

**FLORA OF THE GUIANAS**  
**NEWSLETTER NO. 13**  
**SPECIAL WORKSHOP ISSUE**

**Utrecht, February 2001**

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## 1. INTRODUCTION

The Nationaal Herbarium Nederland, Utrecht University branch, was pleased to host the 2000 meeting of the Flora of the Guianas. On October 30, there were a meeting of the Advisory Board and a general meeting, and on October 31, the workshop was held in the Van Unnikgebouw at the Utrecht University campus De Uithof. On November 1, there was an excursion to wetlands in the SW part of the Netherlands.

This Newsletter includes reports of the Board meeting and summaries of the contributions presented at the Workshop.

Marga Werkhoven (BBS, Paramaribo) became the new chairperson of the Board and Marion Jansen-Jacobs (U) the new Executive Editor.

Other members of the Advisory Board are: Piero Delprete (NY), Renske Ek (U), Jean-Jaques de Granville (CAY, Cayenne), Paul Hiepko (B), Eimear Nic Lughadha (K), Odile Poncy (P), Larry Skog (US) and Inderjit Ramdass (BRG, Georgetown). The editorial office from now on consists of Marion Jansen-Jacobs, Renske Ek and Gea Zijlstra (all U). On both sessions the discussions focussed on how to speed up publication of Flora issues; a priority list of soon-to-be-ready manuscripts will be set up. The problem of specialists who do not return their loans, nor present a manuscript of their treatment, was considered as well. A strategy is needed to solve this (for other flora's also a well-known) problem. Gea Zijlstra will build a website for the Flora of the Guianas. The next meeting will be held in 2002 at Cayenne, French Guiana.

At the Workshop, the keynote lecture was presented by Paul Berry (MO) on how the Flora of Venezuelan Guayana is being organised and produced. Other lectures focussed on flora and vegetation of granitic outcrops, on various plant groups (Cladoniaceae, Cyperaceae, Rubiaceae and legumes), lianas, non-timber forest products and the implication of plant diversity for a Natural Protected Area Strategy. The afternoon session ended with an impressive slide show by Danny Ellinger (Foto Natura, The Netherlands) on flora and fauna of the Guianas.

## 2. MEETING OF THE ADVISORY BOARD

### Opening

Paul Hiepko welcomed all, especially Gwilym Lewis from K, as replacement of Eimear NicLughadha and Carol Kelloff from US, as replacement of Larry Skog. The representative of Guyana BRG, Inderjit Ramdass, was not able to attend due to financial constrains.

### Report of the previous meeting

There were no comments on the minutes of the previous meeting. After the previous meeting, a document was drafted by Larry Skog concerning the need to speed up publication of the printed Flora of the Guianas, in order to encourage botanical exploration of the Guianas region and training of students. This document was sent to Ben ter Welle together with a letter of the chairman. No answer was received. The document by Larry Skog serves as basis for the discussion in the afternoon. A letter was sent to the Environmental Protection Agency (EPA) of Guyana concerning their proposed policy concerning collection permits. No reaction was received, but members of the consortium did not meet problems in Guyana with obtaining collecting - and exporting permits. The EU-proposal as mentioned during the last meeting was not successful. Main reason: no clear benefit for Europe. Hopefully parts of the proposal can be used for future other proposals. During the discussion that followed, various funding agencies were mentioned: IUCN, WWF (has an office in Paramaribo), EU could be tried again, GEO (had an article on Guyana in last January issue) and Nat. Geographics. According to Piero Delprete the NSF (USA) is positive towards inventories in the Guianas, perhaps a proposal could be made for a resident collector, Suriname may be a good choice.

For training and capacity building there is a high chance that a request for funding is granted. Lack of human resources remains a problem in the Guianas, it would be good to have a list of promising students from the Guianas.

In Suriname a workshop was organized under the auspices of Conservation International to discuss the Management Plan for the Central Suriname Nature Reserve, in order to prepare a document for the UNESCO to get Suriname on the World Heritage List. If this becomes realized, possibilities to find funding for work in Suriname will increase.

For a list of websites, see Appendix 1 (p. 71-74)

### Changing of chairperson

Paul Hiepko handed over the gavel to Marga Werkhoven who was appointed as new chairwoman.

### Report by Executive Editor

The Executive Editor started with some sad news. During the last few years, several taxonomists active in our Flora deceased:

V. Rudd, Fabaceae (Reseda, USA);

J.P. Schulz, an ecologist in Suriname, director of BBS, head of STNASU, etc. (the Netherlands);

P. Tixier, Hepatics (P);  
W.H. Wagner, Pteridophytes (US).

[Note of the editors: in the period between the New York and the Paramaribo workshops, two of the founders of the Flora of the Guianas have passed away: R.S. Cowan (Australia, formerly US) and F.A. Stafleu (U); Cowan also was one of the co-authors of the Caesalpiniaceae pp. volume that was published in 1989; W.H.A. Hekking, Violaceae (U) also died in that period.]

After the meeting in Paramaribo, letters were sent to potential contributors. It resulted in a few offers, but no substantial manuscripts can be expected to be ready in the near future.

Offers to contribute to the Flora came from:

Dr. H.E. Ballard (Athens, Ohio, USA): **Violaceae**

Dr. B. Stahl (Göteborg, Sweden): **Theophrastaceae**

Recently the Extended Index to volume IV , part 2 of the Flora of Suriname appeared, made up-to-date by Dr J. Lindeman (U) who added information on the status of the listed names.

Ms. Juul van Dam (U) received quite a lot of information on **Schomburgk collections** data. She will complete the manuscript within a few weeks. Her results will be published in the Supplementary Series. The book will contain extensive lists of data on the collections, with information on the localities. There are several short chapters focussing on the various voyages. Colour plates can also be added thanks to some Dutch funds.

An overview of all submitted manuscripts can be found in Appendix 2 (p. 75-76) .

### Changing of Executive Editor

Ara Görts-van Rijn handed over her red pen and a floppy disk with the guidelines for contributors to Marion Jansen-Jacobs, who together with Renske Ek and Gea Zijlstra will form the new editorial office.

### Changing representatives

Paul Hiepkko announced that he will formally remain the representative of B until the new person is elected (probably somewhere next year).

Renske Ek will be the new representative for U.

Usha Raghoenandan was introduced as alternative representative for Suriname (in case Marga Werkhoven will not be able to attend).

### Publishing 'Studies on the flora of the Guianas'

Everybody is reminded to ask for a number in the 'Studies' when a relevant paper is published. These numbers are issued by Marion Jansen-Jacobs (m.j.jansen-jacobs@bio.uu.nl), as close as possible before

proofs of the paper are printed. One more compilation (nrs 91-100) will be made. After that, the numbering will continue, and persons and institutes will receive a list of published studies, but the studies will no longer be compiled and distributed. Because most journals are not available in Cayenne, Paramaribo, and Georgetown, copies of the papers should be sent to these institutes.

#### Next meeting

CAY will host the next meeting, either in February or October 2002.

#### Other matters

The question was raised what to do with contributors who ask on loan collections of many families, before having finished the families already claimed. The conclusion was drawn that one should not send material to such a collaborator before his or her manuscript, together with illustrations and list of exsicata, is received by the editorial office. All participating institutes will accept this policy.

Carol Kelloff mentioned that US will have a new resident collector in Guyana for the very last time. He/she will collect in specially chosen localities.

### **3. GENERAL MEETING**

#### 3.1. Report of the afternoon session.

The new chairperson Marga Werkhoven (BBS) opened the meeting and welcomed all, especially Paul Berry (WIS), who coordinates the Flora of the Venezuelan Guayana. The Board members were introduced, and so were the members of the editorial office as reconstituted. Short reports of the state of affairs at the participating institutions are given (the complete reports are below in paragraph 3.3).

For the next meeting, February 2002, Jean Jacques de Granville invited the Board to Cayenne.

In her farewell speech, Ara Görts-van Rijn reached back to the sixteenth century with English, Dutch and French settlers who had arrived after the Spanish and Portuguese conquerors. Highlights of the history of botanical exploration were recalled to memory, and it was announced that soon a modern version of the Schomburgk data will appear, prepared by

Juul van Dam. The foundation of herbaria in the three countries was mentioned, starting with the BRG in Georgetown, and so were the precursors of our Flora, namely the Flora of Suriname (1931-1986) and Lemée's Flora of French Guiana (1952-1956).

The general discussions focussed on three topics:

- Speeding up publication of Flora fascicles;
- The problem of specialists who keep their loans too long;
- The Flora of the Guianas on the Internet.

A number of suggestions was made for speeding up publication of fascicles:

- with respect to communication with authors:

Paul Berry: structure is needed in any Flora project. Contributors must see the need to publish. It can be done by setting goals along the way; for instance ask contributors to make a checklist; ask for a first draft treatment of one taxon; etc. Feed back is possible at all those steps.

Carol Kelloff and others: set deadlines for the contributor to have the treatment ready by a certain date. Make a list of the deadlines.

Piero Delprete: put all specialists on an e-mail list and send messages/requests every 6 months.

Gwilym Lewis: look for positive reinforcements, set an incentive to publish soon.

Conraed Kamelbeke: personal contact by telephone or e-mail works out positively.

- a matter of general policy:

Piero Delprete and Marion Jansen-Jacobs: look for coordinators of related (small) families, who can stimulate the authors to have their manuscript ready together with the manuscript of the large family they will be combined with.

Piero Delprete: the editorial office should not ask for manuscripts unless publishing within the near future can be guaranteed.

- within the editorial office:

Piero Delprete: make a priority list of fascicles expected to be ready soon.

Gwilym Lewis and Renske Ek: put together, e.g. in legumes, what is ready and publish. This is in accordance with the Board's decision that also parts of families and even unrelated groups can be published in one fascicle. Look for students to work on as yet untreated genera.

If some new rules are needed, let the editorial office - after consulting the Board - set these.

Stefan Dressler: there are manuscripts that are waiting on the editorial desk since a long time already: put them on the Internet. In this way the



treatments are available although not yet published. New or future specialists can step in.

Find funding to have almost-retired-specialists concentrate on finishing Flora treatments.

#### Specialists not returning the collections they have on loan

Most herbarium curators come across the problem of how to get material back from specialists who have got these specimens on loan long ago, whereas there is no indication that a manuscript is being produced.

Those specialists keep the collections in their office, moreover they often also receive all newly collected specimens - in this way entire families or parts of larger families are unavailable to others.

A policy is needed to solve this problem. Maybe a black list?

This hinders the publication of a family treatment. In some cases maybe it should be decided to publish a treatment minus the taxon or taxa of which the collections are held back.

#### Flora of the Guianas on the Internet

##### - databases:

Odile Poncy told that the AUBLET 2 database is now ready to be put on the Web. It is in French, but is being translated into English. It consists of lists of families, of collections, of collectors, of localities, references, etc. Comparable data are already available from US and NY. According to Piero Delprete and Carol Kelloff, there is no conflict between the Boggan Checklist and the AUBLET 2 database, the latter being a herbarium collections list, the former a taxonomic list. These databases are complementary, and there seem to be no problem to make the Aublet data available.

Combining all databases seems fine and mechanically there seems to be no problem to combine various data bases, but it needs at least one person to keep it updated taxonomically and nomenclaturally. Who volunteers? Paul Berry suggested that the Tropicos people at MO could look at the Aublet 2 database and may link them. Renske Ek and Carol Kelloff stressed that the various databases should be linked as much as possible.

##### - website:

Gea Zijlstra offered to make a website for the Flora of the Guianas. Eric Gouda stressed that unpublished manuscripts could be put on the site. Space is no problem. Jifke Koek-Noorman wondered if putting as yet unpublished manuscripts on the web would not give conflict with property rights, responsibility and authorship of new species. Gwilym Lewis answered that authors will undoubtedly publish new species as quickly as

possible in one of the journals and Gea Zijlstra added that new species 'published' on the Internet would not be validly published.

Stefan Dressler gave a warning: beware of piracy on the Internet and let it not lead to creation of nomina nuda.

Another matter that could be put on the website: Keys - especially those on vegetative characters.

There was a firm consensus that published fascicles should not be available on the Internet, these have to be sold in printed format.

Before closing: Ara Görts-van Rijn thanked Paul Hiepko for having been the chairman during so many years, and Marga Werkhoven thanked Ara Görts-van Rijn for the many years of involvement as the Executive Editor.

3.2. Reports on the state of affairs of the participating institutions, February 1999 - October 2000

**(B) Botanischer Garten und Botanisches Museum Berlin-Dahlem;  
Berlin, Germany**

Publications:

1999: Update for the internet Checklist of the lichens of the Guianas (<http://www.mnh.si.edu/biodiversity/bdg/lichlist.html>).

Flora treatments (Cryptogams)

**Lichens** (Coordinator Harry Sipman):

- **Parmeliaceae:** Material of the genus *Hypotrachyna* has been revised in the framework of a treatment for Flora Neotropica.
- **Thelotremataceae:** no new information.
- **Cladoniaceae:** The Flora Neotropica treatment of this family by T. Ahti was published in February 2000; now the main reason for the stand-still in the preparation of the Flora of the Guianas treatment is eliminated and a continuation is expected in 2001.

**Ferns:** Brigitte Zimmer is cooperating with George Cremers to finish the outstanding fascicles of pteridophytes.

Flora treatments (Phanerogams)

- **Compositae:** The status of the contribution by H. W. Lack (Inuleae s.l., Tageteae, and Lactuceae) is still preliminary.

- **Menispermaceae:** Having finished the monograph of *Agonandra* (Opiliaceae) for *Flora Neotropica*, Paul Hiepko will continue his work on the MS for this family in 2001.
- **Zygophyllaceae:** The status of the contribution by Beat E. Leuenberger is in progress.
- Thomas Raus will treat his very small families if one of the neighbouring families is more or less finished: **Caprifoliaceae, Pedaliaceae, Plantaginaceae, Punicaceae, Ranunculaceae.**

## **(BBS) National Herbarium of Suriname; Paramaribo, Suriname**

### General

During this period, BBS has received several shipments of duplicates from U, US and MO. The specimens have been collected mainly in Guyana and French Guiana; most of the material has been mounted and inserted in the herbarium.

During this period, Ms. Usha Raghoenandan has been teaching every week at the University of Suriname as well as the Advanced Teachers Training College.

In April 1999, during his visit to the University of Suriname, the President of Suriname also visited the National Herbarium (BBS).

In October 1999, the rooms of the herbarium have been fumigated with Fostoxin; there were no problems with the curation of the collections.

In June 2000, Alphamax made a documentary of the National Herbarium of Suriname, which was shown on television in Guyana as well as in Suriname.

### Projects

#### - *The Suriname Bioprospecting Initiative*

One of the International Cooperative Biodiversity Group (ICBG) initiatives is still being implemented in Suriname. This initiative involves the cooperation of Conservation International (CI), tribal communities of the Saramaka Maroons and Indigenous Tirío tribe of Suriname and the national pharmaceutical company Bedrijf Geneesmiddelen Voorziening Suriname (BGVS), with the U.S.-based pharmaceutical company Bristol Myers Squibb (BMS), the agrochemical company Dow Agrosciences (DA), the Missouri Botanical Garden (MO) and the Virginia Polytechnic Institute and State University (VPISU). Phase 2 of this project (1998-2003) is now being carried out in Suriname.

As a direct result of the ICBG project, 158 plant species have been identified as new records for the national database on medicinal plants 'kwasi' which is housed and under the management of BBS.

The research result can be summarized as follows: BGVS provided 4,834 extract samples during the course of the project. The national screening efforts (against microorganisms) resulted in 54 hits and 44 samples selected for fractionation. BMS has performed 96,000 assays, from which 439 hits were registered, 106 samples selected for fractionation resulting in 27 compounds being isolated. VPISU has performed 37,100 assays from which 32 compounds have been isolated. DA performed assays on 2,050 samples with 215 hits of which 16 samples have been selected for fractionation. The CI ethnobotanical collections consist of more than 1,250 specimens, while MO collected ad random about 1,500 specimens.

- *Lianas of Suriname*

The Amazon Conservation Team (ACT), under the presidency of Mark Plotkin started a project in Suriname concerning lianas. Plotkin came several times to Suriname to collect lianas in collaboration with Marc van Roosmalen, Bruce Hoffman and Frits van Troon. The collected specimens have been deposited in BBS. The collectors will publish this liana book by the end of the year 2000. The ACT has the intention to compose a Tree Book for Suriname.

- *Kabo Project*

For the project 'Effects on Logging and Celos Sylviculture Treatments on Forest Biodiversity at Kabo, Suriname', Ms. Raghoenandan led three botanical expeditions to Kabo, from May-October 2000. Measurements were made using the Modified Whittaker Plots system (20 x 50 multiple scaled plots with nested subplots) on the existing one-hectare plots. Logging and Celos Sylviculture System have been performed experimentally on these plots by W. Jonkers ca. 20 years ago. The collected botanical data have yet to be analyzed statistically. This project is being funded by WWF-Suriname.

- *Mungo Project*

For the Suralco-Mungo Works, a rehabilitation project was carried out, titled 'Baseline Study in Mined-out Bauxite Areas'. As part of this project ca. 100 plants were collected from April 1999-April 2000 by the Department of Agricultural Sciences, Faculty of Technology, and were identified by Ms. Raghoenandan.

- *Student Projects*

From September 1999-July 2000 Ms. Raghoenandan has been involved in supervising the botanical part of student projects at the Department of Agricultural Sciences and the Department of Environmental Sciences, Faculty of Technology, e.g. construction of an identification key for

*Capsicum frutescens* cultivars, identification of *Poaceae* species and fieldwork (collecting and preserving specimens).

#### Training / personnel

Ms. D. Traag and Mr. A. Vreedzaam resigned from the herbarium for other jobs.

From 9 May-14 June 1999, Ms. Raghoenandan participated in the Biodiversity Monitoring and Assessment for Adaptive Management Course. This course was organized by the Smithsonian Institution, Washington. A number of the latest methodologies and procedures were presented to measure and monitor biodiversity, including vegetation, birds, amphibians and reptiles, mammals, arthropods, freshwater fishes and aquatic invertebrates. A certificate was handed out at the end of the course. The costs of Ms. Raghoenandan were funded by WWF-Suriname.

#### Expeditions

Three small botanical expeditions were made by Ms. Raghoenandan to Kabo (see above under Kabo Project): from 15-22 May 2000, from 22 August-6 September 2000, and from 2-6 October 2000.

#### National and International Activities

##### - *International Botanical Congress, Saint Louis, Missouri*

From 1-7 August 1999, Ms. Raghoenandan attended the XVI International Botanical Congress in Saint Louis, Missouri, U.S.A. All finances of Ms. Raghoenandan were funded by the Missouri Botanical Garden.

