

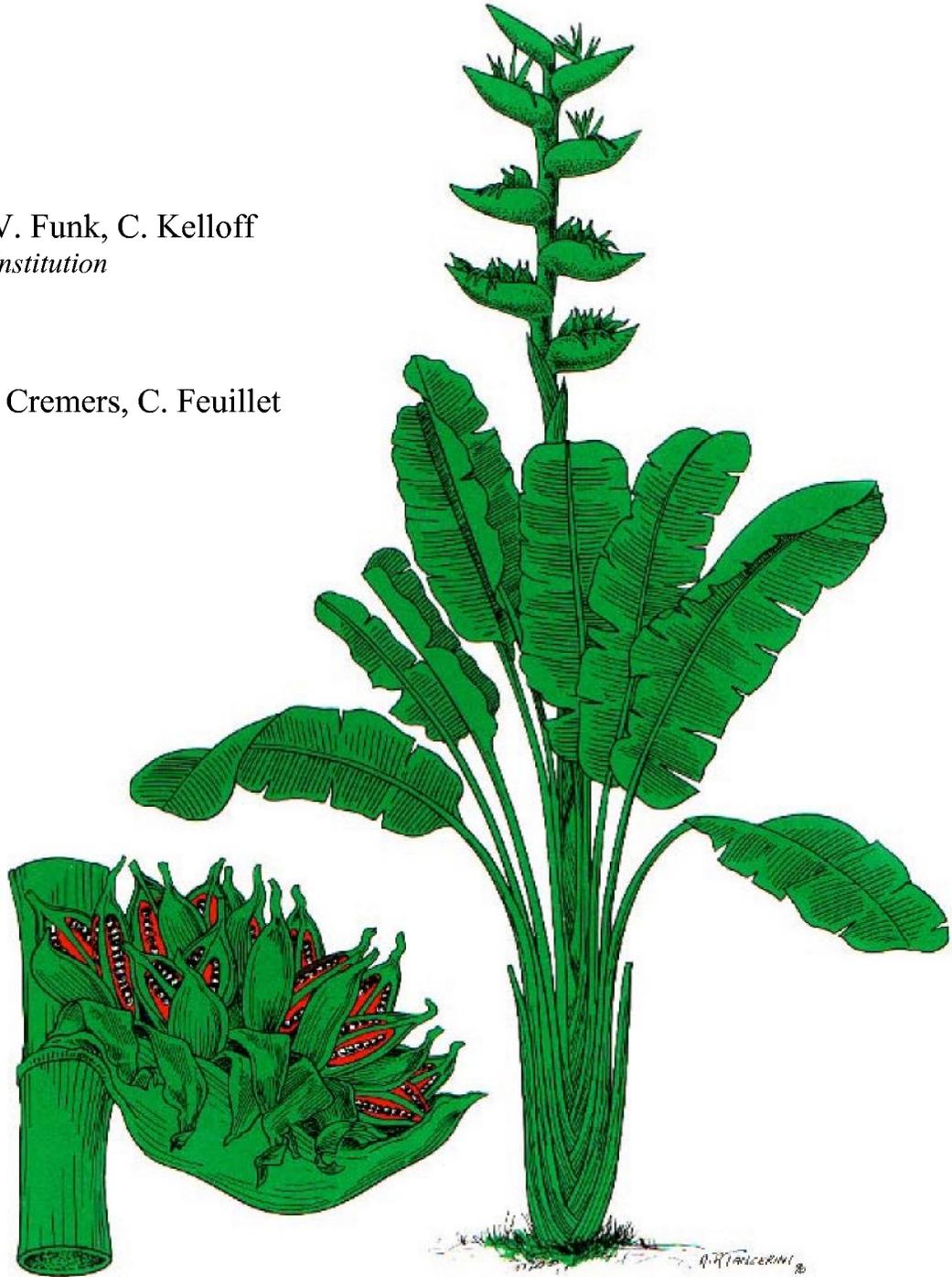
CHECKLIST OF THE PLANTS OF THE GUIANAS  
(Guyana, Surinam, French Guiana)

