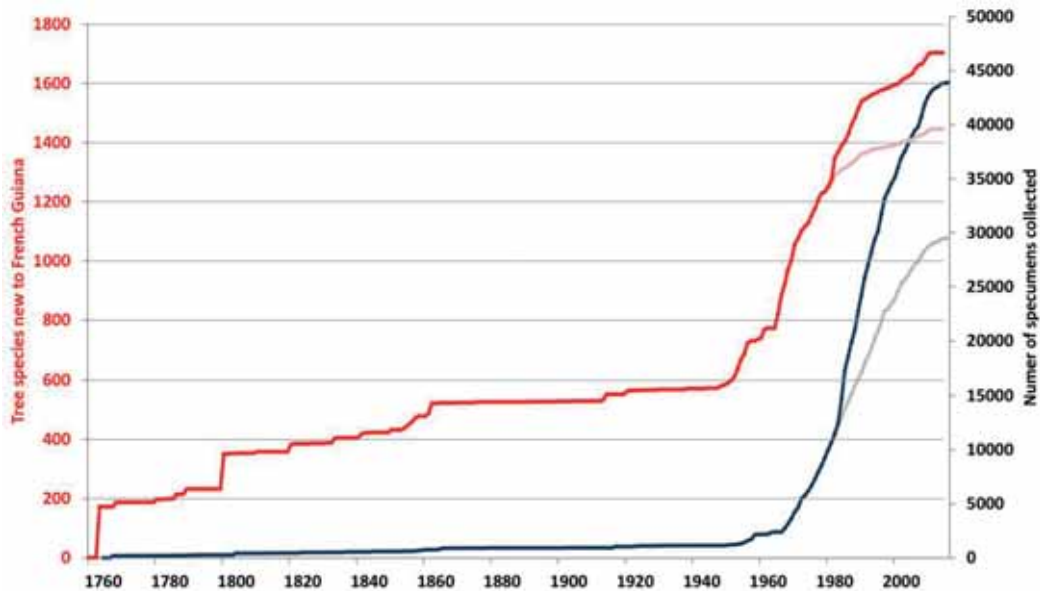
3.25. Mutualisme entre ecologie tropicale, herbiers et systématique: l'exemple de 30 ans de recherché sur les communautés d'arbres forestiers en Guyane

Daniel Sabatier & Jean-François Molino

IRD, UMR AMAP, Herbar IRD de Guyane, Montpellier & Cayenne, France

The floristic inventory of highly diverse tropical rainforests is still incomplete. Moreover, a large proportion of plant species are known from only a few collections and observations. This poses a serious problem for community ecology studies, since they usually rely on botanical inventories, thus on the identification of each recorded plant, as well as on an accurate knowledge of species geographical distribution. In such contexts, the sole solution for community ecologists is to collect botanical specimens that can be studied in herbaria, either by themselves or by specialists of the relevant taxonomic groups. By doing so, not only they (hopefully) obtain accurate identifications of the studied plants, but they also significantly contribute to the enrichment of herbarium collections, thus to taxonomic studies and more generally to the knowledge of the floras. We illustrate this mutualistic relationship between community ecology, herbaria and systematics through the experience of a long-term research program on French Guianan forest tree communities. We show that our main achievements in the analysis of tree diversity patterns in French Guianas, but also in the whole Amazon Basin through our participation to ATDN (Amazon Tree Diversity Network, <http://atdn.myspecies.info/>) would not have been possible without the existence of the CAY Herbarium. Indeed, CAY specialization on Guiana Shield Flora

and the continuous enrichment and improvement of its collections makes it a particularly well suited tool for the identification of the numerous (and often sterile) specimens collected during our field work. On the other hand, through an analysis of floristic inventory accomplished during the last 250 years, we show that 55% of the species newly recorded from French Guiana since 1980 have been collected for the first time during ecological studies such as ours. Finally, we review promising new tools and methods, such as genomics, community diversity modeling or sampling strategies that could help field botanists and ecologists to focus on poorly known taxonomic groups and under-sampled areas to discover the still considerable hidden part of tropical forest's plant diversity.



French Guiana tree flora inventory, 1760 - 2014. Top: cumulative number of tree species and morphospecies; red: all collectors; pink: excluding community ecology studies. Bottom: cumulative number of herbarium specimens; black: all collections; gray: excluding community ecology studies (source: online databases of CAY, MO, NY, P).