##### - *Missouri Botanical Garden*

Ms. Raghoenandan received curatorial training in some sections of the Herbarium of the Missouri Botanical Garden, and also collected information in the herbarium and the library from 8-27 August 1999 for her *Annotated checklist of the plants growing on inselbergs in the Guianas* (see under heading: Publications). All finances of Ms. Raghoenandan were funded by the Missouri Botanical Garden.

##### - *Seminar Medicinal Plants*

On 15 October 1999, Ms. Raghoenandan attended a seminar about Medicinal Plants held in Paramaribo by Dr. Carpenter (Professor of Forestry), Louisiana State University, U.S.A.

##### - *WWF-GFECF Consultation*

On 14 January 2000, Ms. Raghoenandan represented BBS on the WWF-GFECF (World Wildlife Fund-Guayana Forests & Environmental Conservation Project) consultation in Paramaribo. The purpose was to make an inventarisation of all authorities, which can have an input within this project.

- *First regional CITES Meeting, Quito*

The first CITES (Convention on International trade in Endangered Species of Wild Fauna and Flora) Regional Meeting for Central & South America and the Caribbean was attended by Ms. Werkhoven (BBS) and Mr. Baal (Suriname Forest Service, Nature Conservation Division). This meeting was held from 29 February-2 March 2000 in Quito (Ecuador).

- *CACHE Meeting*

From 20-24 March 2000, the Faculty of Technology of the University of Suriname hosted the Board meeting of the Caribbean Council of Higher Education in Agriculture (CACHE). During the technical sessions, Mr. Malone of Conservation International and Ms. Werkhoven of BBS gave a presentation on 'Ethnobotany in Suriname'.

- *Workshop Mercury & Artisanal Goldmining*

On 30 March 2000, Ms. Raghoenandan and Ms. Werkhoven attended the Workshop Kwik en Kleinschalige Goudwinning (Mercury and Artisanal Goldmining) in Paramaribo, organized by the Center for Environmental Research (CMO), University of Suriname. This workshop was the end of the subproject FG-06 'Water Quality monitoring in the Commewijne Watershed Suriname' of the WWF-GFEC Project (World Wildlife Fund-Guianas Forests & Environmental Conservation Project).

- *Excursions Seminar CSNR*

From 10-12 April 2000, Ms. Raghoenandan was invited by Stinasu (Foundation for Nature Conservation Suriname) to participate in the field excursions to the Central Suriname Nature Reserve (CSNR), Voltzberg/Raleighvallen, which preceded the seminar of 12-16 April 2000 'A Process to design a sustainable Tourism Development and Conservation Strategy for Suriname, Highlighting three Core Tourism Products (CSNR, USR-Upper Suriname River, HP-Historic Paramaribo)'. Organized by Conservation International Suriname.

- *11th Conference of the Parties (COP 11) to CITES*

From 10-20 April 2000, the 11th Conference of the Parties (COP 11) to the Convention on International trade in Endangered Species of Wild Fauna and Flora (CITES) was held in Gigiri (Nairobi), Kenya. The leader of the delegation, Mr. Baal, and Ms. Werkhoven of BBS formed the delegation of Suriname. During this Conference, Ms. Werkhoven and Enrique Forero have been elected as representatives for Central & South America and the Caribbean in the Plants Committee of CITES.

- *WIPO Seminar*

From 3-4 May 2000, Ms. Raghoenandan attended the 'WIPO national seminar on the legal framework of intellectual property rights' organized by WIPO (World Intellectual Property Organization, Switzerland) and the government of Suriname. There were several speakers from Suriname, Trinidad & Tobago, Jamaica, and Switzerland.

- *Course Neotropical Botany*

From 10 July-5 August 2000, Ms. Raghoenandan participated as co-lecturer during the 'Neotropical Botany Course' at the University of Guyana, Georgetown. During the first three weeks of the course ca. 50 plant families of the Guianas were presented and in the fourth week fieldwork was carried out. Ms. Raghoenandan was invited by the National Herbarium of the Netherlands (Utrecht) and received a 'Certificate of Appreciation'. All costs of Ms. Raghoenandan were financed by the Alberta Menega Foundation, the Netherlands, and accommodation by Tropenbos-Guyana.

- *Workshop CSNR Management Plan*

From 17 July-21 July 2000, Ms. Werkhoven participated in a workshop dealing with the development of the strategy for the development of the Management Plan of the Central Suriname Nature Reserve, CSNR. This reserve was created in 1998. It covers more than 1.6 million hectares (almost 10% of the country and 80% of the entire protected area system of Suriname, and protects a globally significant expanse of montane and lowland tropical forests of the Guayana Shield, between the Orinoco and Amazon basins. It encompasses three already existing reserves - The Raleighvallen Nature Reserve, the Tafelberg Nature Reserve and the Eilerts de Haan Gebergte Nature Reserve. This Management Plan will be submitted to the UNESCO in order to establish this reserve as a World Heritage Site. The World heritage status will recognize CSNR's value to people throughout the world. With this recognition, international visibility will increase and it will be clear that high quality resource protection, management and visitors service will be necessary.

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## **(BRG) Guyana National Herbarium; Georgetown, Guyana**

### The herbaria

#### - *Storage of specimens*

The Guyana National Herbarium has been unable to fully furnish the physical plant, hence there is a lack of storage cabinets for mounted plant specimens. Further, there are insufficient funds to sustain the programme of mounting in respect of materials (sheets, folders, etc) and for semi-skilled labour. US must be commended for the donation of four metal/wood cabinets to assist in storage, as well as some materials for mounting and filing.

#### - *Merging of herbaria*

No action has been taken since the decision (Flora of the Guianas Meeting in Guyana in 1992) to merge the two herbaria (BRG and the herbarium of the Biodiversity Center) on campus. This issue still appears to be a problematic one.

#### - *Information storage and retrieval*

Currently, the collections at the Biodiversity Center are in a database but this is not so for the Jenman collections in BRG. An attempt has been made by some students doing their final year project in Biology, but this exercise has not been so productive. Further, there is no computer for the Jenman's collections, so this is a limitation.

### Staff and training

Mr. A. Chanderballi is due to complete his studies for a PhD. at Missouri. Also, Ms. C. Simmons returned from Leiden with a Doctorandus degree in biology but she has been seconded to the Iwokrama Programme. It would appear that there are limited options for training at the more advanced member institutions, which is an issue to look at.

### Course Neotropical Botany

In cooperation with U and the Tropenbos-Guyana Programme, a systematic botany course on the recognition and identification of plant families and species of Guyana was organised from 10 July-4 August 2000. This course was given for the first time by Paul Maas and Renske Ek, with the assistance of Usha Raghoenandan (BBS) and Ramesh Lilwah (Environmental Protection Agency, Guyana). Thirteen participants from Guyana, Suriname and French Guiana successfully attended this course and received certificates at the closing ceremony in Georgetown.

### Collecting

There is no definite programme of collections which has been agreed upon with the collaborative institutions. This used to be the case until

recently, and it is suggested here that this pre-planning phase be reintroduced. This would enable the identification of field staff early in the process, which has become a difficulty due to the lateness of requests for local counterparts. Further, it should be brought to the attention of collectors to try their best to obtain replicates instead of unicates which can then be shared among member institutions.

[Note of the editors: botanists never collect unicates, zoologists only in some cases can collect unicates only.]

The following collecting expeditions were undertaken:

- 10 May-30 June 1999: T. Henkel (US) went to Upper Ireing River, Mount Wokomung, and Upper Yararka Creek. This trip resulted in 270 voucher sheets and 359 paper bags with fungi. Mr. Henkel is working on a project entitled 'Ectomycorrhizol Fungi associated with Dicymbe species in the Pakaraima Mountains in Guyana.'
- 16 July-10 October 1999: D. Clarke (US) went to Kwitaro River and Great Falls of the Rewa River, Region 9. He was working on a survey of the floristic diversity that area. A total of 4152 sheets of higher and lower plants were collected.
- 19 Aug-13 October 1999: B. ter Welle and Ms. M.J. Jansen-Jacobs (U) went to Corona Falls (Rewa River) and Essequibo River. A total of 534 higher plants were collected, each of them in 12 duplicates.
- 17 March-20 March 2000: Ms. C. Kelloff (US) went to Amatuk Falls, Potaro River. The collection consisted of 62 sheets of plant specimens which are at the US for processing.
- 15 May-10 July 2000: T. Henkel (US) went to Potaro-Siparuni, eastern slopes of Mt. Ayanganna and adjacent riverine tributaries. This trip was a continuation of his previous trip and resulted in 50 Ziplock bags (50 voucher specimens).

#### Conference and closing remark

US and the Department of Biology of the University of Guyana are planning to host an International Symposium in March 2001 on the Biodiversity of Guyana. This should bring together about 100 scientists and researchers who would report on Biodiversity findings for the country. It is hoped that the Symposium will be a success.

The "Flora of the Guianas" project is useful for the three Guianas in respect of taxonomically studying and documenting the plant species of the region. However, in respect of capacity building, both human and institutional, it still has to focus some attention on these aspects.

## CAY Herbar de Guyane, Institut de Recherche pour le Développement (IRD); Cayenne, France

### Flora treatments

- **Arecaceae**, Coord. J.-J. de Granville (1 fascicle, 8 contributors, 95 taxa listed) and **Caryocaraceae**, J.-J. de Granville: No progress in the manuscripts by lack of time, since J.-J. de Granville is in charge of the Herbarium. At the last meeting, funding the salary of a young botanist able to help J.-J. de Granville in order to speed up the palm treatment, had been discussed in the framework of the E.U. proposal. Unfortunately, the proposal has been rejected.  
A new species of *Bactris* has been described: *B. nancibensis* J.-J. de Granville.
- **Pteridophytes**, Coord. G. Cremers (P) (9 fascicles, 12 contributors, 450-500 taxa): So far, 3 fascicles only have been published. Two other fascicles, already in preparation 2 years ago, are in progress but not yet ready for publication because of nomenclatural changes and difficulties to treat the genera *Elaphoglossum* (Lomariopsidaceae) and *Cyathea* (Cyatheaceae). The delay is also due to the long time necessary to make drawings. These are:  
Fascicle 7: Aspleniaceae, Blechnaceae, Lomariopsidaceae.  
Fascicle 2: Cyatheaceae, Gleicheniaceae, Lygodiaceae, Marsileaceae, Metaxiaceae, Schizaeaceae.
- **Humiriaceae** (22 taxa), **Hugoniaceae** (4 taxa) and **Ixonanthaceae** (3 taxa in the Guianas s.s.; 6 taxa if also considering the bordering areas), D. Sabatier (Montpellier): The manuscript on **Linaceae s.l.** (= Hugoniaceae + Ixonanthaceae) is almost finished. The manuscript on Humiriaceae, reviewed by M.J. Jansen-Jacobs and corrected by the author, will be submitted soon for publication. The key has to be modified because of discovering a species of *Vantanea* new to the Guianas, *V. paraensis*, identified from specimens collected in flowers during the Pic Matécho expedition, in September 2000.
- **Turneraceae** (19 taxa) M. Hoff (P): The manuscript has been written in French and must be translated in English before being submitted to the Editor. Moreover, a few minor modifications and additions have to be made in the treatment of the genus *Piriqueta*, while the treatment of *Turnera* is quite finalized.

### the «AUBLET 2» database

The database «AUBLET», created in 1986 by M. Hoff and G. Cremers, has been transferred in 1998 by M. Hoff and H. Chevilotte in a new database software (ORACLE/ACCESS 97). The new name is « **AUBLET 2** ». The database gathers the specimens hosted at CAY. It aims at

managing the herbarium and providing taxonomical as well as biogeographical informations on the plants from French Guiana.

A scientific board has been appointed in 1999<sup>1</sup>. Several board meetings have been organized in Cayenne in 1999 and 2000 with the purpose of improving the new system, discussing priorities for recording data and specimens, giving advice for all the requests concerning extraction and treatment of computerized data. Since 1999, all the new collections as well as specimens sent on loan are provided by bar-code labels. The bar-code system giving instantaneous connection between the voucher and the corresponding recording, makes much easier and speeds up the control and the management of the collections (new identifications, loans etc...). It will progressively be applied to all the specimens hosted at CAY.

Exploitation and applications of the database is fast increasing due to many requests concerning floristic inventory, relative species richness of studied areas, floras and checklists, impact studies and conservation of biodiversity.

Internet access to the database AUBLET 2 will be open very soon, before the end of this year. Consulting taxonomic reference list with synonyms, as well as the list of specimens occurring at CAY (with up to date identifications), the list of French Guiana localities and habitats will be free of charge. On the other hand, extraction of lists of species per locality or per habitat will be charged and will lead to particular agreements between IRD and the requesting institution.

#### exploration program

J.-J. de Granville participated to the following collecting expeditions:

- **Massif Lucifer** (Réserve Biologique Domaniale Lucifer – Dékou-Dékou) in November 1999. The trip was financed and organized by the O.N.F. (Office National des Forêts) with the purpose of floristic inventory of the table top forests on lateritic crust.
- **Pic Matécho** (Central French Guiana) in September 2000. The trip was financed by the National Geographic Society and organized by the New York Botanical Garden.

B. Bordenave has been working on floristic inventory and vegetation types of the southern slope of the **Kaw Mountain** in the framework of the following programs:

- *Trésor Nature Reserve* (agreement IRD / University of Utrecht).
- *ASARCO* south and southeastern part of the gold mining exploration permit (agreement IRD / ASARCO).

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<sup>1</sup> Composition of the Scientific Board AUBLET 2.: C. Charron, H. Chevilotte, G. Cremers, J. Florence, J.-J. de Granville, M. Hoff, J.-N. Labat, C. Moretti, O. Poncy.

Both studies have been carried out under the responsibility of J.-J. de Granville.

M. Hoff participated in 2 field trips (June 1999 and February 2000) in the Kaw flood plain and other coastal places with the purpose of studying the flora and the vegetation of **brackish coastal area** (swamps, marshes, rocks and sandy beaches).

#### other main scientific programs and researches

##### - *INVENTAIRE TAXONOMIQUE DES PLANTES DE LA GUYANE FRANCAISE*

G. Cremers and M. Hoff go on working on this program. The volumes are published under the auspices of the Muséum National d'Histoire Naturelle (Institut d'Ecologie et de Gestion de la Biodiversité, Service du Patrimoine Naturel) and the Minister of Environment. Eight fascicles have been published until 2000 The fascicle IX MALVACEAE-MONIMIACEAE is quite ready but funding is needed for publication.

##### - *GUIDE TO THE VASCULAR PLANTS OF CENTRAL FRENCH GUIANA*

S.A. Mori, G. Cremers, C. Gracie, J.-J. de Granville, M. Hoff and J.D. Mitchell are co-editors of the book. The 1st volume (Monocots + Pteridophytes), in which ferns have been treated and illustrated by G. Cremers and palms by J.-J. de Granville, came out in 1997. In the 2nd volume, already reviewed by editors, the Caryocaraceae have been prepared by J.-J. de Granville. The book is expected early next year.

##### - « *ZNIEFF* » *PROGRAM*

The ZNIEFF (Zones Naturelles d'Intérêt Ecologique Faunistique et Floristique) are natural areas deemed worthy of protection because of their unique ecological, faunistic and floristic characteristics. These areas are selected throughout France, including overseas departments, based on information provided by inventories. A scientific board, the C.S.R.P.N. (Comité Scientifique Régional du Patrimoine Naturel) comprising specialists of flora and fauna is in charge of the program. The C.S.R.P.N., met in Cayenne in February 2000. The Board has been working during 2 days on several items, in particular on a 2 years program (2000-2001) aiming at improving the ZNIEFF network and redefining more accurate boundaries. This new program is based on settling a global recognition method integrating all informations available, complementary flora and fauna inventories, identification of patrimonial species. A definitive list of 719 patrimonial vascular plant species has been ratified by the C.S.R.P.N. in February 2000.

- *PLANT SPECIES SUBMITTED TO PROTECTION BY LAW IN FRENCH GUIANA*

In the framework of an agreement between IRD and the DIREN (Direction Régionale de l'Environnement), 83 endangered or vulnerable plant species have been selected with the purpose of being protected by ministerial order. Each species is briefly described, illustrated, and its distribution is given in French Guiana. This work, requested by the C.N.P.N. (Comité National de la Protection de la Nature), has been carried out by B. Bordenave and V. Hequet, under the authority of J.-J. de Granville and M. Hoff. The list of species submitted to protection has been ratified by a board composed of 12 plant specialists from IRD, MNHN, CNRS and US.

- *INDEX OF FRENCH GUIANA PLANT COLLECTORS*

The manuscript of M. Hoff, already reviewed and getting ready after minor corrections, will be published in the Supplementary Series of the Flora of the Guianas.

visiting scientists

About 250 persons visited the Herbarium in 1999-2000°, 100 of them are scientists from other institutions and several, involved in scientific programs on French Guiana, came 2 or 3 times a year.