2nd Edition

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*Smithsonian Institution*

and

M. Hoff, G. Cremers, C. Feuillet  
*ORSTOM*



Prepared under the auspices of the Centre for the Study of Biological Diversity  
University of Guyana, Georgetown, Guyana



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# PREFACE TO THE REVISED EDITION

by John Boggan

Since its publication in 1992, numerous additions and corrections have been made to the *Checklist of the Plants of the Guianas*. We have incorporated these changes in a revised edition, along with some changes in the format that we hope will make the checklist easier to use. Additions have included newly-described species, new records for the Guianas, and names overlooked or otherwise omitted from the first edition. Synonymy and reference lists have been expanded. In several cases (e.g., Nyctaginaceae, Turneraceae), the species list for a family has been completely revised. All the spermatophytes (seed plants) are arranged together alphabetically by family. The country distribution codes have been changed to GU, SU, and FG for Guyana, Surinam, and French Guiana, respectively, in anticipation of a checklist including the "Guayanan" portions of Venezuela and Brasil.

The treatment of the various families remains uneven, with some families well-known (either with recent monographic or floristic treatments, or with a specialist actively identifying specimens) and others (e.g., Dioscoreaceae, Smilacaceae) very poorly known. All available publications dealing with Guianan plants since publication of the first edition have been consulted, in some cases resulting in substantial changes; in other cases, older publications not seen for the original checklist were consulted with the result that certain families are in much more complete (e.g., Liliaceae s.l. but excluding Smilacaceae).

We have tried not to include any unpublished names or combinations without indicating them as such (i.e., "sp. nov. ined." or "comb. nov. ined."). However, it has not been possible to verify every name found on herbarium specimens or in the literature as validly published. The editors regret and take full responsibility for the use of any invalid names.

The first edition of the "Checklist of the Plants of the Guianas" was a collaborative project, with contributions by many researchers worldwide. Authors of the family lists were identified as "contributed by...." Otherwise, family lists were compiled by the editors, and in some cases these were reviewed by additional specialists (identified as "reviewed by...."). Additions and corrections suggested by the reviewers were incorporated. Authorship of the revised edition is complicated by the fact that additions and corrections were made by the editors, by most (but not all) of the original contributors and reviewers (listed in Appendix A), and by new contributors and reviewers (listed in Appendix B). The editors have tried to clearly indicate the authorship of each family list, and hope we have given sufficient credit to the contributors.

It is the nature of publications such as this to be obsolete as soon as they are published. During the time between the completion of editing and final publication, several new species have been published, and new country records have been discovered. In addition, numerous additions and corrections were received from Jan C. Lindeman (U) shortly before going to press. Unfortunately, there was not enough time to incorporate most of these in the revised checklist. The majority of those not already received from other sources were synonyms whose current status could not be verified. New country records indicated by Lindeman (primarily for Surinam) are indicated with a question mark.

This is publication number 30 in the Smithsonian's Biological Diversity of the Guianas Program publication series. This publication was supported by the BDG program and copies are available from the program at no charge while supplies last.



## INTRODUCTION

by V.A. Funk

This checklist is a preliminary listing of the known vascular plants (flowering plants, gnetophytes, cycads, conifers, ferns and "fern allies") and "bryophytes" (mosses, hornworts, liverworts) from the Guianas. Although our knowledge of the algae is insufficient to enable us to produce a species list at this time, we have included the Characeae (stoneworts) of the macroalgae because the information was easily available. This checklist excludes lichens and fungi, which are usually classified together under fungi and are not plants in the strict sense. A checklist of the lichens reported from the Guianas before 1987 has been published (Hekking & Sipman 1988) and hopefully, a list of all the fungal groups will be forthcoming.