4. ABSTRACTS OF POSTERS / RESUMÉS DES POSTERS

4.1. Taxonomic revision of the family Elaeocarpaceae from the states of Pará and Amapá (Brazil) and the Guianas

4.1. Revisión taxonomique de la famille Elaeocarpaceae des états du Pará et Amapá (Brazil) et les Guyanes

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Elaeocarpaceae is a family of pantropical distribution (absent in Africa) with 12 genera and about 600 species. In Brazil two genera and about 46 species are present, *Crinodendron* with a single species, endemic to southern Brazil, and *Sloanea*, distributed in the Amazon, Caatinga, Cerrado, Atlantic Forest and Pantanal biomes. The main objective of this study is to produce the taxonomic treatment of the family Elaeocarpaceae for the Guianas (Guyana, Suriname and French Guiana) and the Brazilian states of Para and Amapá. This study envisions the following products: 1) A description of all the genera and species; 2) Dichotomous keys for the identification of species and occurring in the region; 3) List of Exsiccate. For the realization of this project, specimens of this region present in the CAY, MG, IAN, INPA, HAMAB e RB herbaria are studied. These specimens are analyzed with the aid of a dissecting scope, and the species descriptions were produced with the classic methods and terminology presented in classical references in



Sloanea sp. (Elaeocarpaceae). Photo L. Assunção Teixeira

plant taxonomy, and identified with the help of specialized literature, observation of type specimens and of digital images available in virtual herbaria. The initial study of the taxa thought to be present in the region produced a long list of names, which was later reduced either by treating some of them as synonyms or by eliminating some of them from the list

because absent in the region. A preliminary study demonstrated that 24 species of *Sloanea* are present in the region. Among them, *S. garckeana*, *S. grandiflora* and *S. guianensis* are remarkable by being widespread throughout the whole region, and by having a large geographical distribution. On the other hand, *S. echinocarpa*, *S. laxiflora*, *S. schomburgkii* and *S. tuerckheimii* have been collected only in the Guianas.

4.2. Taxonomic revision of the family Ericaceae from the states of Pará and Amapá (Brazil) and the Guianas

4.2. Revisión taxonomique de la famille Ericaceae des états du Pará et Amapá (Brazil) et les Guyanes

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The family Ericaceae is worldwide distributed, and is traditionally subdivided into nine subfamilies. The family is represented by 126 genera and 4010 species, and occurs mainly in temperate regions and in the mountainous areas of the tropics. Many genera are economically important because of their edible fruits (berries) and/or their ornamental value. They can be epiphytic or terrestrial; their habits vary from trees to shrubs to herbs, and often have micorhizal associations; and they usually prefer sunny areas and acid soils. They have pendulous inflorescences, and corolla commonly fused into a basal tube. In the Guianas and the Brazilian states of Pará and Amapá, at least 15 genera and 30 species of this family are present/ can be found. The main goal of this project is to carry out a taxonomic revision of genera and species of the Ericaceae occurring in this region, based on the study of specimens of the MG, CAY, HAMAB, RB, INPA herbaria and bibliographic consultation of the main references related to this family. This project seeks to clarify and expand the knowledge of the group in the region, and produce information that can be useful for conservation initiatives, as well as for the treatment of the family for the Flora of the Guianas series. With this in mind, this project will have the following products: 1) A description of all the genera and species; 2) Dichotomous keys for the identification of genera occurring in the region; 3) List of Exsiccate, organized by Amapá, Pará, French Guiana, Suriname and French Guiana.

4.3. Protected Ferns and Lycophytes of French Guiana

4.3. Les Fougères et Lycophytes protégés de Guyane Française

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In 2014, 335 taxa of Ferns & Lycophytes were recorded to occur in French Guiana. Out of this total, only seven species are now protected by the Ministerial Order of 9 April 2001, published on 5 July 2001, which comprises a list of 83 plant species. The protected species were not only chosen just because of their rarity, but also for their location along the Atlantic coastal zone in threatened habitats (swamps, savannas, low forests), which

are strongly subjected to anthropic advances (urbanization, agriculture). The seven protected species of Ferns & Lycophytes are following: 1) *Actinostachys pennula* (Sw.) Hook. (Schizaeaceae), 2) *Anemia pastinacaria* Moritz ex Prantl (Anemiaceae), 3) *Ceratopteris pteridoides* Hieron. (Pteridaceae), 4) *Isoetes* sp. (Isoetaceae), 5) *Marsilea polycarpa* Hook. & Grev. (Marsileaceae), 6) *Ophioglossum nudicaule* L.f. (Ophioglossaceae), and 7) *Schizaea incurvata* Schkuhr (Schizaeaceae). For each species, a short description, photos taken in natural habitat, a discussion about their habitat, and a map of distribution in French Guiana are given.

4.3. The National Herbarium of Suriname

4.4. L'Herbier Nationale du Suriname

Angela Grant

National Herbarium of Suriname, Anton de Kom University of Suriname, P.O. Box 9212, Paramaribo, Suriname

The history, organizational structure, and current position of the National Herbarium of Suriname at the Anton de Kom University of Suriname are presented. Our mission and vision are: 1) to shape our status and the future position of the institute where our diverse floristic collection is kept in a safe environment; 2) to bring this institute closer to the youth, the staff of the Herbarium offers tours to students from secondary school and onward; 3) to participate in different projects related to the conservation of nature and biodiversity as a way of contributing to sustainable development and globalization.

5. LIST OF PARTICIPANTS / LISTE DES PARTECIPANTS

More than 100 participants attended the conference. The list below is not exhaustive, as no permanent log was kept during the conference.