\* From **P**: S. BAHUCHET (Program SOFT/APFT), J. BARDAT (Bryophytes), B. BORDENAVE (flora of the Kaw mountain, "Trésor Nature Reserve, impact study on gold mining permits), BRULARD ("Aublet 2" database), Y. CHANE KIVE, M. FLEURY (Ethnobotany), P. HAFFNER ("Aublet 2" database), J. JEREMIE (aquatic plants), J.-N. LABAT ("Aublet 2" database), J. MUNZINGER (Violaceae), A. NGUEMA (D.E.A.), M. PIGNAL (Monimiaceae), O. PONCY (Mimosaceae – *Inga* -, "Aublet 2" database, C.S.R.P.N., La Trinité and Trésor Nature Reserves), A. RAYNAL (aquatic plants), C. SARTHOU (flora of "Les Nouragues" Nature Reserve), E. TRANCHAR (cultivated trees – training course -), J.-F. VILLIERS (flora of "Les Nouragues" Nature Reserve)

\* From **U**: R. EK (flora of "Trésor" Nature Reserve), E. GOUDA (Bromeliaceae), N. RAES (flora of the Kaw Mountain: impact study on gold mining permits)

\* From **NY**: W.R. BUCK (Flora of Central French Guiana), P. DELPRETE (Rubiaceae), S.A. MORI, H. PECKHAM (Flora of Central French Guiana), M. ROTHMAN and N. SMITH (Flora of Central French Guiana)

\* From **US**: P. ACEVEDO (Sapindaceae), C. FEUILLET (Flora of Central French Guiana)

\* From **I.R.D.**: H. CHEVILLOTTE (CSRPN and "Aublet 2" database), G. CREMERS (CSRPN), P. GRENAND (ethnology), J.-L. GUIL-

LAUMET (Program SOFT), M. HOFF (C.S.R.P.N., coastal wetlands; “Aublet 2” database), L. LALLOVE (cultivated plants), J.-F. MOLINO (flora of the field station “Paracou”), B. ORPHELIN (phytochemistry), D. SABATIER (forest flora)

\* From **CIRAD**: DUBUS and J. SEITER (*Aniba rosaeodora*), D. PAGET (forest types), P. PETRONELLI (forest flora)

\* From **C.N.R.S.**: C. EDELIN (architecture of *Chrysobalanus*), C. MARTAYAN (flora of the island “La Mère”), P. CHARLES-DOMINIQUE (Field station « Les Nouragues », European program COPAS), S. GONZALES (plants of the understory – thesis - ), B. RIERA

\* From **ENGREF**: Ph. CHAREYRE, M. GAZEL (forest flora), M. REDER (scientific literature)

\* From **O.N.F.** (Office National des Forêts): DEWYNTER, B. DUTREVE (forest flora), J. MASSEMIN, M. PENEZ L. and Van REETH (field guide on trees)

\* From the **universities**:

- Paris University: V. ALLEAU (training course on medicinal plants), P. BLANC (Program SOFT), M. LUSQUINHOS (Program SOFT), C. MARTIN (Melastomataceae, flora of “Trésor” Nature Reserve)
- Goettingen University: I. HOLZ (liverworts).
- Duke University: R. YAHR (lichens).
- Helsinki University: P. KOPONEN (training period, EU Project “Large Scale Facility”: nodulation of legume trees), L. JUNIKKA, J. KOLEHMAINEN, J. NIEMINEN, C. ORAVA, M. REIKAINEN, L. SCHULMAN, E. TIDENBERG and V. MUSTIALA (Flora of Central French Guiana, Annonaceae, Melastomataceae)
- Michigan University: C. BARALOTO (seedlings)
- Ulm University: U. MANFRED (thrips’ hostplants), J. PFEIFFER (Cyclanthaceae)
- Lyon University (training course on poisonous plants): E. DORANGEON
- Metz University: G. KALLIN (flora of coastal savannas – instruction course)
- Toulouse University: M. GIBERNAU (pollination of Araceae)
- From the University “Antilles-Guyane”: E. SAUR, A. ROUSTEAU,

\* From the Institute of Ecology of Mexico: B. AMBROSE and F. VERGARA SILVA (Triuridaceae)

\* From Montréal botanical garden: D. BARABE (Araceae), F. FOREST (Araceae, Sapindaceae)

\* From the American Museum of Natural History (Flora of Central French Guiana: plant/beetle interactions)

\* From the Thailand Research Fund: Prof. M.D. VICHARN PANICH

\* L. AUDRY (“Trésor” Nature Reserve), Ph. BIRNBAUM (flora of the field station “Paracou”), L. CADAMURO (medicinal plants – Labo. BIO-CODEX), B. CAPDEVILLE (DIREN), G. FRADET (thesis), V. HEQUET (threatened species, forest flora), J. KASHA (Inst. of Zoology of Cracovie), A. PAVE and M. LAURENT (Institut de Recherches Amazonien); D. GIROU (Regional representative of Research), Dr. MABITE (Peru – Medicinal plants).

#### miscellaneous

F. Crozier and V. Hequet attended the course Neotropical Botany in Guyana in July/August 2000.

#### literature on the Guianas: reports, publications and lectures

- Bordenave, B. & J.-J. de Granville. 1998. Les mesures de la biodiversité: outil de la conservation en forêt guyanaise. *J. Agric. Trop. Bot. Appl.* 40(1-2): 433 - 446.<sup>1</sup>
- Cremers, G. & M. Hoff. 2000. Inventaire Taxonomique des Plantes de la Guyane française. VIII. Les Dicotylédones - 4ème partie : Flacourtiaceae à Malpighiaceae. Collection Patrimoines Naturels. Volume n° 44. Série Patrimoine Génétique. Service du Patrimoine Naturel. Institut d'Ecologie et de Gestion de la Biodiversité. Muséum national d'Histoire naturelle, Paris. 123 pp.
- Cremers, G. & M. Hoff. (in press). Petite flore illustrée du littoral guyanais. Nouvelle édition revue et complétée de «Petite Flore Illustrée: rivages de l'île de Cayenne, SEPANGUY, 1986». IRD edit.
- Granville, J.-J. de. 1999. Remarks on vegetative variations in *Bactris* and associated taxonomic problems. International Conference Evolution, Variation and Classification of Palms, New York, 18-20 juin 1997. *Mem. New York Bot. Gard.* 83: 29-34.
- Granville, J.-J. de. 1999. Palms of French Guiana, diversity, distribution, ecology and uses. *Acta Bot. Venez.* 22(1): 109-125.
- Granville, J.-J. de. (in press). A new species of *Bactris* (Palmae) from French Guiana. Studies on the Flora of the Guianas n° 00. *Brittonia* 00: 00-00.
- Granville, J.-J. de. (in press). L'Herbier de Guyane. In: L'Encyclopédie de la Guyane en 4 volumes.
- Granville, J.-J. de. (in press). Practical Guide to the Palms found on Les Nouragues Trail Network. In F. Bongers & al. (eds.), *Nouragues, Dynamics and Plant-Animal Interactions in a Neotropical Forest*. Biological Monographs, Kluwer Academic Publisher, Dordrecht, Nederland.

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<sup>1</sup> For more information on this volume 40, see the note on p. 29



- Granville, J.-J. de (in press). Caryocaraceae. In S.A. Mori & al. (ed.), Guide to the vascular plants of central French Guiana. New York Botanical Garden, New York.
- Granville, J.-J. de & B. Bordenave. 1998. La protection du patrimoine végétal en Guyane: Historique, outils et perspectives. *J. Agric. Trop. Bot. Appl.* 40(1-2): 509 - 522.<sup>1</sup>
- Granville, J.-J. de & F. Crozier. 199. Etude botanique du site proposé pour l'ouverture d'une carrière de sable par « Les Carrières du Pic Saint-Loup », R.D. 22 (Route de Mana à Awala), Multigr., IRD Cayenne, 23 pp, 25 fig.
- Hoff, M., G. Cremers & J.M.N. Walter. 1999. Evaluation de la diversité floristique d'une région de forêt dense humide : l'interfluve bas Oyapock - basse Approuague en Guyane française. *J. Bot. Soc. Bot. Fr.*, 9.
- Mori, S.A., G. Cremers, C. Gracie, J.-J. de Granville, M. Hoff & J. D. Mitchell. (in press). Guide to the vascular plants of central French Guiana. Part 2: Dicotyledons. *Mem. New York Bot. Gard.*
- Poncy, O., M. Hoff & J.F. Brulard. 1998. La connaissance actuelle de la flore de Guyane peut-elle étayer les projets de conservation? *J. Agric. Trop. Bot. Appl.* 40(1-2): 373 - 398.<sup>2</sup>

## **(K) Royal Botanic Gardens, Kew; Richmond, UK**

### Flora treatments

There has been little progress since the last FoG meeting in Surinam in January 1999. Treatments of **Labiatae** (R. M. Harley), **Lentibulariaceae** (P. Taylor), **Meliaceae** and **Sapotaceae** (T. D. Pennington) continue to be on hold or progressing slowly, largely because the researchers associated with those families are either retired from Kew, unsalaried or both. As legume co-ordinator, Gwilym Lewis has received no new legume manuscripts, but is pleased to report that the **Mimosaceae** (co-ordinated by Odile Poncy at P) is complete. Odile (who contributed treatments of *Inga* and *Parkia*) is currently working on the submitted manuscript from R.C. Barneby and J. Grimes.

### Publication at Kew

No new fascicles have been published during the report period and currently there are no family treatments in the publication pipeline. The

<sup>1</sup> For more information on this volume 40, see the note on p. 29

<sup>2</sup> For more information on this volume 40, see the note on p. 29

Schomburgk volume, which is to be the next in the collector's series, is moving forward. Correspondence took place between the Information Services Department of Kew and Juul Vandam and prices for a 300 print run of the volume (including some colour and black and white illustrations) have been quoted. Kew now awaits copy before proceeding.

### Other Institutional News

The International Plant Names Index (IPNI), reported on in FoG newsletter 12: 34-35 and 54-55, went live in December 1999 and was officially launched in June 2000. IPNI is an Internet accessible database of the scientific names of all seed plants. It is a product of collaboration between Kew, Harvard University Herbaria and the Centre for Plant Biodiversity Research, Canberra. Combining the records of *Index Kewensis*, the *Gray Index* and the *Australian Plant Names Index*, IPNI will become an invaluable resource for all who work with plants. It will allow scientific names to be checked and be a first point of access to the taxonomic literature as well as providing a nomenclatural backbone to which other sorts of data can be added. Feedback from users will guide the development of subsequent releases. It is published on the Internet:

<http://www.ipni.org>

Kew is taking part in a EU-funded project to set up a Bioprospecting Unit in the Iwokrama Reserve, Guyana. This project is co-ordinated by the Iwokrama International Centre and CABI, and builds on the biodiversity research currently being undertaken in Guyana. The initial aim of the project is to set up a laboratory in the reserve to start a collection of fungal isolates and extracts for research and screening. A natural product chemist, Dr. Ramish Pingal, and a mycologist, Coralie Simmons, have been recruited to the project and are undertaking training at CABI and Kew before setting up the laboratory in Guyana at the end of 2000. Contact: Prof. Monique Simmonds, e-mail: [M.Simmonds@rbgkew.org.uk](mailto:M.Simmonds@rbgkew.org.uk)

## **(NY) Report of The New York Botanical Garden; New York, USA**

### The International Plant Studies Center

The construction of the International Plant Studies Center is now completed, and the entire collection, which accounts for more than six million specimens, is now moved into the new building. What is remarkable is that the whole collection has been available for the entire moving period. The new building has twelve offices for visiting scientists. The main building is now going through a restoration, and the entire roof and all the windows are currently being replaced.

### Flora treatments

Regarding the treatments for the FTG, there is little progress made at NY. Contributors, taxa and current status are indicate below:

Author	Family	Genera	Species	Status
M. Nee & coll.	Cucurbitaceae	20	42	in progress
J. Luteyn	Ericaceae	15	28	in progress
R. Barneby	Mimosa	1	20	submitted
W. Thomas	Simarubaceae Cyperaceae (p.p.)	6	14	in progress in progress
D. Daly	Burseraceae	6	47	in progress
L. Struwe	Loganiaceae s.l.	8	37	in progress
M. Nee	Solanaceae	13	79	in progress
N. Holmgren	Scrophulariaceae	17	44	in progress
P. Delprete (coord.)	Rubiaceae	71	459	see below

### Rubiaceae

This is one of the largest families in the Guianas, for which a short account was given in the previous Newsletter (Delprete, FG Newsletter 12: 12-13. 1999), with a list to al the genera and relative approximate number of species. Since the last meeting several Rubiaceae specialists were contacted and agreed to contribute several genera as follows:

Author	Taxa
L. Andersson (GB)	Cinchoneae
C. Bestetti (SP)	Coccocypselum
R. Cortés (NY)	Retiniphyllum
C. Gustafsson (NY)	Randia, Rosenbergiodendron
P. Delprete & R. Cortés	Sipanea
P. Delprete (NY)	Miscellaneous genera
T. McDowell (TENN)	Morinda
C. Persson (BG)	Gardenieae (excl. Randia, Rosenbergionendron)
C. M. Taylor (MO)	Palicourea, Psychotria, Faramaea, Coussarea

The target date for the completion of the Rubiaceae treatment is for the year 2003.

### Publications

*Guide to the Vascular Plants of Central French Guiana*, edited and contributed by S. Mori and collaborators. The first part of this treatment, which includes the monocots, was published in 1997. The second part,

which includes the dicots, is now accepted, and will be published in two volumes of about 600 pages each, by the end of 2001 or beginning of 2002.

In connection to this publication, it is possible to access an interactive database of the *Fungal and Plant Diversity of Central French Guiana* at the following address: [http://www.nybg.org/bsci/french\\_guiana](http://www.nybg.org/bsci/french_guiana)

## **(P) Museum National d'Histoire Naturelle; Paris, France**

### General information

No change since the previous report (Paramaribo, newsletter n° 12)  
Activity is highly perturbed at P because of works in the building of the Herbarium (March – December 2000).

The Aublet2 Database at Herbar de Guyane, Cayenne and CSRPN, list of protected plants:

see report CAY by J.J. de Granville.

### Field work

- Jul 1999, tree inventory in the Reserve "Montagnes de la Trinité".  
As part of the scientific program in this Reserve, a botanical inventory of trees started in collaboration with ONF (Office National des Forêts). It was conducted along a transect, using the point-centered quadrats. 1000 trees were recorded and 150 were collected. Odile Poncy (MNHN) and Françoise Crozier (IRD) participated in the first field work (July 1999). Progress in this program is planned in 2001, permanent plots should be created.

- Nov-Dec 1999, tree inventory at "Les Nouragues".  
Odile Poncy (MNHN) and Françoise Crozier (IRD) have completed the preliminary inventory of trees >10 cm DBH in a 12 ha plot situated on the so-called "Petit-Plateau" of the gridded study area. Local names were scored. Preliminary identification (most often to genus) is available for the area, and data were entered in the Nouragues database.

- Jul-Aug 2000, botanical study of the "Sentier Botanique" of the Réserve de la Montagne Trésor.

Odile Poncy and Claire Martin (student, Univ. Paris) did a 10 days field work supported by the "Direction Régionale de l'Environnement" (DIREN), and the "Association de la Réserve Trésor", aiming to the inventory of plants and trees along a 1700 m long path open (May 2000) in the forest of the upper part of the Reserve.

- 1999-2000, effects of traditional agriculture on forest regeneration. As part of a program funded by the Ministry of Environment "Impact de l'agriculture traditionnelle sur la régénération forestière" (effects of traditional (cut-and-burn) agriculture on forest regeneration), Marc Pignal participated in three field works (3-4 weeks each) for the study of the vegetation on ancient "abattis", in the upper Maroni region (wayana amerindians, aluku maroons) and in the upper Oyapock (wayampi amerindians).

### Flora treatments

- **Apocynaceae**, by Lucile Allorge - Ms ready, corrections requested by reviewers done (june 1999).
- **Cyclanthaceae**, P. Blanc - No progress.
- **Monimiaceae**, by M. Pignal. - Ms reviewed, corrected ms expected by the beginning of 2001.
- **Loganiaceae**, B. Bordenave - No progress.
- **Mimosaceae**, by R. Barneby, J. Grimes, O. Poncy – Corrections and updatings in progress.
- **Ochnaceae**, by C. Sastre - No progress ; descriptions ready, some illustrations missing.
- **Oxalidaceae, Lythraceae, Mayacaceae**, by A. Lourteig - No progress. ms not word-processed. The monograph of Oxalis is now complete (second part issued in Bradea, 2000).
- **Vitaceae**, by B. Descoings - Ms almost ready (needs revision of indexes for studied collections).

G. Cremers, M. Hoff (IRD): see report CAY by J.J. de Granville.

It may be necessary to find other contributors for Loganiaceae and Cyclanthaceae.

### TMR European Program

As part of the french account to this program ("ParSyst"), K. Camelbeke visited P in spring 1999 to study the genus *Scleria* (Cyperaceae). Because of current construction in the Herbarium building, P was not able to welcome visitors in 2000. Applications can be addressed to "ParSyst" again (info available on the MNHN website – <http://www.mnhn.fr>).

### Publications and reports

Fleury M. & O. Poncy, coord. 1998. Conserver, gérer la biodiversité: quelle stratégie pour la Guyane? *J. Agric. Trop. Bot. Appl.* 40. 678 pp.<sup>1</sup>

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<sup>1</sup> The book gathers 37 papers, including contributions by several botanists involved in Flora of the Guianas: J.-J. de Granville, B. Bordenave, S. Mori (with J. Mitchell, C. Gracie), O. Poncy, M. Hoff and G. Cremers. To order it (FF 200), contact jataba@mnhn.fr or OP (mail or email).

Poncy O., B. Dutrève & F. Crozier. 1999. L'inventaire des arbres de la Réserve Naturelle des Montagnes de la Trinité. Premiers résultats (étude de terrain juillet 1999). Unpubl. report, DIREN-Guyane/MNHN.

Poncy, O., D. Sabatier, M.F. Prévost & I. Hardy. (in press). The lowland high rainforest: structure and tree species diversity. Chapter 4 In F. Bongers et al. (eds.), *Ecological study of a neotropical rainforest: the case of Les Nouragues, French Guiana*. Kluwer, the Netherlands.

Poncy O. and C.M. Martin, 2000. Inventaire préliminaire du Sentier Botanique de la Réserve Trésor. Unpubl. report, DIREN-Guyane & MNHN. 20 p.

Poncy, Hoff & Brulard 1999: see report CAY.

Poncy, Hoff & Bordenave 1999: see report CAY.

### Projects

Odile Poncy wishes to stimulate further botanical study of trees in the permanent station Les Nouragues. Because this station provides comfortable conditions for residents as well as a scientific basis for botanical studies (a 100 ha area gridded into plots of one ha each, trees numbered and mapped, etc. see report Poncy in Newsletter n°11, 1996), colleagues interested in doing field work centered in their own topic are advised to come.

Moreover, in order to prepare a new proposal for funding studies focusing on tree families (NGS or other; a first application to NGS in 1997 was rejected), colleagues interested in joining a cooperative fieldwork in 2002 may contact OP before 30 april 2001. Information on data already available will be given upon request (poncy@mnhn.fr).

## **U    Nationaal Herbarium Nederland, Utrecht University branch; Utrecht, the Netherlands**

### Flora treatments

Gentianaceae	Marion Jansen-Jacobs	start 1994
Piperaceae	Ara Görts-van Rijn	start 1994
Polygalaceae	Arian Jacobs-Brouwer	start 1994
Annonaceae	Paul Maas et al.	start 1997
Musci 4	Jeanne Florschütz-de Waard	start 1997
Bromeliaceae pp.	Eric Gouda	start 1999
Marcgraviaceae	Ad de Roon & Stefan Dressler	start 1999

<u>Wood and timber:</u>		
Mimosaceae	Ben ter Welle & Pierre D�tienne	ready for publication
Polygalaceae	Ben ter Welle & Pierre D�tienne	ready for publication
Humiriaceae, Hugonia- ceae, Styracaceae	Pierre D�tienne & Ben ter Welle	in preparation
Apocynaceae	Karel Bonsen, Pierre D�tienne & Bep Mennega	in preparation

### The participation of the Utrecht Herbarium in the Tropenbos Programme in Guyana

- Tinde van Andel will defend her PhD-thesis on: Non-timber forest products of the North-West District of Guyana, at 29 November 2000 in Utrecht.
- Renske Ek continued her work for Tropenbos in 1999-2000, funded by the EU, on the project: Formulation of criteria and indicators of forest disturbance, using lianas.