This checklist is an attempt to list all of the vascular plants and bryophytes of the Guianas in an effort to encourage further research. Checklists have many uses. They can aid in identifications, although new species and new records are always a possibility. In addition, checklists tell us how many organisms of a certain kind are in a particular area, thus giving us an idea of the species richness. Checklists can act as an indicator of endemism within an area and provide information on the number of introduced species. They can be used in a comparative manner between and among areas. If they cover a natural area (one that has biotic or geologic significance) they can be used to formulate questions about centers of origin and evolutionary history. In addition, a checklist is a way to help standardize spelling and authors and to promote accurate labeling of specimens. Checklists, however, reflect our knowledge at a particular time and our current taxonomic opinions and so their usefulness is tempered by the knowledge that they are never entirely correct and that the list will be constantly changing. For instance, we are sure that this list contains incorrect synonymies, records based on misidentifications, that additional species remain

to be added, and that many species have not yet been described or even discovered. However, this type of "snapshot" is valuable because it provides a way of focusing and stimulating work in the area. In order to help us keep this checklist as current and accurate as possible, please contact the Director, Biological Diversity of the Guianas Program, with any additions or corrections.

The part of the northeastern shoulder of South America along the Atlantic coast commonly known as the "Guianas" consists of three political areas (Map 1) with a total area of about 500,000 sq. km. The westernmost political entity is Guyana, formerly known as British Guiana, which has 800,000 inhabitants and an area of 231,800 sq. km. To the east of Guyana is Surinam, formerly known as Dutch Guiana, with 400,000 inhabitants and 173,840 sq. km. The easternmost is French Guiana, an overseas department of France, with 120,000 inhabitants and 88,240 sq. km. (areas from McConnell and Choubert 1975). In all three of these areas, the population is concentrated along the coast and near the respective capital cities.

The Guianas constitute only part of a phytogeographic or natural area called the Guiana Shield (see Geology section). To make them a natural area would require including Venezuela south and east of the Orinoco River and small parts of Colombia and Brazil. During the next year the "Flora of the Venezuelan Guayana" project of the Missouri Botanical Garden will produce a checklist for the Venezuelan Guayana. Proposed collaboration between the Smithsonian and Missouri will produce a combined checklist covering the bulk of the Guiana Shield a natural area to study and determine if the flora of the Guiana shield is a unique evolutionary unit.

For this checklist, we have recorded over 9200 species from the three Guianas: approximately 6500 from Guyana, 5100 from Surinam, and 5400 from French Guiana. Of these, only about 3% are introduced and naturalized. The families with the largest number of species in the Guianas are the Leguminosae (Cronquist, 1981, divides the legumes into three segregate families but they are often treated as one) with more than 800 species and the Orchidaceae with about 700. Other large families are the Rubiaceae and the Poaceae (grasses), both with more than 400 species.

## GEOLOGY

Underlying all of northeastern South America is the Guiana Shield (Map 2), which occupies a broad area between the Atlantic Ocean and the Orinoco and Amazon rivers. In addition to the three Guianas, the Guiana Shield covers a small part of eastern Colombia and the Venezuelan departments of Amazonas and Bolivar to the west and parts of the Brazilian departments of Roraima, Pará and Amapá to the south and east. Geologically, the Guiana Shield is an ancient Precambrian land mass (4 billion - 590 million years old) made up of varied formations of sedimentary and igneous origin that were metamorphosed and folded (McConnell and Choubert 1975). Overlying the central portion of the Shield are the Roraima sediments that, although lacking in fossils, are believed to have been laid down on the Guiana Shield during the Cretaceous Period (140 - 68 million years ago) probably as shallow marine or brackish water deposits (Gansser 1954, Maguire 1970). The Roraima formation consists of pink, yellow and white sandstones, red quartzites, green, black and red shales, conglomerates and boulder beds (Fanshawe 1952). At an earlier time, the Roraima formation must have been considerably larger, perhaps extending south to the Matto Grosso highlands in Brazil (Fanshawe 1952, Gansser 1954). Erosion decreased the size of the formation and the remaining sediments extend west from the Kaieteur escarpment in central Guyana, forming the Pakaraima