Plus de 100 personnes ont participé à la conférence. La liste ci-dessus n'est pas exhaustive car aucun registre permanent n'a été mis à disposition pendant la conférence.

Acevedo-Rodríguez, Pedro (Smithsonian Institution, Washington, USA)
Affouard, Antoine (INRIA, ZENITH, Montpellier, France)
Amasifuen Guerra, Carlos Alberto (Universidad Peruana Cayetano Heredia, Lima, Peru)
Assunção, Lisandra (Museu Paraense Emílio Goeldi, Belém, Pará, Brazil / Universidade Federal Rural da Amazônia, Belém, Pará, Brazil)
Bilot-Guerin, Veronique (IRD, Cayenne, French Guiana)
Blanchard, Frédéric (Region Guyane, Cayenne, French Guiana)
Bordères, Michel (ex ONF, Cayenne, French Guiana)
Boudrie, Michel (Cayenne, French Guiana)
Brossard, Michel (IRD, Cayenne, French Guiana)
Brunaux, Olivier (ONF, Cayenne, French Guiana)
Bruno, Milena (CNRS, Cayenne, French Guiana)
Charron, Christophe (IRD, Cayenne, French Guiana)
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Costa da Silva, Juliana (Hospital Estadual de Oiapoque, Oiapoque, Brazil)
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Delprete, Piero (IRD, Cayenne, French Guiana)
Doudou, Jean-Claude (IRD, Cayenne, French Guiana)
Engel, Julien (CIRAD, Kourou, French Guiana)
Eparvier, Veronique (IRD, Cayenne, French Guiana)
Flcury, Marie (Muséum National d'Histoire Naturelle, Antenne de Cayenne, French Guiana)
Franc, Alain (INRA, Cestas, France)
Gahaly, Jeannine (IRD, Cayenne, French Guiana)
Geniez, Chantal (IRD, Cayenne, French Guiana)
Giaretta de Oliveira, Augusto (Universidade de São Paulo, São Paulo, Brazil)
Girault, Rémi (Sepanguy, Cayenne, French Guiana)

Gonzalez, Sophie (IRD, Cayenne, French Guiana)
Goulamoussene, Youven (IRD, Cayenne, French Guiana)
Gozlan, Joanna (simultaneous translation, Cayenne, French Guiana)
Gozlan, Rodolphe (IRD, Cayenne, French Guiana)
Grant, Angela (University of Suriname, Paramaribo, Suriname)
Granville, Jean-Jacques de (ex IRD, Cayenne, French Guiana)
Heuret, Patrick (CIRAD, Kourou, French Guiana)
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Köster, Nils (Botanical Garden and Botanical Museum, Berlin, Germany)
Léotard, Guillaume (Matoury, French Guiana)
Leroy, Celine (IRD, Kourou, French Guiana)
Lopes, Camille (Museu Paraense Emílio Goeldi, Belém, Pará, Brazil / Universidade
Federal Rural da Amazônia, Belém, Pará, Brazil)
Louisa, Cristelle (IRD, Cayenne, French Guiana)
Lucas, Eve (Kew Botanic Gardens, Surrey, U.K.)
Maas, Paul (Naturalis, Leiden, The Netherlands)
Maas-van de Kamer, Hiltjie (Naturalis, Leiden, The Netherlands)
Marie-Rose, Rosiane (IRD, Cayenne, French Guiana)
Marjanom, Gunovaino (University of Suriname, Paramaribo, Suriname)
Moatti, Jean-Paul (IRD, President-Director (CEO), Marseille, France)
Molino, Jean-François (IRD, Montpellier, France)
Monlois, Garvey (IRD, Cayenne, French Guiana)
Moonen, Joep (Emerald Jungle Village, Montsinéry, French Guiana)
Mota de Oliveira, Sylvia (Naturalis, Leiden, The Netherlands)
Neibecker, Stéphanie (IRD, Cayenne, French Guiana)
Odonne, Guillaume (CNRS, Cayenne, French Guiana)
Ogeron, Clémence (CNRS, Cayenne, French Guiana)
Pelletier, Vincent (Biotope, Cayenne, French Guiana)
Pinel, Serge (IRD, Cayenne, French Guiana)
Poncy, Odile (Muséum National d'Histoire Naturelle, Paris, France)
Poumaroux, Marie-Claude (IRD, Cayenne, French Guiana)
Prevoteau, Jean-Marie (Parc Naturelle Regional de Guyane / Sepanguy, Cayenne,
French Guiana)
Proisy, Christophe (IRD, Cayenne, French Guiana)
Prudent, Ramon (IRD, Cayenne, French Guiana)

Ramsodit, Sarmila (University of Suriname, Paramaribo, Suriname)
Richard, H el ene (ONF, Cayenne, French Guiana)
Ringard, Justine (IRD, Cayenne, French Guiana)
Sabatier, Daniel (IRD, Montpellier, France)
Sarrazin, Max (IRD, Cayenne, French Guiana)
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