### Course Neotropical Botany in Guyana

In July-August 2000 a course concerning Neotropical Botany was given by Paul Maas, Renske Ek, Usha Raghoenandan and Ramesh Lilwah at the University of Guyana. Among the 13 participants where 10 from Guyana (of which 4 from the Forest Department), 2 from French Guiana and 1 from Suriname. Included in the program was one week of field projects in the Mabura Hill area. The course was organized by the University of Guyana in cooperation with the Tropenbos-Guyana Program and the Utrecht University.

Lecturing materials (slides and books) were donated to the University of Guyana.

In June-July 2001 this course will be repeated in Guyana.

### Schomburgk project

In 1999-2000, Juul van Dam worked on the digitization of the data from the Schomburgk collections, based on the data collected by Dr. J.C. Lindeman.

### Index on Vernacular Suriname plant names

In 2000 a project was started by Charlotte van 't Klooster to digitize and publish the data about local plant names in Suriname documented by Dr. J.C. Lindeman in handwritten notes.

### Research of Utrecht MSc-students

- In Tr sor, French Guiana: Emilie van der Knaap, 1999. The Araceae of the Tr sor area, French Guiana.

- In the Mabura Hill area in Guyana within the framework of the project of R.C. Ek: Elze Hesse and Thijs van der Velden, 2000. Dynamical patterns of lianas after logging. Changing patterns of indicator species in a tropical rain forest in Guyana.
- For the Flora of the Guianas: Aletta van den Berg, 1998-2000. *Pepinia* / *Pitcairnia* (Bromeliaceae).

#### Fieldwork / Expeditions

- In 1999: Renske Ek, Bruno Bordenave (P) and 2 students carried out fieldwork in Trésor, French Guiana.
- In 1999: Ben ter Welle, Marion Jansen-Jacobs, Padmatty Haripersaud (FDG) and 2 students went on an expedition up the Rewa River in Guyana.
- In 2000: Renske Ek and 2 students carried out fieldwork in the Mabura Hill area, Guyana.

#### Forthcoming fieldwork / Expedition

- In 2001: Renske Ek, a research assistant and 2 students will continue fieldwork in the Mabura Hill area, Guyana.
- Proposals are submitted for further fieldwork in the Trésor area in French Guiana.

#### Publications

- Andel, T.R. van, 1998. Commercial exploitation of Non-Timber Forest Products in the North-West District of Guyana. *Carrib. J. Agric.Nat. Resources* 2(1): 15-28.
- Andel, T.R. van, 2000. *Non-Timber Forest Products of the North-West District of Guyana*. Part I and II. Tropenbos-Guyana Series 8a & 8b. PhD thesis, Utrecht University.
- Andel, T.R. van, and M.A. Reinders, 1999. Non-timber forest products in Guyana's North-West District: Potentials and pitfalls. In M.A.F. Ros-Tonen (ed.): *Seminar Proceedings "NTFP Research in the Tropenbos Programme: Results and Perspectives"*. The Tropenbos Foundation, Wageningen: 47-62.
- Gouda, E.J., 1999. Checklist of Bromeliaceae of the Guianas with notes on critical species. *Selbyana* 20: 30-39.
- Jansen-Jacobs, M.J. and H. ter Steege, 2000. Southwest Guyana: a complex mosaic of savannahs and forests. In H. ter Steege (ed.): *Plant Diversity in Guyana*. Tropenbos Series 18: 147-157.
- Lindeman, J.C., 1998. Extended Index to Volume IV, Part 2. In *Flora of Suriname* 4(2): 359-416. Foundation van Eedenfonds, Utrecht.



- Steege, H. ter, R.C. Ek and T.R. van Andel, 2000. A comparison of diversity patterns of tree and non-tree groups. In H. ter Steege (ed.): *Plant Diversity in Guyana*. Tropenbos Series 18: 131-138.
- Steege, H. ter, M.J. Jansen-Jacobs and V.K. Datadin, 2000. Can botanical collections assist in a National Protected Area Strategy in Guyana? *Biodiversity and Conservation* 9: 215-240 and in H. ter Steege (ed.): *Plant Diversity in Guyana*. Tropenbos Series 18: 79-99.
- Steege, H. ter, R. Lilwah, R.C. Ek, T.R. van Andel, P. van der Hout, R. Thomas, J. van Essen and I. Ramdass, 2000. Diversity at different scales: a comparison of large-scale forest inventories and smaller plots. In H. ter Steege (ed.): *Plant Diversity in Guyana*. Tropenbos Series 18: 117-130.
- Steege, H. ter, D. Sabatier, H. Castellanos, T.R. van Andel, J.F. Duivenvoorden, A. Adalardo de Oliveira, R.C. Ek, R. Lilwah, P.J.M. Maas and S. Mori, 2000. A regional perspective: analysis of Amazonian floristic composition and diversity that includes the Guiana Shield. In H. ter Steege (ed.): *Plant Diversity in Guyana*. Tropenbos Series 18: 19-34.

### Reports

- Berg, E.R.A. van der, 1999. Medicinal plant use in Guyana's North-West District. M.Sc. thesis, Utrecht University.
- Boo, H. de, 1999. Revision of the genus *Unonopsis* (Annonaceae) in the Guianas. M.Sc. thesis, Utrecht University.
- Christenhusz, M.J.J. 1999. The genera *Euphorbia*, *Pedilanthus* and *Macaranga* in the Guianas. M.Sc. thesis, Utrecht University.
- Ek, R.C., B.G. Bordenave, R. Sluiter and E.C. van der Knaap, 2000. The floristic composition and vegetation structure of the Trésor Reserve, French Guiana. Report Trésor Foundation, Utrecht.
- Evers, J.B., O. Muller and M. van der Zee, 1999. Revision of the genus *Guatteria* (Annonaceae) of the Guianas. M.Sc. thesis, Utrecht University.
- Jansen-Jacobs, M.J., 1999. Botanical exploration in Guyana, South Rupununi Savanna, August-October, 1997. Annex: identifications. Internal report, Herbarium Utrecht University.
- Knaap, E. Van der, 2000. The Araceae of the Trésor area, French Guiana. M.Sc. thesis, Utrecht University.
- Klooster, C.I.E.A. van 't, 2000. Het gebruik van medicinale planten door Surinamers in Amsterdam. M.Sc. thesis, Utrecht University.
- Steege, ter H., R. Lilwah, R.C. Ek, P. Van der Hout, R. Thomas, J. van Essen and V. Jetten, 2000. Composition and diversity of the rain forest in Central Guyana. Tropenbos-Guyana Reports 2000-1. Utrecht University, Utrecht.

Welle, B.J.H. ter, M.J. Jansen-Jacobs and P.P. Haripersaud, 2000. Botanical exploration in Guyana, Corona Falls (Rewa River) towards Essequibo River. Internal Report Herbarium Utrecht University.

**(US) Department of Botany, National Museum of Natural History, Smithsonian Institution; Washington, DC, USA**

This report combines the activities of the persons preparing treatments for the Flora of the Guianas along with the field and collecting activities recently undertaken. The field and collecting program is funded by the National Museum of Natural History (NMNH), Smithsonian Institution as the Biological Diversity of the Guianas Program, and combines both zoological and botanical fieldwork. Only the botanical portion is reported on below.

**I. THE BIOLOGICAL DIVERSITY OF THE GUIANAS (BDG) PROGRAM.**

V.A. Funk, Director & Principal Investigator, BDG, Department of Botany, National Museum of Natural History, Smithsonian Institution.  
Progress Report for Fiscal Year-2000 (October 1999-September 2000)

The goal of the Biological Diversity of the Guianas (BDG) program is to document, study, and preserve the biodiversity of the Guianas. To achieve this goal we not only provide the opportunity for excellent scientific projects on biodiversity to be conducted in the Guianas but also find ways to take the information generated by these studies and make it useful for conservation and education. Currently we are active only in Guyana.

**Collections:**

The Biological Diversity of the Guianas Program continues to collect, sort, mount, inventory, and file all plant specimens collected by the program. In addition, we assist scientists from other departments in NMNH, other bureaus at the Smithsonian Institution, and we collaborate with nearly 100 scientists around the world. We awarded over 7 small grants for field expeditions and 2 collections improvement grants to identify specimens from the Guianas. The funding was down from previous years because of budget cuts.

### Summary of Specimen and Database work

The program's databases now contain 62,562 plant records. Plant specimens determined in FY2000: 2,715. Specimens sent as gifts for determination: 145. Duplicates sent out as exchange: 5,716. Approximately 1301 single (new determinations) and ca. 9935 duplicate labels have been prepared. 3,538 sheets (newly mounted specimens) have been bar-coded for inventory records and inserted into the U.S. National Herbarium. 7,057 sheets (historical collections from the U.S. National Herbarium) have been inventoried and bar-coded for this year. We will continue to barcode and database non-BDG collected specimens in the U.S. National Herbarium from the region of the Guianas over the next several years.

This year, 5 Smithsonian staff members and 6 visiting scientists have collected approximately 145 plant numbers (ca. 539 sheets). However, because of the cuts in funding, we decided to work on the increasing buildup of our backlog and we therefore postponed sending another resident plant collector to Guyana. Dr. J. Pipoly (Clusiaceae), Dr. R. Callejas (Piperaceae) H. David Clarke (Legumes) were sponsored to identify plant specimens in their specialties. GEO magazine published an article in the about the BDG program in the January 2000 issue.

### Plant Expeditions (Guyana)

- Clarke number series: (1-10) Amatuk Falls, with C. Kelloff, D. Naraine, 17-18 March 2000. 10 numbers, 34 sheets.
- Henkel number series: (7827-7849) Mt Ayanganna, Upper Potaro River, with M. Chin, S. Miller, C. Andrew, 20 May - 15 August 2000: 23 numbers, 115 sheets.
- Hollowell number series: (300-386) Shell Beach mangrove ecological plots and Mabaruma area, with A. James, L. Savory, V. James, M. Sewell. 29 April - 16 May 2000: 88 numbers, 320 sheets.
- Kelloff number series: (1393-1414) Amatuk Falls, with K. David, D. Naraine, 17-18 March 2000. 24 numbers, 70 sheets.

Specimens returned to Guyana (October 1999-September 2000): 2600 plant specimens (BDG).

### Other activities (these activities were severely curtailed because of budget cuts)

- The mounting of plant specimens for the Guyana National Herbarium (BRG) continues at the Centre for the Study of Biological Diversity (CSBD, Georgetown, Guyana). The BDG Program has supplied all mounting materials including paper, glue, thread, tape, and fragment pockets. Kelloff, during her visits to Guyana, filled in as herbarium curator during Ms. Simmons (Scientific Officer, UG) absence. Over

- 1,500 sheets have been accessioned and filed into the Guyana National Herbarium.
- M. Sewell (US) was sent to Guyana and spent two months accessioning and filing the backlog of specimens at the Guyana National Herbarium (approx. 1000 sheets).
  - Cynthia Watson was sponsored as a participant to the SI/MAB Measuring and Monitoring Course.
  - BDG assisted the CSBD in Georgetown with preparation of a proposal for building expansion and collection improvements at CSBD.
  - R. Callajas (HUA) visited US to work on unidentified Piperaceae specimens for the BDG Program and other botany staff.
  - C. Kelloff (US) assisted the Guyana National Herbarium (BRG) with accessioning and filing the backlog of plant specimens (ca. 2000 sheets), and established a separate type specimen collection for the BRG herbarium.
  - BDG purchased supplies for the BRG herbarium: fumigant (PDB), mounting paper, genus covers, backing tape, and strapping tape.

#### Biological Diversity of the Guianas Website:

<http://www.mnh.si.edu/biodiversity/bdg/>

We have updated and enhanced our website. In addition to information about the BDG Program, we added the plant checklists of Kaieteur and Iwokrama and the "A" families of the Guianan Shield (combined checklists of the Venezuelan Guayana and BDG). The "B - Le" families on the combined checklist should be completed and on-line by March 2001. The lichenized fungi keys have been updated and we now have several links to collaborators throughout the website and give credit where we have used maps and photos.

The website now has more information about the Centre for the Study of Biological Diversity at UG and information and links for those interested in doing research in Guyana. The Guyana Symposium 2001 to be held in Georgetown, Guyana in 11 - 17 March 2001 also has a link through our website. The Symposium website URL:

<http://www.guyana2001.org/>

## II. THE FLORA OF THE GUIANAS

Flora treatments (including other information provided by specialists)

- **Acanthaceae** (being prepared by D. Wasshausen): treatment completed, to be submitted by 15 November 2000.
- **Agavaceae** (being prepared by R.A. DeFilipps and Shirley L. Maina): Genera & Species: 5/7; text status: done, but waiting for preparation of illustrations, etc.

- **Aizoaceae** (being prepared by R.A. DeFilipps and Shirley L. Maina): Genera & Species: 1/1; treatment completed except for Index of Synonyms.
- **Algae (parts)** (being undertaken by M. Littler and J. Norris): no information on current activities.
- **Aloeaceae** (being prepared by R.A. DeFilipps and Shirley L. Maina): Genera & Species: 1/1; text status: done, but waiting for preparation of illustrations, etc.
- **Amaranthaceae** (being prepared by R.A. DeFilipps and Shirley L. Maina): Genera & Species: 10/24; treatment has been completed, submitted, reviewed, and awaiting publication with related families.
- **Apiaceae** (being prepared by R.A. DeFilipps and Shirley L. Maina): Genera & Species: 2/2; text status: done, but waiting for preparation of illustrations, etc.
- **Araliaceae** (being prepared by R.A. DeFilipps and Shirley L. Maina): Genera & Species: 4/15; text status: incomplete, and waiting for preparation of illustrations, etc.
- **Asteraceae** (being prepared by V. Funk and H. Robinson at US, and W. Lack at B): no activity by Funk at US due to competing projects. However, Robinson will work on the Guianas treatment after completion of the Flora of Ecuador in about two years.
- **Basellaceae** (being prepared by R.A. DeFilipps and Shirley L. Maina): Genera & Species: 2/2; treatment has been completed, submitted, reviewed, and awaiting publication with related families.
- **Bataceae** (being prepared by R.A. DeFilipps and Shirley L. Maina): Genera & Species: 1/1; text status: done, but waiting for preparation of illustrations, etc.
- **Boraginaceae** (being undertaken by C. Feuillet): treatment underway and progress includes paper on three new species of *Cordia* from the Guianas submitted for publication, submission of family treatment for the Mori, et al., Guide to the Vascular Flora of Central French Guiana, vol. 2, and databasing of specimens.
- **Brassicaceae** (being prepared by R.A. DeFilipps and Shirley L. Maina): Genera & Species: 5/7; text status: done, but waiting for preparation of illustrations, etc.
- **Cabombaceae** (being prepared by R.A. DeFilipps and Shirley L. Maina): Genera & Species: 2/3; text status: done, but waiting for preparation of illustrations, etc.
- **Campanulaceae** (being prepared by R.A. DeFilipps and Shirley L. Maina): Genera & Species: 3/4; text status: done, but waiting for preparation of illustrations, etc.

- **Canellaceae** (being prepared by R.A. DeFilipps and Shirley L. Maina): Genera & Species: 1/1; text status: done, but waiting for preparation of illustrations, etc.
- **Capparaceae** (being prepared by R.A. DeFilipps and Shirley L. Maina): Genera & Species: 4/25; text status: done; illus.: done, but waiting for completion of other parts of treatment.
- **Caricaceae** (being prepared by R.A. DeFilipps and Shirley L. Maina): Genera & Species: 2/3; text status: done, but waiting for preparation of illustrations, etc.
- **Caryophyllaceae** (being prepared by R.A. DeFilipps and Shirley L. Maina): Genera & Species: 2/2; treatment has been completed, submitted, reviewed, and awaiting publication with related families.
- **Celastraceae** (being prepared by R.A. DeFilipps and Shirley L. Maina): Genera & Species: 3/12; text status: Incomplete, but waiting for preparation of illustrations, etc.
- **Ceratophyllaceae** (being prepared by R.A. DeFilipps and Shirley L. Maina): Genera & Species: 1/1; text status: done, submitted and reviewed; waiting for preparation of illustrations, etc.
- **Chenopodiaceae** (being prepared by R.A. DeFilipps and Shirley L. Maina): Genera & Species: 1/1; treatment has been completed, submitted, reviewed, and awaiting publication with related families.
- **Clethraceae** (being prepared by R.A. DeFilipps and Shirley L. Maina): Genera & Species: 1/1; text status: done, but waiting for preparation of illustrations, etc.
- **Commelinaceae** (being undertaken by R. Faden): text and exsiccatae done, but waiting for preparation of illustrations, etc.
- **Crassulaceae** (being prepared by J. McKnight, R.A. DeFilipps, and Shirley L. Maina): Genera & Species: 1/1; text status: done, submitted and reviewed; waiting for preparation of illustrations, etc.
- **Cunoniaceae** (being prepared by R.A. DeFilipps and Shirley L. Maina): Genera & Species: 1/4; text status: done, but waiting for preparation of illustrations, etc.
- **Cyperaceae** (being coordinated by M. Strong): Genera & Species: 34/300. Contributors to the treatment include K. Camelbeke and P. Goetghebeur (GENT), R. Kral (BRIT), D. Simpson (K), G. Tucker (EIU). Genera with the largest representation of species are *Rhynchospora* (80 taxa), *Cyperus* (60 taxa), and *Scleria* (40 taxa). A project to inventory all specimens of Cyperaceae from the Guianas at the U.S. National Herbarium continues. M. Strong welcomes any loan or gift for names of Cyperaceae collections from the Guianas. Please feel free to contact him at his internet address: [strong.mark@nsmnh.si.edu](mailto:strong.mark@nsmnh.si.edu). A deadline of the 31 December 2001 has been set for completion of the Cyperaceae treatment. One paper on

Cyperaceae has been published during the past year and another is in press.