Mountains, and on through parts of Venezuela and Colombia and south into northern Brazil (Leechman 1913). Within this area, erosion has created vertical-walled, more or less flat-topped peaks called "tepui". These table-like formations are often virtually inaccessible and are so unusual that in a fictional account of a scientific expedition, one of them was referred to as "The Lost World" (Doyle 1912). Their unique flora and fauna has resulted in the descriptor "lost world" being applied to all of these table mountains. The highest peaks of the Guianas are found in the Roraima Formation in western Guyana with Mt. Roraima reaching 2772 m., Mt. Ayanganna to 2134 m., and Mt. Wokumung to 2042 m.

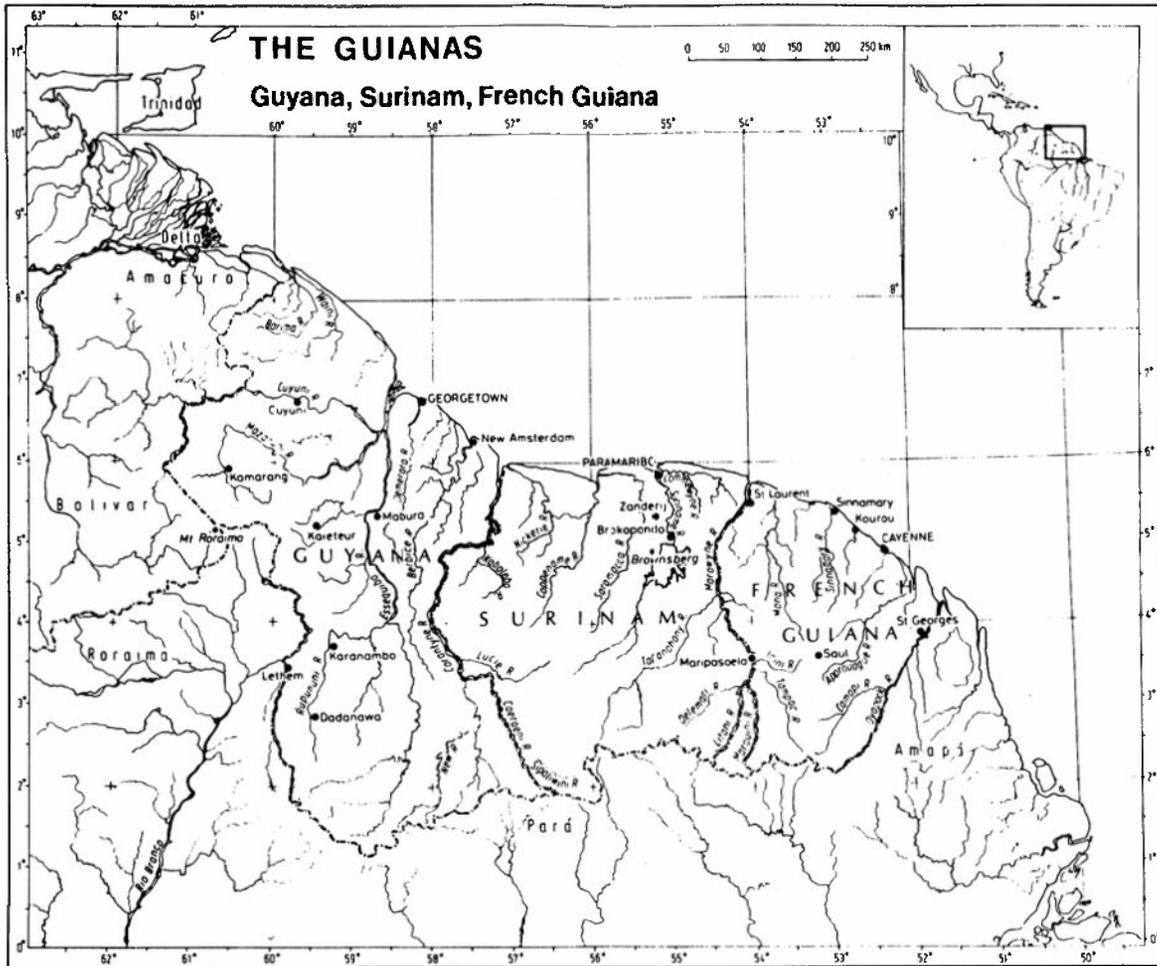
The Guiana Shield can be divided into four natural geologic regions: 1) coastal plain; 2) central pediplains and rugged mountains of Precambrian metamorphic and granitic rocks; 3) high plateaus of the Pakaraima Mountains, formed by the tabular Roraima Formation; and 4) southern pediplains descending to the Rio Negro and the Amazon basin.