- **Dilleniaceae** (being prepared by C. Kelloff): fieldwork, but no activity on treatment due to competing projects.
- **Gesneriaceae** (being undertaken by L. E. Skog and C. Feuillet): illustrations complete, but treatment awaits publication of two new genera and several new species, restructuring of text, and databasing of collections. A treatment of the family was published in the Flora of the Venezuelan Guayana, vol. 5, and another has been submitted for the Guide to the Vascular Flora of Central French Guiana, vol. 2.
- **Hydrophyllaceae** (being prepared by R.A. DeFilipps and Shirley L. Maina): Genera & Species: 1/3; text status: done, but waiting for preparation of illustrations, etc.
- **Ixonanthaceae** (being prepared by R.A. DeFilipps and Shirley L. Maina, with collaboration by Sabatier (CAY): Genera & Species: 2/3; text status: done and submitted, but waiting for preparation of illustrations, etc.
- **Lacistemataceae** (being prepared by R.A. DeFilipps and Shirley L. Maina): Genera & Species: 1/3; text status: done, but waiting for preparation of illustrations, etc.
- **Lemnaceae** (being prepared by R.A. DeFilipps and Shirley L. Maina): Genera & Species: 4/8; text status: done, but waiting for preparation of illustrations, etc.
- **Lichens** (parts being prepared by P. DePriest): Checklist of the lichens of the Guianas on-line (with H. Sipman).
- **Liliaceae** (incl. **Amaryllidaceae**) (being prepared by R.A. DeFilipps and Shirley L. Maina): Genera & Species: 10/18; text status: almost done, but waiting for preparation of illustrations, etc.
- **Malvaceae** (being prepared by L. Dorr): no information.
- **Menyanthaceae** (being prepared by R.A. DeFilipps and Shirley L. Maina): Genera & Species: 1/1; text status: done, but waiting for preparation of illustrations, etc.
- **Molluginaceae** (being prepared by R.A. DeFilipps and Shirley L. Maina): Genera & Species: 2/2; treatment submitted, and completed except for Index of Synonyms.
- **Moringaceae** (being prepared by R.A. DeFilipps and Shirley L. Maina): Genera & Species: 1/1; text status: done, but waiting for preparation of illustrations, etc.
- **Myoporaceae** (being prepared by R.A. DeFilipps and Shirley L. Maina): Genera & Species: 1/1; text status: done, but waiting for preparation of illustrations, etc.

- **Nelumbonaceae** (being prepared by R.A. DeFilipps and Shirley L. Maina): Genera & Species: 1/1; text status: done, but waiting for preparation of illustrations, etc.
- **Nyctaginaceae** (being prepared by R.A. DeFilipps and Shirley L. Maina): Genera & Species: 6/14; treatment has been completed, submitted, reviewed, and awaiting publication with related families.
- **Oleaceae** (being prepared by R.A. DeFilipps and Shirley L. Maina): Genera & Species: 1/1; text status: done, but waiting for preparation of illustrations, etc.
- **Pandanaceae** (being prepared by R.A. DeFilipps and Shirley L. Maina): Genera & Species: 1/1; text status: done, but waiting for preparation of illustrations, etc.
- **Passifloraceae** (being prepared by C. Feuillet): treatment underway and progress includes two papers on new species of *Passiflora* from the Guianas submitted for publication, submission of family treatment for the Mori, et al., Guide to the Vascular Flora of Central French Guiana, vol. 2, and databasing of specimens. A collecting trip was taken to Pic Matecho near Saül in September 2000.
- **Peridiscaceae** (being prepared by R.A. DeFilipps and Shirley L. Maina): Genera & Species: 1/1; text status: done, but waiting for preparation of illustrations, etc.
- **Phytolaccaceae** (being prepared by R.A. DeFilipps and Shirley L. Maina): Genera & Species: 6/9; treatment has been completed, submitted, reviewed, and awaiting publication with related families.
- **Portulacaceae** (being prepared by R.A. DeFilipps and Shirley L. Maina): Genera & Species: 2/7; text status: done, but waiting for preparation of illustrations.
- **Rhamnaceae** (being prepared by R.A. DeFilipps and Shirley L. Maina): Genera & Species: 5/16; text status: incomplete, but also waiting for preparation of illustrations, etc.
- **Rosaceae** (being prepared by R.A. DeFilipps and Shirley L. Maina): Genera & Species: 2/2; text status: done, but waiting for preparation of illustrations, etc.
- **Rutaceae** (being prepared by R.A. DeFilipps and Shirley L. Maina): Genera & Species: 20/45; text status: incomplete, but also waiting for preparation of illustrations, etc.
- **Sabiaceae** (being prepared by R.A. DeFilipps and Shirley L. Maina): Genera & Species: 1/3; text status: incomplete, but also waiting for preparation of illustrations, etc.
- **Sapindaceae** (being prepared by P. Acevedo): treatment about 30% completed and will require about one to three years for completion.



- **Smilacaceae** (being prepared by R.A. DeFilipps and Shirley L. Maina): Genera & Species: 1/22; text status: incomplete, but also waiting for preparation of illustrations, etc.
- **Sphenocleaceae** (being prepared by R.A. DeFilipps and Shirley L. Maina): Genera & Species: 1/1; text status: done, but waiting for preparation of illustrations, etc.
- **Sterculiaceae** (being prepared by L. Dorr): no information.
- **Thurniaceae** (being prepared by M. Strong): treatment in process.
- **Typhaceae** (being prepared by M. Strong): treatment completed, except for examination of critical types.
- **Velloziaceae** (being prepared by R.A. DeFilipps and Shirley L. Maina): Genera & Species: 1/1; text status: done, but waiting for preparation of illustrations, etc.

## 4. WORKSHOP 31 OCTOBER 2000

### 4.1. Opening comments

by Paul Maas, NHN-Utrecht (U)

On behalf of the Utrecht Herbarium - no, that is how I should have started such an opening two years ago; on behalf of the **Utrecht University branch of the Nationaal Herbarium Nederland** (NHN-Utrecht) I would like to welcome all of you. You are guests here at our Institute, the place where in 1983 the Flora of the Guianas started. In that year we had only a vague idea if the Flora of the Guianas project would be succesful; now after almost twenty years, however, we can look back at some real accomplishments:

- Concerning the publications I would like to mention a few: About 30 Flora treatments of Phanerogams, Mosses, and Lichens were published; a whole bunch of Newsletters was produced; there were some special volumes like the very much used two Indices of Plant Collectors of Guyana and Suriname.
- There were several joined expeditions, most of them in Guyana, but also some in French Guiana. For the future it would be a dream to have such joined expeditions in Suriname as well.

As you are our guests here, I feel obliged to give you some information about our Institute. Since about one year, our Institute is a branch of the National Herbarium of the Netherlands, jointly with the *Universiteit Leiden branch* (L, specialized in the Flora of Tropical Asia) and the *Wageningen*

*University branch* (WAG, specialized in the Flora of Tropical Africa). The foundation of the *Nationaal Herbarium Nederland* made the cooperation between the Dutch Herbaria even more tight than it was before. It also gave us some extra financial resources, for example in the field of computerisation (we got a much better computer equipment). Since the last Workshop here in Utrecht our herbarium expanded a little bit, by now we have approximately 850.000 herbarium specimens (700.000 Phanerogams and 150.000 Cryptogams). There are some new developments, concerning the type collection and the wood collection. Each of our 8000 type collections was digitized, and they are available at the NHN-Leiden site (<http://nhncml.leidenuniv.nl/rhb/#types>). We have about 40.000 wood samples, most of which are from the Neotropics. The entire collection is now being digitally registered by Els Bakker. She does not only include the data of the herbarium labels, she is also adding a very spectacular aspect by scanning approximately 6000 microscopic wood slides. So both the label data and the microscopic slides will become easily accessible to everyone interested.

Unfortunately the Staff of our Institute is becoming older and older, yet fresh blood has arrived during the last few years. We now have 2 postdocs: Renske Ek who is specialized in Biodiversity studies and particularly in lianas, and Lars Chatrou who is studying Annonaceae. Moreover, Lars is heavily involved in the development of molecular work here in Utrecht. The inclusion of such molecular studies makes often quite exciting the sometimes dull life (is that really true?) of a taxonomist. You should have seen Lars and also various of my colleagues during the last weeks: we recently received a flowering collection from Guyana of which the family could not be traced. The morphologically orientated and the molecularly orientated taxonomists both were anxiously gathering data in order to unravel the identity of the "Unknown Yellow". We even put some photographs of the "Unknown Yellow" on our website and many taxonomists from all over the World actively participated in discussing its taxonomic placement. By the way, we are highly interested in your opinion about it!

After this short presentation of the Utrecht situation, I now want to go back to the Workshop again. I hope that all of you will have a very fruitful Workshop, I am sure that you will have an exciting excursion, I hope that you will have a look at our herbarium and check "your" family, and I am convinced that thanks to informal meetings like this Workshop, the Flora of the Guianas project will have a very good future.

## 4.2. The making of tropical floras and the case of the Venezuelan Guayana

by Paul E. Berry, University of Wisconsin, Madison

In undertaking a major flora like the *Flora of the Guianas* or the *Flora of the Venezuelan Guayana*, several things are important to maintain the focus and the timely publication of the treatments.

**A.** Who is the intended audience? If you want the flora to be accessible to an audience that extends beyond the small number of active neotropical plant systematists, the treatments need to be user-friendly. This means as many illustrations or pictures of plants as possible; the use of non-technical keys, and ways of dealing with the flora as a whole (rather than just an amalgamation of different treatments), such as shortcuts to identifying plants with distinctive vegetative and floral characters.

**B.** The Flora should not be seen as an end in itself, but rather as a tool to promote the further study of particular groups and to facilitate ecological or biogeographical studies in the area. Given the low sampling density of northern South America, any flora in this region will necessarily be a work-in-progress and subject to periodical updates.

**C.** A strategy should be devised to maintain the visibility and vitality of the Flora over the extended period it is actively being worked on. Examples of this for the Guianas region are the making of a Checklist early on in the project, indexes to collectors and topographic sites, and field work targeted at poorly known areas. The amount and the rate of publication of the treatments is the most critical element in any flora, and the coordinators must seek ways of ensuring rapid publication of suitable manuscripts soon after their submission. This relates to the overall organization of the Flora, in terms of size of treatments, systematic placement, and preferred order of publication. If pressure is not exerted upon contributors in a concerted way, that is, clearly give them a deadline and a timeline for publication, then it is unreasonable to expect a timely completion of their manuscripts. An active, informative, and well-illustrated web site could be an effective tool in implementing this strategy.

I believe the key elements of the *Flora of the Venezuelan Guayana* that have made it a viable flora include **a)** a small, centralized editorial group, **b)** a strategic decision early on to publish the Flora by alphabetical order of families, thus establishing a clear priority and allowing us to focus on the groups needed to publish each succeeding volume, **c)** a synoptic format that does not require detailed descriptions for each species, and **d)** the simultaneous pursuit of in-depth systematic and ecological studies in the flora area that clearly demonstrate the usefulness of the baseline data provided in the Flora.

### 4.3. Flora and vegetation of granite outcrops in the Guianas by Jean-Jacques de Granville, *Herbier de Guyane*, IRD (CAY)

#### I. distribution of granite outcrops

**In Suriname**, rocky outcrops and bare slopes are found everywhere on the highest peaks on a crystalline base, up to ca 1000 m, especially in the central and the southern parts of the country, up to the Sipaliwini Savannah (Wilhelmina Gebergte, southern part of Bakhuis Gebergte, Acarai Gebergte, Eilerts de Haan Gebergte; Van Asch van Wijck Gebergte, including Ebbatop, Kayser Gebergte, Oranje Gebergte, Kasi-kasima Top, Emma Range, Rosevelt Piek, Bemau Top...). The most well-known is the Voltzberg. Rocky outcrops do not occur in the northern quarter of Suriname.

**In Guyana**, "...the South Rupununi Savannah in particular has many places with bare rock. These rocks can vary from small plates to large outcrops, up to 50-80 m high..." (Jansen-Jacobs & ter Steege 2000). Shea Rock and Mt. Shiriri are well-known granite outcrops occurring in this area. Epipetric plant communities are also found on bare slopes of higher mountains (Granville 1991): Kanuku Mountains (960 m); Makarapan Mt; (762 m); Wokrama Mts (710 m)

**In French Guiana**, the greatest concentration of outcrops is found in the South and in the East. Most of them have already been explored and partially inventoried. The highest ones are situated in the following mountain ranges: Tumuc-Humac (Mitaraka: 700 m); Bakra mountains (Pic Coudreau: 700 m); Mt. Saint-Marcel (635 m); Massif des Emerillons (570 m), Montagnes de la Trinité, Montagnes Balenfois (« Les Nouragues » research field station). Other big outcrops are: Roche Koutou, Piton d'Armontabo, Grand Croissant, Mont Chauve, Mont Belvedere, Montagne des 3 Pitons.

#### II. vegetation types

The physiognomy, the height and the vegetation cover vary depending of the thickness of the soil, the steepness of the slopes and the local water run-off. In consequence, a mosaic of different vegetation types are observed on the granitic outcrops: bare rock, patches of herbaceous or scrubby vegetation, more or less continuous mats of monocotyledons, wood patches, low dry forest, forest borders, epipetric florula of the cliffs...

One can roughly distinguish the following vegetation types:

**II. a. The “rock-savannahs”** are granitic slopes partially covered by a discontinuous, epipetric, xeric, vegetation well adapted to the very inhospitable habitat. They include:

- **Algae communities on bare rock, dominated by Cyanobacteria**  
Exposed rock surfaces have a dark, almost blackish, colour caused by cyanobacteria (Sarhou 1992).

- **Gravel pools and periodically inundated herbaceous communities**

Flat, wet depressions harbour seasonally inundated herbaceous plant communities dominated by Lentibulariaceae (in particular *Utricularia nana* and *U. amethystina*), Xyridaceae and Eriocaulaceae. Poaceae (*Axonopus ramosus*), Cyperaceae (*Rhynchospora subdicephala*) and sometimes *Drosera* sp. are often present in these communities.

- **Monocotyledonous mats dominated by *Pitcairnia geyskesii* on granite slopes**

Patches of annual herbs, sclerophylls, succulent are the most common vegetation types found on the inselbergs.

In the flat zones, the vegetation can be almost continuous and fairly dense. On the biggest outcrops studied in the Tumuc-Humac range, such mats are dominated by Cyperaceae (*Rhynchospora barbata*, *Scleria cyperina...*) and Poaceae (in particular *Ischaemum guianense*) mixed with *Pitcairnia geyskesii* (Bromeliaceae), *Stylosanthes guianensis* (Fabaceae), *Unxia camphorata* (Asteraceae), *Irlbachia purpurescens* (Gentianaceae), *Chamaecrista desvauxii* (Caesalpiniaceae), *Ernestia* sp. pl. (Melastomataceae) etc. This is the most species diverse type of outcrop herbaceous vegetation.

On the contrary, on dry and steep rock slopes, the vegetation is very discontinuous and mostly constituted by small patches of succulent herbs, in particular Orchidaceae: *Encyclia granitica*, *Epidendrum nocturnum* var. *tumuchumaciense*, *Cyrtopodium andersonii* and *C. glutiniferum*. Cactaceae can be locally frequent, in particular in Suriname and Guyana (*Cereus hexagonus*, *Melocactus smithii* and *Hylocereus triangularis*).

- **Cliffs with *Pitcairnia satrei* cover**

The base of the steepest side of some big outcrops often forms vertical cliffs, ending in the high forest. When these cliffs are more or less permanently wet and in half shade, they can support a cover of particular epipetric plants, the most remarkable of which is *Pitcairnia satrei*, a rare bromeliad with narrow, membranous, hanging leaves. In the same habitat are found *Lembocarpus amoenus* (Gesneriaceae) and ferns.

## II. b. Thickets of shrubs and wood patches dominated by *Clusia*

Isolated and dense thickets of *Clusia* sp. pl. (*C. minor*, *C. nemorosa*, *C. kanukuana*, Clusiaceae), 1 to 5 meters high, are scattered on the slopes and also found along transition forest borders. Other species of shrubs and treelets are mixed with *Clusia*. The most common are *Erythroxylum citrifolium* (Erythroxylaceae), *Eriotheca surinamensis* (Bombacaceae), *Myrcia saxatilis* and *Eugenia biflora* (Myrtaceae) and *Pollalesta milleri* (Asteraceae). One of the most characteristic and abundant epiphytic bromeliads growing on the shrubs is *Catopsis berteroniana*, a species easily recognizable by its whitish pulverulent, twisted leaves.

**II. c. Low, transition forests** are found on the top of outcrops, in transition zones and in belts between the bare slopes and the high rainforest on deep soils. They are characterized by very thin soils and a dense cover of treelets, lianas and shrubs rarely overtopping 10 to 15 meters, bearing generally many epiphytes in the understory, especially orchids, bromeliads, aroids, ferns, Gesneriaceae and Ericaceae (*Cavendishia callista*, *Satyria cerander* and *Sphyrospermum cordifolium*).

Many species of Myrtaceae are found in these forests. Other frequent species are *Inga virgultosa* (Mimosaceae), *Daphnopsis* sp., (Thymeleaceae), *Tapirira guianensis* (Anacardiaceae), *Humiria balsamifera* (Humiriaceae), *Cochlospermum orinocense* (Cochlospermaceae) and the palm *Syagrus stratincola*, restricted to some inselbergs where it can be dominant (Roche Touatou).

The most characteristic species of the understory are *Psychotria ctenophora* and *P. hoffmannseggiana* (Rubiaceae), *Rhynchospora cephalotes* (Cyperaceae) and *Ananas ananassoides* (Bromeliaceae).

## III. succession

According to Sarthou (1992), two different ways are supposed to lead from the pioneer vegetation either on wet or on dry bare rock, to the same final forest community (**table I**). Nevertheless, the succession can be stopped at any step by environmental constraints.

<b>Flat depressions Gravel pools</b>	<b>Xeric rock surfaces on slopes</b>
CYANOBACTERIA	<b>CYANOBACTERIA</b>
Xyris + LENTIBULARIACEAE	
<b>seasonally inundated grass- land POACEAE + CYPERACEAE + <i>Pitcairnia</i></b>	<b><i>Pitcairnia</i></b>

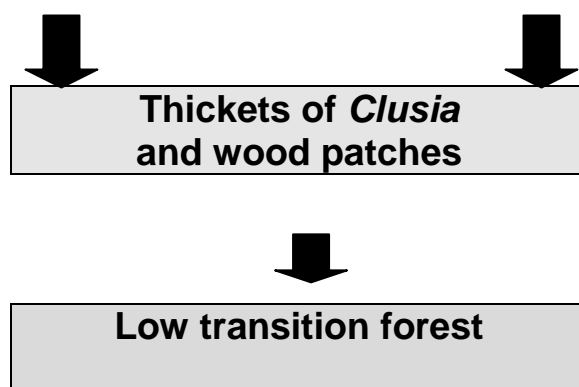


Table I: Schematic phases of the presumed succession

#### IV. the flora

##### IV. a. Species diversity

In the provisional checklist established from the data base "AUBLET 2" (Hoff et al. 1995), 613 species of vascular plants have been recorded from rock outcrops in the Guianas: 327 Dicotyledons, 208 Monocotyledons, 1 Gymnosperm and 77 Pteridophytes.

Among the Angiosperms, the most species diverse families represented in the rock outcrops communities are the Orchidaceae (68 species), the Melastomataceae (41 species), the Rubiaceae (40 species), the Bromeliaceae (28 species), the Poaceae (27 species), the Cyperaceae (26 species) and the Araceae (23 species). All other families are represented by less than 20 species (**table II**).

NB SP. / FAMILY	FAMILIES
> 50	Orchidaceae (68)
30 - 49	Melastomataceae (41) Rubiaceae (40)
20 - 29	Araceae (23)      Bromeliaceae (28) Cyperaceae (26)      Poaceae (27)
10 - 19	Asteraceae, Bignoniaceae, Euphorbiaceae, Fabaceae, Mimosaceae, Myrtaceae, Marantaceae
5 - 9	Apocynaceae, Cactaceae, Cecropiaceae, Clusiaceae, Convolvulaceae, Cucurbitaceae, Gentianaceae, Gesneriaceae, Lentibulariaceae, Loranthaceae, Moraceae, Ochnaceae, Piperaceae
< 5	Other families

Table II: The most species diverse families

#### IV. b. Distribution areas

A floristic study of 8 granite outcrops of the Tumuc-Humac range (Granville 1978), based on 148 species collected in herbaceous communities as well as in low transition dry forests, shows that the most important distribution patterns are (table III):

- Species having a very wide distribution in South America (about 40 %),
- Species found in the Guianas and in the Amazon Basin (27 %)
- Species endemic to the Guianas (20 %).

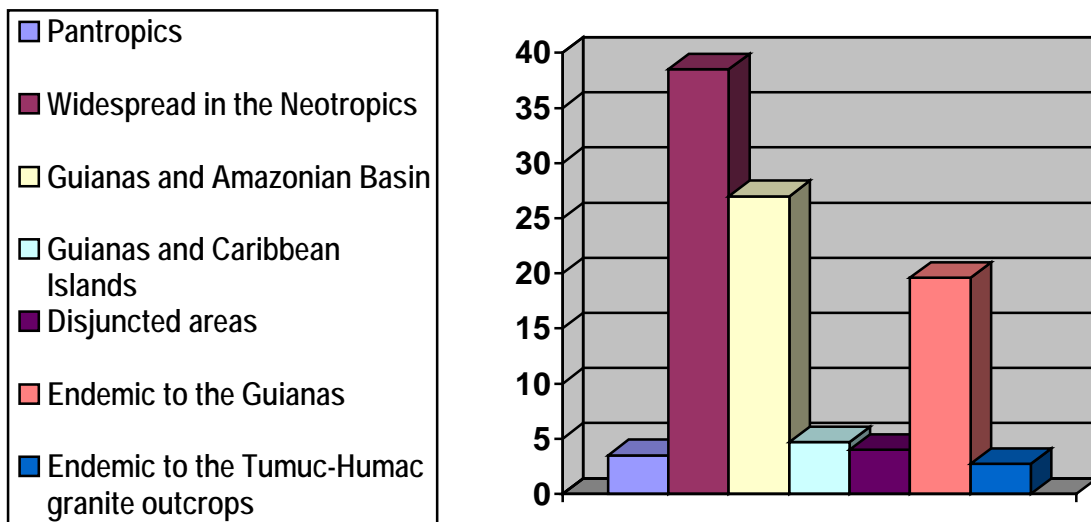


Table III: Distribution areas of 148 species inventoried on the Tumuc-Humac granite outcrops (in % of species; Granville 1978)

#### IV. c. Floristic relationships with other habitats

Though some species grow on granite outcrops only, many others are also found in other habitats in other localities and often at lower altitudes. In the context of the theory of refugia, rocky outcrops act as refuges of xeric flora during the wet climatic periods, as well as dry coastal savannahs, rocks of the streams, forest canopy and other open habitats which have been more or less in continuity during the arid climatic periods. The following categories can be roughly distinguished:

- Species also found in the high forests, on deep and well drained soils. Ex. : *Tabebuia serratifolia*, *Tapirira guianensis*, *Aechmaea lateralis*, *Psychotria hoffmannseggiana*.
- Species widespread in other open areas. Ex. : *Cochlospermum orinocense*, *Merremia squamisepala*, *Chrysothemis pulchella*.
- Species growing on rocky sea-shore and coastal sandy ridges.



Ex. : *Furcraea foetida*, *Cereus hexagonus*, *Cnidocolus urens*.

- Species of the coastal savannahs.

Ex. : *Irlbachia purpurescens*, *Heliconia psittacorum*, *Stylosanthes guianensis*.

- Species usually epiphytes in forest canopy.

Ex. : *Epidendrum nocturnum*, *Clusia grandiflora*, *Souroubea guianensis*.

- Species only growing on granite outcrops.

Ex. : *Cyrtopodium andersonii*, *Cyrtopodium glutiniferum*, *Encyclia granitica*, *Pitcairnia geyskesii*, *Pitcairnia satrei*, *Syagrus stratincola*.

- Species endemic to a small group of granite outcrops.

Ex. : *Mandevilla surinamensis*, *Melocactus smithii*.

- Species of the Guayana Highland sandstone.

Ex.: *Phragmipedium lindleyanum*, *Doryopteris sagittifolia*, *Asplenium zamiifolium*, *Sauvagesia tafelbergensis*, *Polypodium triseriale*.

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#### 4. 4. Cladoniaceae of the Guianas

by Harrie Sipman, Botanischer Garten & Botanisches Museum Berlin-Dahlem (B) and André Aptroot, Centraalbureau voor Schimmelcultures, Utrecht

In early reports of lichens from the Guianas, the family Cladoniaceae plays a prominent role. This is surprising, as the family is known to have a preference for cool to cold regions and to perform growth even under a snow cover. The familiarity of the first botanical explorers, generally coming from Europe, with this family seems to have stimulated biased collecting. Indeed, half of the 10 species reported before 1850 have a European distribution. However, successive collectors reported more Cladoniaceae species and by 1985, before lichenologically trained botanists worked in the area, 29 species were reported.

Knowledge of Neotropical Cladoniaceae has increased greatly since ca. 1980 by the studies of T. Ahti. He recognized many additional species and changed the delimitation of most existing species. At the same time lichenological exploration of the Guianas has increased, confirming that the Guianas really have a varied Cladoniaceae-flora, comparable in diversity with temperate areas though composed of different species. Consequently, of 29 species reported before 1985, only 9 have been confirmed during the current revision of the family by T. Ahti and the first

author, while nowadays 40 species are known from the Guianas, including 5 species still awaiting description.

Within the Guianas, the family is most numerous in the Pakaraima mountains of Guyana, where 38 species occur. The preferred habitat is sandstone flats where peaty soil accumulates and where the phanerogam vegetation is largely restricted to fissures so that sufficient light for lichen growth can reach the soil. The next important regions for Cladoniaceae are the coastal white sand savannahs of Guyana (16 species) and Surinam (10 species), where similar acid soil conditions are found. From the interior of Surinam 6 species are known. They seem to originate from sites similar to the Pakaraima mountains and therefore it is probable that additional species are still to be discovered in Surinam. French Guiana is poor in Cladoniaceae (4 species). The few species are found mainly on decaying wood in man-made clearings. The natural vegetation cover of the country, and of large parts of the Guianas in general, is too dense for soil lichens like Cladoniaceae. A more open vegetation is sometimes found on granitic inselbergs, but these appear to be unfavourable to Cladoniaceae. Likewise the savannahs of southern Guyana are poor in Cladoniaceae.

A much discussed topic is to what extent fire favours the Cladoniaceae. The preferred habitats are particularly susceptible to fire and many of the Cladoniaceae stands are in evidently fire-influenced sites. Maybe open and low scrub vegetation and peat are the primary habitats, and largely bare sandstone flats and grassy vegetation on sand might be fire-induced habitats, probably degradation stages of primary habitats that with their more dense vegetation originally were unsuitable for Cladoniaceae. Certainly frequent fires are no guarantee for Cladoniaceae, as is shown by the savannahs of southern Guyana.

The largest phytogeographical element in the flora is formed by the 13 species which occur elsewhere only in the Guayana Highland. Another 9 species are more widespread but do not extend beyond the Amazon Basin. 6 Species are shared with SE Brazil; they occur usually also in the Guayana Highland but only occasionally in intermediate sites in the Amazon Basin. Only 8 species have a wider distribution, an unusually low percentage for lichens: 5 species are widely distributed in the Neotropics and only 3 are pantropical, one of these with a wide range extension into the temperate areas of the southern Hemisphere.

The main centers for Cladoniaceae in the Neotropics are the Guayana Highland, SE Brazil, the Andes and the Caribbean/Central America. A

comparison with these areas shows, not surprisingly, that the Cladonia-ceae flora of the Guianas is very similar to that of the Guayana Highland. Most endemic species of that region have been found also in the Parakaima Mountains. The next close affinity is with the mountains of SE Brazil, the World's richest Cladoniaceae region. This affinity is partly expressed above species level and concerns, e.g., a high diversity in the *Cladonia uncialis*- and *C. miniata*-group and some vicarious species. There are also remarkable differences, e.g. the absence of the *Cladonia verticillata* group in the Guianas (and the Guayana Highland). The second centre of Cladoniaceae in the Neotropics, the Andes, does not show close affinities. Its Cladoniaceae flora is adapted to the cool climate of high elevations and shows stronger affinities with the temperate and cold zones of the world. There is equally no close affinity with Central America and the Caribbean. The shared species concern widespread taxa, and no taxa with restricted distribution. This is in contradiction with observations before ca. 1980, when several Caribbean taxa were reported from the Guianas. These are now considered to be based on misidentifications.

#### **4. 5. Status on the treatment of Cyperaceae for the 'Flora of the Guianas'**

by Mark T. Strong, Department of Botany, Smithsonian Institution/US National Herbarium (US) and Konraad Camelbeke, Department of Plant Morphology, Systematics and Ecology, Gent

Mark Strong (US) is coordinating the treatment of Cyperaceae for the *Flora of the Guianas*. There are at present 34 genera and approximately 300 species of Cyperaceae recorded from the Guianas. Genera with the largest representation of species are *Rhynchospora* (80 taxa), *Cyperus* (60 taxa), and *Scleria* (30 taxa). A project to inventory all specimens of Cyperaceae from the Guianas at the U.S. National Herbarium is in progress. Mark Strong welcomes any loan or gift for names of Cyperaceae collections from the Guianas. Following is a list of specialists and the treatments they are preparing for the Cyperaceae. A deadline of the 31 December 2001 has been set for completion of the Cyperaceae treatment.

**Contributors to 'Flora of the Guianas' Cyperaceae treatment and status of treatments**

<p><b>Konraed Camelbeke and Paul Goetghebeur (GENT):</b>  <i>Becquerelia</i>  <i>Bisboeckelera</i>  <i>Calyptracarya</i>  <i>Diplacrum</i>  <i>Scleria</i></p> <p><b>Paul Goetghebeur (GENT):</b>  <i>Ascolepis</i> (completed)  <i>Lipocarpha</i> (completed)</p> <p><b>Robert Kral (BRIT):</b>  <i>Abildgaardia</i> (completed)  <i>Bulbostylis</i> (completed)  <i>Fimbristylis</i> (completed)  <i>Fuirena</i> (completed)</p> <p><b>David Simpson (K):</b>  <i>Hypolytrum</i>  <i>Mapania</i></p> <p><b>Gordon Tucker (EIU):</b>  <i>Cyperus</i>  <i>Kyllinga</i></p>	<p><b>Mark Strong (US):</b>  <i>Carex</i>  <i>Cephalocarpus</i>  <i>Cladium</i>  <i>Didymiandrum</i>  <i>Diplasia</i>  <i>Eleocharis</i>  <i>Everardia</i>  <i>Exochogyne</i>  <i>Lagenocarpus</i>  <i>Machaerina</i> (completed)  <i>Oxycaryum</i>  <i>Pleurostachys</i>  <i>Remirea</i>  <i>Rhynchocladium</i>  <i>Rhynchospora</i>  <i>Schoenoplectus</i> (completed)  <i>Trilepis</i>  <i>Uncinia</i>  <i>Websteria</i></p>
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- Strong, M.T. & R. Kral. 1999. Proposal to conserve *Scirpus miliaceus* L. (Cyperaceae) with a conserved type. *Taxon* 48: 387-389.
- Strong, M.T. (in press). Novelties in *Rhynchospora* (Cyperaceae) from the Guianas. *Novon*.

### **New species and combinations recently published for Cyperaceae of the Guianas**

*Bulbostylis truncata* (Nees) M.T. Strong - from Guyana, Surinam, and French Guiana

*Machaerina ayangannensis* M.T. Strong - from Guyana.

*Scleria triquetra* M.T. Strong - from French Guiana and adjacent Brazil.

### **Progress report for year 2000**

**Mark Strong** (US) recently had a paper accepted for publication in *NO-VON* describing 5 new taxa of *Rhynchospora* from the Guianas. Work on *Rhynchospora* is nearly complete.

**Gordon Tucker** (EIU) and **David Simpson** (K) indicate that their treatments are in progress.

**Konraed Camelbeke** (GENT) has indicated that *Scleria* will be finished by December 2000. Keys and descriptions of the Bisboeckelerae taxa have been completed.

### **Detailed information on the *Scleria* treatment**

Following is a table of *Scleria* names and their status in a) the 2<sup>nd</sup> Edition of the Checklist of the Plants of the Guianas, b) the forthcoming treat-

ment of *Scleria* for the Flora of the Guianas, and c) the Flora of the Venezuelan Guayana.

Citations of *Scleria acanthocarpa* and *Scleria tepuiensis* in the 1997 Checklist are based on misidentified material. Seven names have been put in synonymy. *Scleria grandis*, nom. illeg., has been mentioned for Guyana by Core, Mem. New York Bot. Gard. 12(3): 62, 1965, but no specimens are cited. In our study we did not encounter specimens of *Scleria grandis* and we believe this citation should be considered doubtful. Nevertheless we plan to include the species in the identification key. Two nomenclatural problems remain to be solved: the identity of *Scleria martii* and *Scleria violacea*.

accepted names s.l.	checklist Guianas 1997	our study (2000)	FVG (1998)
<i>Scleria acanthocarpa</i>	OK	misidentification	
<i>Scleria amazonica</i>			endemic
<i>Scleria bracteata</i>	OK	OK	OK
<i>Scleria camaratensis</i>			endemic
<i>Scleria cerradicola</i>	OK	synonym	synonym
<i>Scleria cyperina</i>	OK	OK	OK
<i>Scleria cyperinoides</i>			OK
<i>Scleria distans</i>	OK	OK	OK
<i>Scleria eggersiana</i>	OK	OK	OK
<i>Scleria flagellum-nigrorum</i>	OK	OK	OK
<i>Scleria grandis</i>	OK	not seen	OK
<i>Scleria hirtella</i>	OK	OK	
<i>Scleria interrupta</i>	OK	OK	OK
<i>Scleria lacustris</i>	OK	OK	
<i>Scleria latifolia</i>	OK	OK	OK
<i>Scleria lindleyana</i>	OK	synonym	
<i>Scleria lithosperma</i>	OK	OK	OK
<i>Scleria longigluma</i>	OK	OK	
<i>Scleria macrogyne</i>	OK	OK	OK
<i>Scleria macrophylla</i>	OK	OK	OK
<i>Scleria martii</i>	OK	nomencl. problem	
<i>Scleria melaleuca</i>	OK	OK	OK
<i>Scleria microcarpa</i>	OK	OK	OK
<i>Scleria micrococca</i>	OK	synonym	synonym
<i>Scleria mitis</i>	OK	OK	OK
<i>Scleria neogranatensis</i>		OK	
<i>Scleria nutans</i>	OK	synonym	synonym
<i>Scleria parallela</i>			OK
<i>Scleria phylloptera</i> (?)		OK	
<i>Scleria pinetorum</i>	OK	synonym	
<i>Scleria plusiophylla</i>		OK	
<i>Scleria pterota</i> var. <i>melanocarpa</i>	OK	synonym	

<i>Scleria purdiei</i>			OK
<i>Scleria ramosa</i>			OK
<i>Scleria reticularis</i>		OK	OK
<i>Scleria scabra</i>	OK	OK	OK
<i>Scleria secans</i>	OK	OK	OK
<i>Scleria setacea</i>	OK	synonym	synonym
<i>Scleria splitgerberiana</i>	OK	OK	
<i>Scleria staheliana</i>	OK	OK	
<i>Scleria stipitata</i>	OK	OK	
<i>Scleria stipularis</i>	OK	OK	OK
<i>Scleria tenacissima</i>			OK
<i>Scleria tepuiensis</i>	OK	misidentification	OK
<i>Scleria triquetra</i>	OK	OK	
<i>Scleria vaginata</i>	OK	OK	OK
<i>Scleria verticillata</i>	OK	OK	OK
<i>Scleria violacea</i>	OK	nomencl. problem	
<i>Scleria</i> sp. nov. (?)		OK	
total: 49	total: 37	total: 30	total: 28

#### 4. 6. Comments on Guianan legumes

by G. P. Lewis, Royal Botanic Gardens, Kew (K)

##### Current status of the legumes for the Flora of the Guianas

The Flora divides the legumes into three separate families: the Caesalpiniaceae, Mimosaceae, and Fabaceae. Currently a total of 698 species are recognised in 133 genera. The only published legume fascicle includes 101 species in 13 genera of Caesalpiniaceae (Cowan & Lindeman, 1989). A further 42 species, in three genera, of subtribe Cassiinae of the Caesalpiniaceae were submitted by R. C. Barneby in 1991 but have not yet been published. That leaves 109 species in 26 genera of Caesalpiniaceae that still need to be written up. Some of these are being worked on by specialists, but many are not. The Mimosaceae, contributed by R. C. Barneby, J. W. Grimes and O. Poncy, are complete. The Mimosaceae fascicle, being edited by O. Poncy in Paris, contains 171 species in 30 genera. Preparation of illustrations for the fascicle is nearing completion. The genus *Dinizia*, traditionally placed in the Mimosaceae, has been transferred to the Caesalpiniaceae. In the Fabaceae, three genera (*Aeschynomene*, *Chaetocalyx* and *Machaerium*), containing a total of 30 species, were submitted by V.E. Rudd in 1992 and 1993. The large bulk of the Papilionaceae (245 species in 58 genera) are still to be written up.



For the legumes as a whole, 344 species in 49 genera are published or submitted, while 354 species in 84 genera have not yet been written up. Outstanding complex genera in the Caesalpiniaceae and Fabaceae, that will require research outside the Guianas region in order to resolve issues of taxonomy and nomenclature, include *Bauhinia* (c. 26 species in the Flora region), *Copaifera* (6 species), *Tachigali* (including *Sclerolobium*) (15), *Dioclea* (14), *Lonchocarpus* (15, at least six of which are now better placed in the segregate genus *Deguelia*), *Ormosia* (13) and *Vigna* or possible segregate of it, pending further study (11).