## VEGETATION TYPES

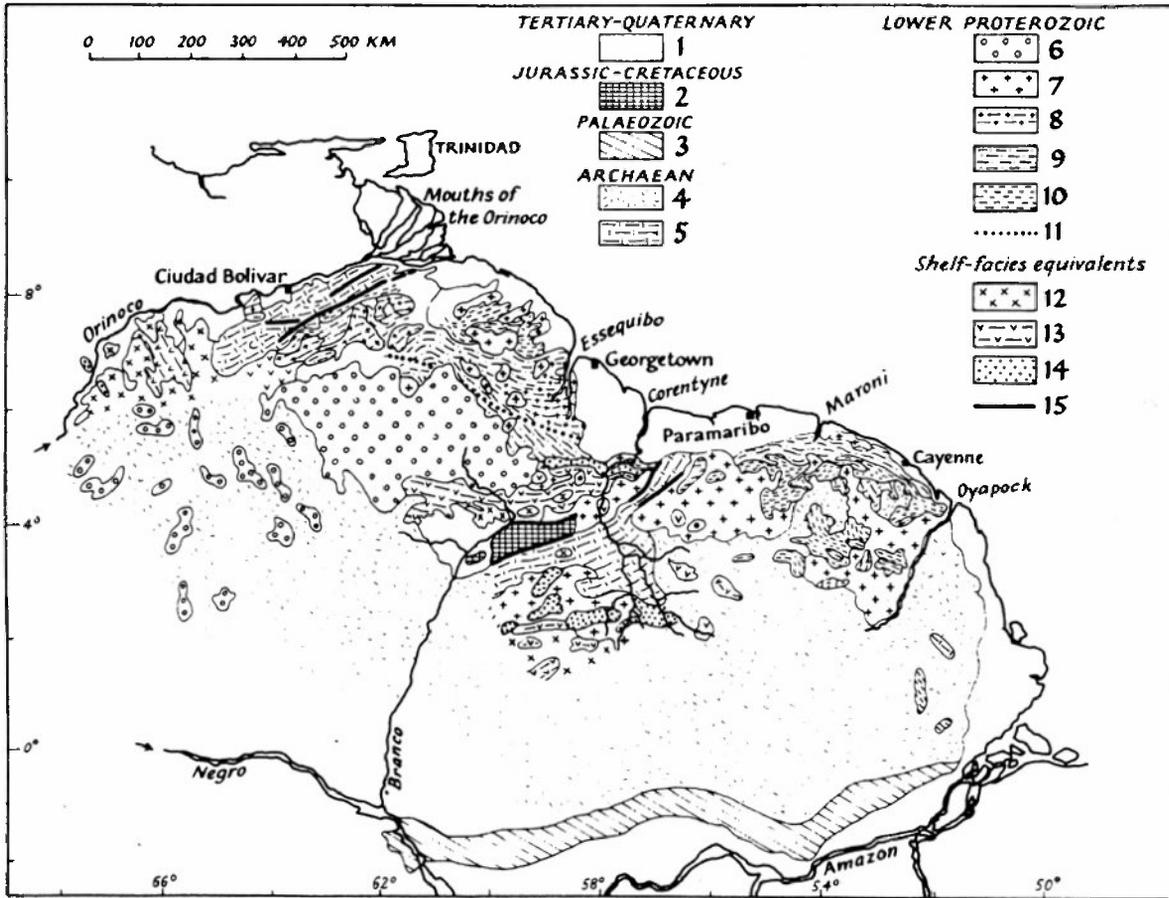
The vegetation of the Guianas is determined by the underlying geology, altitude, and annual amount of rainfall. All of the Guianas experience at least one dry season a year and during most years, two. As with most tropical countries, the rains sometimes come early or sometimes late, and occasionally a dry or rainy season does not occur at all. In general, there is sufficient rainfall for most of the Guiana area to be forested. The estimated percentage of forest cover varies from 86% for Guyana (Haman and Wood 1928) to 97.7% for French Guiana (Granville 1974). The Guianas have a remarkable diversity of organisms and their rich flora and fauna remain largely unexplored and unexploited. They constitute one of the few tropical areas worldwide that still has the majority of its forests intact. Estimates vary, but clearly only a small percentage of the Guianas has been deforested.