### Legumes – three families or one? – the debate continues.

There are several alternative nomenclatures in use:

Three families:

CAESALPINIACEAE	MIMOSACEAE	PAPILIONACEAE
CAESALPINIACEAE	MIMOSACEAE	FABACEAE

One family:

FAMILY	SUBFAMILY	SUBFAMILY	SUBFAMILY
LEGUMINOSAE	Caesalpinioideae	Mimosoideae	Papilionoideae
FABACEAE	Caesalpinioideae	Mimosoideae	Faboideae

The term Fabaceae is thus ambiguous as it may refer to the whole legume family or to part of it (the Papilionoideae, when this is referred to under its alternative taxonomic status as the family Papilionaceae). This has resulted in much confusion in the botanical literature. Note also that Fabaceae, subfamily Papilionoideae, sometimes used in botanical texts, is an unacceptable combination. Leguminosae–Caesalpiniaceae (as used by Cowan and Lindeman, 1989) is also unacceptable as it implies a family within a family.

Treatment of the legumes in some recent South American Floras:

Flora	Leguminosae	Caesalpiniaceae	Mimosaceae	Papilionaceae
Guianas (1989)	Leguminosae	Caesalpiniaceae	Mimosaceae	Papilionaceae
Guianas (now)		Caesalpiniaceae	Mimosaceae	Fabaceae
Venez. Guayana		Caesalpiniaceae	Mimosaceae	Fabaceae
Peru	Fabaceae	-	-	-
Ecuador		Caesalpiniaceae	Mimosaceae	Fabaceae
Bahia, Brazil	Leguminosae	Caesalpinioideae	Mimosoideae	Papilionoideae

The case for recognising one large family (as in the case of Bahia in the above table) is supported by a wide range of modern techniques that highlight an underlying pattern of relationship. There is greater interrelatedness between subfamilies of the legumes than there is between legumes as a whole and “nearest neighbour” families (Schrire, 1999). The Mimosoideae and Papilionoideae are apparently unique and distinct lineages which arose independently within the large, amorphous, basal group Caesalpinioideae (Schrire, 1999). Eventually the Caesalpinioideae will be divided into more clearly definable groups which are comparable in status to the Mimosoideae and Papilionoideae.

The Flora of the Guianas recognises three separate legume families but this is now untenable given the scientific evidence.

But what should we call the legume family? The single family can be referred to as either the Leguminosae or the Fabaceae, but given the ambiguity of the term Fabaceae, the alternative Leguminosae is preferable as it results in no confusion.

### How rich are the Leguminosae in the Guianas?

The table below compares the legume flora of the Guianas with that of other regions of varying size in South America.

	Area (km <sup>2</sup> )	Caesalpinioideae genera / species	Mimosoideae genera / species	Papilionoideae genera / species	Total gen / spec
Guianas	c 500,000	42 / 252	30 / 171	61 / 275	133 / 698
Venezuelan Guayana	c 500,000	31 / 195	unpublished	67 / 368	?
Peru	c 1,300,000	32 / 173	26 / 231	80 / 567	138 / 971
Ecuador	c 285,000	22 / 105	28 / 187	77 / 299	127 / 591
Bahia, Brazil	560,000	29 / 195	27 / 209	76 / 337	132 / 741
Maracá Is. Fed.Terr. Roraima	960	10 / 26	11 / 31	33 / 66	53 / 123

Although a lack of collecting in some regions and a lack of modern revisions for some genera results in only an approximation of the figures in some cases, these are, nevertheless, worthy of some discussion. The Guianas and Venezuelan Guayana cover almost the same area and, although the Mimosoideae have not yet been published for the latter, we can predict that the total number of legume genera and species for the two regions will be very similar. In the Flora of the Venezuelan Guayana the legume tribe Swartzieae is treated under the Papilionoideae (as

family Fabaceae), but in the Flora of the Guianas the Swartzieae *sensu lato* is treated by Cowan and Lindeman (1989) under the Caesalpinioideae (as family Caesalpinaceae). If the Swartzieae genera are removed from the Caesalpinioideae for the Guianas then the numbers are reduced to 35 genera and 186 species, giving totals very similar to those for the Venezuelan Guayana. Adding the Swartzieae to the Papilionoideae for the Guianas would increase the numbers to 68 genera and 341 species, again bringing the subfamily totals in line with those for the Venezuelan Guayana. While generic and tribal realignment of basal legumes will evidently alter the numbers of species and genera in the subfamilies, statistical comparisons between regions based on the total numbers of legumes will be unaffected. This is another benefit of recognising legumes as one family. The combined figures for the three subfamilies invariably places the Leguminosae close to the top of the list of important families in floras and inventories. Given the multi-purpose use and economic importance of many legumes, their ranking in regional lists is often a key factor in decisions about habitat conservation. If three families of legumes are recognised the impact is greatly reduced.

Given the vast differences in area of the regions in the above table, it is interesting that the total number of legume genera in Bahia, Ecuador, the Guianas and Peru are so similar. While each region has many endemic species, they have very few endemic genera. There are no endemic legume genera in the Guianas, only one in Ecuador, one in Peru and three in Bahia.

Species numbers for some regions are definitely inflated, for example, of the 567 Papilionoideae recorded for Peru, 171 species are in the genus *Lupinus*, a taxon in need of detailed revision, especially in the Andes. It is very likely that the number of lupin species in Peru will eventually be reduced by over 100. In the Guianas there are no lupins, so the Papilionoideae species total is more accurate.

### **Critical legume species in the Guianas**

Legume species for which we would like to have close up colour transparencies of flowers and fruits, plus leaf material dried in silica for molecular studies include:

#### **Caesalpinioideae:**

*Jacqueshuberia brevipes*

*Martiodendron excelsum* (also *M. parviflorum*)

*Paloue riparia* (also *P. brasiliensis*, *P. guianensis*, and *P. induta*)

*Paloveopsis emarginata*

*Recordoxylon speciosum*

*Vouacapoua americana* (also *V. macropetala*)

## **Papilionoideae:**

*Cymbosema roseum*

*Dussia discolor*

*Etaballia dubia*

*Fissicalyx fendleri*

*Hymenolobium petraeum* (also *H. excelsum*, *H. flavum*, *H. nitidum*, and  
*H. pulcherrimum*)

*Monopteryx inpae*

*Muelleria frutescens*

*Spirotropis longifolia*

*Taralea oppositifolia*

*Vatairea guianensis* (also *V. erythrocarpa*, and *V. paraensis*)

*Vataireopsis speciosa*

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#### 4. 7. **Annonaceae on CD-ROM (demonstration)**

by Els Bakker, NHN-Utrecht (U)

In 1996 the Utrecht University branch of the National Herbarium of the Netherlands started the preparation of an interactive multimedia and information system on the plant family Annonaceae in collaboration with the Expert Center for Taxonomic Identification (ETI) in Amsterdam. In June 1999 this project ended and this year the CD-Roms have been published. Two CD-Rom titles did appear: *Annonaceae: Genera Worldwide* and *Annonaceae: Neotropical genera and species*. Both CD-Roms are available for both Macintosh and Windows platforms, either as a hybrid CD-ROM (Worldwide) or two separate CD-Roms (Neotropical). I have prepared the CD-Roms by using the software, called Linnaeus II, that had been developed by the ETI. This user-friendly biodiversity software allows specialists to store biodiversity information in text, pictures, videos and sound. The software also contains a "smart" identification system which will give fast access to species information. The project has been carried out in order to compile all available information present within the scope of the Annonaceae Project in a interactive and user-friendly way.

The CD-Rom *Annonaceae: Genera Worldwide* contains the information on genus level of all known genera of the Annonaceae (121) on a worldwide scale. It includes new concise genus descriptions and additional information accompanied by line drawings, photos, colour slides and newly prepared geographical distribution maps. In total about 2000 illustrations have been included on this CD-Rom. Two types of interactive identification keys are present: a dichotomous key and separate so-called multi-entry keys for the African, Asian/Australian and Neotropical genera. An interactive geographical information system shows distribution data and allows geographical searches and comparisons. A fully updated literature database with over 4800 references and an illustrated glossary of over 650 terms and over 300 accompanying illustrations also are parts of the system

The second CD-Rom *Annonaceae. Neotropical genera and species* comprises information on all 39 neotropical genera in the form of concise description and additional information. For 263 species of 17 recently revised genera highly detailed descriptions are provided, accompanied by line drawings, photos and full colour slides of plant, flower, fruit and seed, and geographical distribution. Again two types of identification keys have been included: a dichotomous key to all neotropical genera and to the included species and a multi-entry key to all neotropical genera, which leads to 17 multi-entry keys to the species of the revised gene-

ra. The literature database on this CD-Rom, containing over 2400 references concerning Neotropical Annonaceae, and the illustrated glossary are invaluable additions. The Introduction and the Index complete the CD-Rom.

During this workshop I have demonstrated the CD-ROM "Annonaceae. Neotropical genera and species".

When the programme is opened the user arrives in the **Navigator** from where one can enter several sections of the programme.

The **Species** and **Higher Taxa** modules comprise the biodiversity database with fields for description, taxonomy, synonyms, literature and multimedia. In the text one can click on (blue-marked) pictures to show them and on terms and references that are included in the glossary and literature database. On this CD-Rom all 39 neotropical genera are included.

For 17 recently revised genera the information goes down to the species level (263 species). In these modules it is possible to scroll the text, click to the next or previous genus/species, to search for a species, to compare line drawings with colour slides, compare illustrations of different genera/species with each other and to save or print the information.

The **Text Key** contains the traditional, dichotomous identification key. Choosing between 2 or 3 questions lead to the next question. Finally, one arrives at a genus/species name and then the user can jump to the related genus/species information in the databases by clicking on the name. In case the user is not sure about the choices made during the identification process, one can click on the "decision path" button which will show the text of the choices made so far. It is possible to directly return to an earlier choice in the path, by clicking on that choice and resume the identification.

In **Identify-It** the keys are composed of a matrix in which known character states of more than 80 characters of habit, leaf, inflorescence, flower, fruit, seed and pollen of the included genera and species are stored. One can start an identification procedure with any given character. After choosing one or more character states the computer sorts out the genera/species in order of probability. By adding an other character(s) the number of probable genera/species can be reduced to the point that only one or few genera/species are left (having 100% score). By clicking on the genus/species name the related information in the higher taxa or species database is shown. Furthermore, genera/species can be examined for their characters or compared with each other.

In **Map-It**, the geographical database, the user can get insight in the distribution patterns of species and biodiversity richness. Several newly developed detailed distribution maps of Central and South America can be studied for each species. Distribution patterns of 2 species can be com-

pared with each other or the species richness of a selected area can be studied by asking for an object list, which shows all species occurring in that area.

An illustrated **Glossary** is included for explanation of botanical terms accompanied by illustration(s). One can search for a specific term and open an illustration of it.

A fully updated bibliography on neotropical Annonaceae (**Literature**) containing over 2400 references completes the CD-ROM. The user can search for a certain author or genus/species and get a list of all included references.

By using the **Index** one can quickly enter the desired information of any taxa included on the CD-Rom.

In the **Introduction** additional information is presented on the kind of information stored in each module of the Linnaeus software. In addition one can find information on the Flora of the Guianas Project and the Annonaceae Project.

#### **4. 8. Changing patterns of indicator liana species in a tropical rain forest in Guyana**

by Thijs van der Velden and Elze Hesse, NHN-Utrecht (U)

This research is part of the project *The use of liana diversity for logging damage assessment* by Renske Ek, in which the occurrence of lianas will be used as indicator for the condition and biodiversity of an ecosystem. The term 'lianas' is used as a synonym for several types of climbers, such as woody climbing plants, woody hemiepiphytes and herbaceous climbers. Because of their rapid response to disturbance, lianas are sensitive indicators of changing habitat conditions by disturbance. The research site is located in a mixed Greenheart dominated forest on brown sand in the West-Pibiri compartment in Guyana. In 1993, three one-hectare plots were established in this area. In 1994, two of the plots were logged with a logging intensity of 16 stems/ha. Before logging all the plots were enumerated and in 1996, 1998 and 2000 they were re-enumerated.

By using all the obtained data we will try to answer the following questions: 1. Do clear spatial patterns related to logging exist after a longer period of time between logging and enumeration? 2. Can individual liana species be divided into functional groups (group of species with similar characteristics and adaptations to a changing environment)?

The one-hectare plots were divided into 20 x 20 subplots and enumerated with the following intensity: lianas with dbh > 10 cm for every 20 x 20 subplot; lianas with height > 2 m in 10 x 10 subplot; lianas with height

50cm>2m in 5 x 5 subplot, one in every 10 x 10 subplot; lianas <50 cm in 2 x 2 subplot, one in every 5 x 5 subplot. For each sampled individual species name, coordinates within plot, height, diameter and diameter of host were determined. In each plot we also measured the gap area: the vertical projection of a canopy opening enclosed by adjacent trees.

At the moment we are still working on the analysis of the data. With the aid of a Geographical Information System (PCRaster) we will try to combine the data of the exact liana composition within the plot and the specified damage zones around gaps and skid trails.

Six years after logging we recorded 38 families in total. Most species occur in the Bignoniaceae, Malpighiaceae, Leguminosae and Convolvulaceae families (respectively 14, 12, 9 and 9 species). *Connarus perrottetii* of the Connaraceae family is the most abundant species (>30% of all individuals) in all plots. In the two disturbed plots the number of individuals and species increases after logging. Six years after logging the number of species steadily decreases again. The number of individuals and species in the undisturbed plot fluctuates in time. The total amount of gap area decreased after logging and became more patchy. With these preliminary we could already distinguish five distinct patterns of species reacting differently on logging, regardless where they occur in the plots. Further analyses have to show whether this division is statistically and ecologically correct.

#### **4. 9. Non-timber forest products (NTFPs) in primary and secondary forest in northwest Guyana**

by Tinde van Andel, NHN-Utrecht (U)

An overview was given of the present NTFP harvesting in two major forest types in Guyana's North-West District: mixed primary forest and 20- and 60-year old secondary forest. Research was carried out near a small Carib Indian village along the remote Barama River and in a larger Arawak community along the coastal Moruca River.

The abundance and diversity of NTFPs was discussed for four hectare plots: two in well-drained mixed forest, co-dominated by Lecythidaceae and Chrysobalanaceae, one plot in 20 years old secondary forest, characterized by *Schefflera morototoni*, *Byrsonima* spp. and *Pentaclethra macroloba*, and one plot in 60 years old secondary forest, with *Mabea piriri*, *Goupia glabra*, and *Inga alba*.



The main conclusions were:

- Both primary and secondary forest are important for NTFP harvesting; each vegetation type has its own important NTFPs.
- Early secondary forest (abandoned farms till 20 years old) also yields many useful plants.
- NTFPs provide an income for local people and stimulate economic development, although the vast majority of NTFPs is harvested only for subsistence use.
- NTFPs are only harvested in primary forest when they are not present in secondary forest, people prefer collect NTFP close to home.
- The commercialisation of NTFPs from primary forest should be stimulated, otherwise people will still cut down the forest for timber.
- Low-diversity forests offer best chances for (sustainable) commercial extraction.

#### **4. 10. Striving for a National Protected Areas System in Guyana**

by Hans ter Steege, Plant Ecology Department, Utrecht University

Guyana is at crossroads where utilisation, conservation and preservation of its forests are concerned. At one hand, the Government of Guyana (GoG) has an understandable need to exploit its natural resources for the development of the country and its people. The GoG has expressed its intention to do this in a sustainable manner. As a result of this large tracts of forest (approximately 4.5 mln ha) have recently been designated as State Forest Lands and may be leased to new foreign concessionaires in the form of exploratory concessions. In addition, the granting of large exploratory mining concessions is being considered over large stretches of the country. On the other hand, Guyana ratified the Convention on Biological Diversity in 1994, committing itself to strive for the conservation and sustainable use of its biodiversity. At present Guyana is in a process of developing a project to establish a National Protected Areas System (NPAS) to be funded mainly through the Global Environmental Facility (GEF). To effectuate its Environmental Policy the Government, through an Environmental Protection Act, established the Environmental Protection Agency (EPA) that will be responsible for the "effective management of the environment so as to ensure conservation, protection and sustainable use of its natural resources". More recently the EPA produced a draft National Biodiversity Action Plan (NBAP), which is now in a process of public consultation.

There are still ample opportunities for conservation in Guyana. The forest is relatively intact over large areas. However, there are also

serious threats to Guyana's biodiversity of which logging and mining are perceived to be the greatest.

It is obvious that under the given circumstances data on which to base a NPAS have to be gathered quickly in order to make a 'best estimated guess' as to where the highest gain is to be expected from protected areas, with the least possible conflicts for development. The NBAP foresees in such a process. The Tropenbos-Guyana Programme aims to assist the EPA in gathering and analysing plant data to support informed decision making, in a project funded by the European Union.

The project 'Patterns of Plant Diversity in Guyana' started in early 1999 and has produced its first recommendations early 2000. Because of the urgency of the process we mainly focussed on already existing data, such as forest inventories, plot data, and botanical collections. Forest inventories are largely neglected in the debate of the selection of protected areas world-wide. However, the use of national forest inventory data to describe the forest regions in Guyana proved very rewarding.

Based on the National Forest Inventory seven forest regions were described for Guyana. Forest composition was largely influenced by geology at the national level, and by soil types at the regional level. Species (alpha) diversity was highest in the southern portion of Guyana. A study of botanical collections largely supported the division into the forest regions described. At regional level (gamma diversity) the central area of Guyana proved equally rich when compared to the southern portions. Contrary to a widely held belief the Kanuku Mountains were not found to contain a very diverse flora, which was also poor in endemics. The Pakaraima region is expected to harbour the largest number of species, partly caused by the altitudinal component present. Endemics are found in two concentrations in Guyana, the Pakaraima Highlands and the Berbice Formation of Central Guyana. These endemics are habitat specialists of the poor sandy soils of that area and are under serious threat due to forest exploitation, charcoal production, forest conversion and wild fires. The area is in serious need of attention of Guyana's policy makers. To be able to put Guyana's conservation efforts into a regional perspective, other topics discussed include diversity and forest composition in the Greater Amazon and Guiana Shield level. Studies of diversity at smaller scales were also included.

#### 4. 11. Neotropical Rubiaceae Websites

by Piero Delprete, New York Botanical Garden (NY)

Rubiaceae is one of the largest families of flowering plants in the World and in the Neotropics. According to a recent account, this family is represented in the Neotropics by approximately 216 genera (including taxa in cultivation) and 5,000 species.

Two web sites on Neotropical Rubiaceae are available and connected to The New York Botanical Garden web master:

##### **A. Neotropical Rubiaceae Specialists**, by *P. Delprete*

(<http://www.nybg.org/bsci/res/delpic.html> )

This site is dedicated to Current Research in Neotropical Rubiaceae. It lists all the specialists that work primarily on systematics, floristics, phylogeny, and biochemistry of Neotropical Rubiaceae, with names, institutions, addresses, contact numbers, and field of research. Some of the names are connected to their personal web page. The primary goal of this site is to inform the botanical community on which specialists works on which taxa and floristic region, in order to avoid duplication of work and stimulate cooperation among scientists. Any addition and/or correction are most welcome.

##### **B. Synopsis of Neotropical Rubiaceae Genera**, by *P. Delprete and R. Cortés*

(<http://www.nybg.org/bsci/res/delpic2.html> )

The goal of this site is to produce a synopsis of all Neotropical genera. Each genus will be represented by one or a few color photos, synonyms, description, geographic distribution, approximate number of species in the Neotropics, and a few selected references. Several taxa native to the Old World are also included because they are important crops, ornamentals, or source timber in the Neotropics.

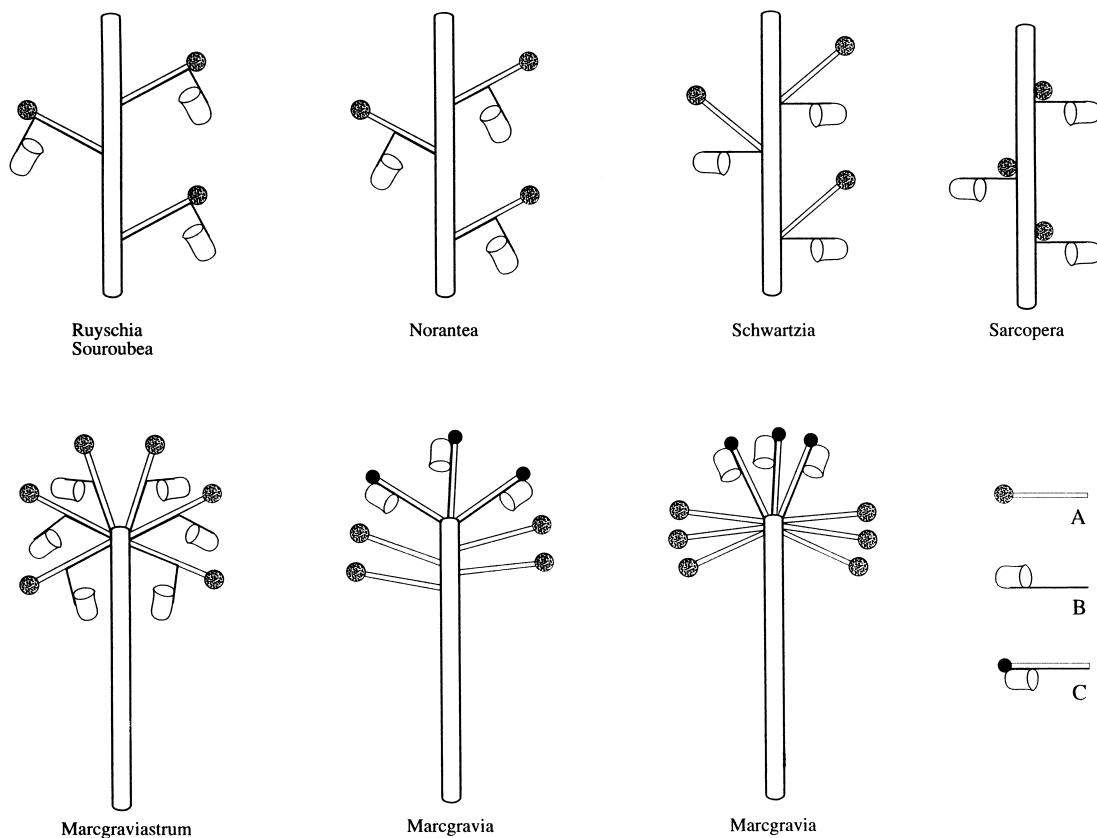
The descriptions available in this site were produced using the DELTA program. So far, we have entered about half of the Neotropical Genera using 74 characters, and we are here presenting our progress. The DELTA program will enable us to produce descriptions, and dichotomous and interactive keys. Please visit this web site and enjoy the color photos available at the moment. If you have good color slides of the genera with the indication **Photos Needed** please contact us for their inclusion in this venue (species, locality, and photographer will be properly cited).

We will be grateful to receive any comments on this web site, as well as suggestions and corrections. For communications, please write directly to us at: [pdelprete@nybg.org](mailto:pdelprete@nybg.org) or [rcortes@nybg.org](mailto:rcortes@nybg.org)

#### 4. 12. A portrait of the Marcgraviaceae

by Stefan Dressler, Forschungsinstitut Senckenberg, Frankfurt/M

After a recent rearrangement of the c. 130 species into 7 genera the neotropical family Marcgraviaceae was presented here with its new structure. The taxa occur from S Mexico to N Bolivia including the Caribbean and comprise mainly lianas but also sprawling shrubs and small trees. Typical for the family is the occurrence of extrafloral nectary cups of various shapes and arranged in different positions in the generally racemose inflorescence. Tropical montane rain and cloud forests but also tropical to semideciduous lowland forests form the habitat of the family. Some taxa seem to be not very rare (their ability for vegetative reproduction through rooting shoots and the endozoochorous dispersal of the small seeds embedded in a pulp is noteworthy here), but because of their flowering in high canopies they are often ill represented in botanical collections.



Schema of the inflorescences of the genera of Marcgraviaceae (after de Roon 1975)

A. fertile flower, B. nectary cup, C. sterile flower fused with nectary cup

The genera are recognizable by their respective inflorescence type and the position of the nectary cups:

*Ruyschia* (7 spp.) and *Souroubea* (c. 20 spp.) have racemes with the nectaries attached to the flower base. The former has generally 3 stamens and foliose to gibbose nectaries, the latter mostly 5 stamens and tubular, often auriculate nectaries. All other genera have higher, indefinite numbers of stamens and tubular, sac- or boat-shaped nectary cups. The former genus *Norantea* (s.l.) is very heterogenous with regards to its inflorescence structure and was recently split into 4 genera (de Roon & S. Dressler, Bot. Jahrb. Syst. 119: 327-335. 1997).

The genus *Norantea* (s.str., 2 spp.) has long racemes with the nectaries attached at about the middle of the pedicel, *Schwartzia* (14 spp.) has mostly short racemes with the nectaries attached below the middle of the pedicel, *Sarcopera* (10 spp.) has spikes with the nectaries attached immediately below the flower, *Marcgraviastrum* (15 spp.) has pseudoumbellate inflorescences.

The genus *Marcgravia* (c. 60 spp.) also has pseudo-umbellate inflorescences but not every flower is subtended by a nectary as in the other genera, but only the central = sterile flowers. This genus is characterised by some features as clearly advanced within the family: heterophylly, distichous (vs. spiral) leaf arrangement, 4 (vs. 5) sepals and petals, totally fused corolla, and the conspicuous oligomerisation in the inflorescence (clear division between attracting and reproductive parts).

Long regarded as a classical case of ornithophily this family proves to comprise a wide array of pollination systems: ornithophily (both by perching as well as hovering birds) plays a major role in *Norantea* and *Sarcopera*. A few species of *Schwartzia* and *Marcgravia* are bird-pollinated, and maybe also a few *Souroubea* spp., but in the latter butterfly and moth pollination might be more important. *Marcgraviastrum* and the bulk of *Marcgravia* and *Schwartzia* are probably bat-pollinated, whereas climbing marsupials were postulated to play an important role in a Central American *Marcgravia* sp. (Tschapka & v. Helversen, Plant Biol. 1: 382-388. 1999). About the pollination of *Ruyschia* nothing is observed, but fly pollination is suggested.

A revision of the genus *Marcgravia* is currently underway and the family will be studied and phylogenetically analysed in several collaborations for a monograph. The family is revised for several flora projects (incl. Flora of the Guianas). In the Guianas the genera *Marcgravia*, *Marcgraviastrum*, *Sarcopera*, *Norantea*, and *Souroubea* occur.

## Reference

Roon, A.C. de. 1975. *Contributions towards a monograph of the Marcgraviaceae*. Thesis. Utrecht.

## 5. LIST OF PARTICIPANTS

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Zijlstra, Gea	Utrecht

## 6. APPENDICES

### Appendix 1 List of websites

#### A. sites from the Guianas

##### Guyana:

**SDNP** Guyana - <http://www.sdn.org.gy/sdn/index.shtml>

A Government of Guyana / United Nations Development Programme initiative to make relevant information on sustainable development readily available. Its philosophy: "The Sustainable Development Networking Programme (SDNP), is an attempt to utilize information and communication technology in their various forms, to facilitate a holistic and integrated approach for policy, strategy and management of the development process, with the emphasis on sustainability.

The SDNP acts as a not-for-profit Internet Service Provider, linking partners in development in Guyana, with the larger mandate of, creating information and on-going dialogue and benefits, for the sustainable development of Guyana."

**EPA** = Environmental Protection Agency, Guyana - <http://www.sdn.org.gy/epa/>

The Mission of EPA: To facilitate and coordinate effective environmental management and protection; and the sustainable use of Guyana's natural resources. Includes a.o. permitting information.

**GSMP** = Guiana Shield Media Project - <http://www.gsmp.org/>

The objective of the Guiana Shield Media Project is to produce information for regional and international distribution about environmental issues in the Guiana Shield territory.

## Suriname:

**National Herbarium of Surinam** - <http://www.cq-link.sr/bbs/> (this link does not work any more?)

**Stinasu** = Stichting Natuurbehoud Suriname -  
[http://www.stinasu.sr/about\\_us.html](http://www.stinasu.sr/about_us.html)

This Foundation for Nature Conservation in Suriname was founded in June 1969. Its mission is to preserve the nature of Suriname by conducting research, providing nature education and organizing nature tourism activities in the nature reserves and nature park of Suriname.

## French Guiana:

**L'Herbier de Guyane**, Cayenne -  
<http://cayenne.cayenne.orstom.fr/laboratoires/herbier/herbier.html>

**IRD** = Institut de Recherche pour le Développement, Cayenne -  
[http://cayenne.cayenne.orstom.fr/recherches/botanique/labo\\_bota.html](http://cayenne.cayenne.orstom.fr/recherches/botanique/labo_bota.html)

## **B. foreign sites**

**CI** = Conservation International, the Guianas -  
<http://www.conservation.org/web/fieldact/regions/guianreg/guianreg.htm>

**CI** in Guyana -  
<http://www.conservation.org/web/fieldact/regions/guianreg/Guyana.htm>

**CI** in Suriname -  
<http://www.conservation.org/web/fieldact/regions/guianreg/Suriname.htm>

**Flora of the Venezuelan Guayana** -  
<http://www.mobot.org/MOBOT/Research/ven-guayana/welcome.html>

## Guyana:

**BDG** = Biological Diversity of the Guianas -  
<http://www.mnh.si.edu/biodiversity/bdg/>

The Biological Diversity of the Guianas (BDG) is a field-oriented program of the Department of Botany, National Museum of Natural History, Smithsonian Institution, that has been operating since 1983. The goal of the BDG is to study, document and preserve the biological diversity of the Guianas.

Including many links, a.o.:



- Plant checklists from Guyana - <http://www.mnh.si.edu/biodiversity/bdg/plants.html>
  - Lichenized fungi of the Guianas - <http://www.mnh.si.edu/biodiversity/bdg/lichlist.html>
  - *The checklist* - <http://www.mnh.si.edu/biodiversity/bdg/checklst.html>
- J. Boggan, V. Funk, C. Kelloff, M. Hoff, G. Cremers, & C. Feuillet, 1997, Checklist of the Plants of the Guianas, 2nd ed.

**CSBD** = Centre for the Study of Biological Diversity - <http://www.mnh.si.edu/biodiversity/bdg/csbd.html>

A collaborative project of the BDG and the University of Guyana; the Centre for the Study of Biological Diversity at the University of Guyana was founded in 1992. CSBD is a non-governmental organization dedicated to the study, documentation and conservation of nature.

**IWOKRAMA** = International Centre for Rainforest Conservation and Development - <http://www.sdn.org.gy/iwokrama/>

an autonomous international conservation, research and development organisation formed by agreement between the Government of Guyana and the Commonwealth Secretariat ... managing 3,600 square km of pristine tropical forest ...

**Tropenbos** Guyana Programme - <http://www.tropenbos.nl/tropenbos/guyindex.html>

The TROPENBOS-Guyana programme carries out research with the objective of developing guidelines for sustainable forest management and conservation.

### Suriname:

The Tropical Rainforest in Suriname - <http://www.euronet.nl/users/mbleeker/suriname/suri-eng.html>  
 Site of Marco Bleeker, in the seventies an Utrecht student in biology.

### French Guiana:

**FGRN** = The French Guiana Rainforest Network - <http://members.netscapeonline.co.uk/scalesclan/>  
 The FGRN is a voluntary organization set up to promote French Guiana as a region of rainforest for conservation and research. The aim of the FGRN is a.o. to create a network of universities, non-governmental organizations and local people to further conservation work and research in French Guiana.

Fungal and plant **diversity** of Central French Guiana -  
[http://www.nybg.org/bsci/french\\_guiana](http://www.nybg.org/bsci/french_guiana)

### **C. Sites of general importance**

**Biodiversity** and Biological Collections WWW Server -  
<http://www/biodiversity.uno.edu/>

This WWW server is devoted to information of interest to systematists and other biologists of the organismic kind. Within these pages you will find information about specimens in biological collections, taxonomic authority files and directories of biologists.

**ING** = Index Nominum Genericorum (Plantarum) - <http://www.nmnh.si.edu/ing/>  
The Index Nominum Genericorum (ING), a collaborative project of the International Association for Plant Taxonomy (IAPT) and the Smithsonian Institution, was initiated in 1954 as a compilation of generic names published for all organisms covered by the International Code of Botanical Nomenclature.

**IPNI** = International Plant Names Index - <http://tc.huh.harvard.edu/>  
The International Plant Names Index (IPNI) is a database of the names and associated basic bibliographical details of all seed plants. In addition, it is possible to find data on author names, derived from Brummitt & Powell, Authors of plant names: one can find all forenames and / or the standard abbreviation of author names.

IPNI is the product of a collaboration between the Royal Botanic Gardens in Kew, the Harvard University Herbaria and the Australian National herbarium.

**Tropicos** nomenclatural database and associated authority files -  
<http://mobot.mobot.org/W3T/Search/vast.html>

This site provides access to the Missouri Botanical Garden's VAST (VAScular Tropicos) nomenclatural database and associated authority files.

#### **Type specimens on the internet:**

Type Specimens present in NY (vascular plants) -  
[http://www.nybg.org/bsci/herbarium\\_imaging/](http://www.nybg.org/bsci/herbarium_imaging/)

Type specimens present in AMD, L, U and WAG -  
<http://nhncml.leidenuniv.nl/rhb/#types>

## Appendix 2

### Manuscripts submitted

(October 2000)

#### *Series A: Phanerogams*

**Alismataceae & Limnocharitaceae** by R. Haynes & L. Holm-Nielsen.

Checked at editorial office; waiting for remaining families to be completed.

**Apocynaceae** by L. Allorge. Under revision.

Wood & Timber ready. Illustrations available.

**Asclepidiaceae** by G. Morillo. Part of ms as sample; suggestions sent.

**Caricaceae** by M. Christenhusz & E. v.d. Berg. Draft.

### CARYOPHYLLALES

**Amaranthaceae** (including COLLECTIONS STUDIED) checked.

**Phytolaccaceae** with remarks on **Achatocarpaceae**

**Aizoaceae**

**Chenopodiaceae**

**Portulaccaceae**

**Basellaceae**

**Molluginaceae**

**Caryophyllaceae**

all by R. DeFilipps, S. Maina and sometimes with J. MacKnight. All reviewed, but waiting for list of COLLECTIONS STUDIED and for illustrations.

**Nyctaginaceae** R. DeFilipps & S. Maina. Ready.

**Ceratophyllaceae** by R. DeFilipps & S. Maina. Reviewed; no illustrations.

**Chloranthaceae** by C.A. Todzia. Complete; reviewed; to be combined with Piperaceae.

**Crassulaceae** by R. DeFilipps & S. Maina. Reviewed; no illustrations.

**Cyperaceae (Ascolepis & Lipocarpha)** by P. Goetghebeur. Has been sent as a sample for comments; checklist present.

**Droseraceae** by Rodrigo Duno di Stefano. Ready for publication, including illustrations.

**Euphorbiaceae: Hippomaneae p.p** by H.J. Esser. Waiting for illustrations and for second reviewer.

**Euphorbiaceae: Hippomaneae p.p. (Euphorbia)** by M. Christenhusz. Waiting for second reviewer.

**Hernandiaceae** by A. van Proosdij. Reviewed.

**Humiriaceae** by D. Sabatier. To be reviewed and waiting for illustrations.

**Ixonanthaceae** by D. Sabatier. Waiting for comments.  
**Lentibulariaceae** by P. Taylor. Ready, but waiting for the corrections of the illustrations by the author.  
**Loranthaceae** and **Eremolepidaceae** by J. Kuijt. Not complete, partly under revision.  
**Lythraceae** by A. Lourteig. Waiting for the final version.  
**Mayacaceae** by A. Lourteig. Waiting for the final version.  
**Mendonciaceae** by D. Wasshausen. Has been sent as a sample for comments.  
**Mimosoideae** by J. Grimes, R. Barneby & O. Poncy. Being reviewed; waiting for illustrations and final corrections.  
**Monimiaceae** and **Siparunaceae** by M. Pignal. After review back to author.  
**Orchidaceae (Cattleya)** by E. Christenson. Has been sent as a sample for comments.  
**Orchidaceae: Key to the Suriname taxa** by M. Werkhoven. Reviewed.  
**Oxalidaceae** by A. Lourteig. Waiting for the final version.  
**Typhaceae** by M. Strong. Ready for publication; without illustration.  
**Vitaceae** by J.A. Lombardi. Under review.

*Series C: Bryophytes*

**Cololejeunea** and **Diplasiolejeunea** by P. Tixier. Reviewer suggests important corrections, correct translation and addition of the remaining genera of the subfamily. Still under correction, etc. Waiting also for **Aphanolejeunea** by T. Pocs.  
**Colura** by s. Jovet-Ast. Ready to be combined with **Cololejeunea**, **Diplasiolejeunea** and **Aphanolejeunea**.

*Series E: Fungi and Lichens*

*Supplementary Series*

**Index of French Guiana Plant Collectors** by M. Hoff. Waiting for final corrections.