There are nine vegetation types in the Guianas according to Lindeman and Mori

## INTRODUCTION



Map 1: The Guianas



Map 2: The Guiana Shield (McConnell & Choubert 1975)

(1989): 1. seasonal evergreen forest (or seasonal wet forest); 2. mangrove; 3. strand vegetation (beach vegetation); 4. marsh forests; 5. swamp forests; 6. herbaceous swamps; 7. savannas; 8. montane vegetation; and 9. inselbergs (granitic outcrops). However, Lindeman and Mori's list focuses mainly on Surinam and French Guiana. Fanshawe (1952) lists 28 vegetation types in six categories for Guyana: 1. rain forest; 2. seasonal forest; 3. dry evergreen forest; 4. montane forest; 5. marsh forest (includes savannas); and 6. swamp forest (includes mangrove and herbaceous swamps types). Neither list covers all of the vegetation types with the Lindeman and Mori list lacking several forest types and the Fanshawe list missing the strand and inselberg vegetation. Combining the two lists gives a broader, more complete range of vegetation types found in this region. One possible way to combine the two lists is to use the 28 types of Fanshawe's and add the two missing categories from Lindeman and Mori.

### **SOME CURRENT PROGRAMS AND PROJECTS IN THE GUIANAS**

Several programs and projects are now underway in the Guianas. A few that deal with floras are listed below. The first two collaborated to produce this checklist.

*Biological Diversity of the Guianas (BDG)* - Smithsonian Institution. The BDG started in 1983 and now operates from the "Centre for the Study of Biological Diversity" on the campus of the University of Guyana. The BDG program seeks to document and study the flora and fauna of the Guianas. Activities include collecting specimens to be housed at the Centre and training students and staff of the University as well as producing checklists, flora treatments, inventories, vegetation maps, and other publications such as a listing of the plants and animals of Kaieteur Falls National Park in Guyana.

*Herbarium of Cayenne* - ORSTOM. The general herbarium was founded in 1965 by R. A. A. Oldeman to succeed the savanna (grass)

collection established by J. Hoock between 1955 and 1965. From the beginning, the activity of the laboratory focused on the floristic and ecological studies of the forests of French Guiana. Activities in Cayenne include collecting specimens in remote areas of the country, especially inselbergs, and producing treatments for flora projects. In 1988, a checklist of the Flowering Plants and Pteridophytes of French Guiana was published (Cremers et al. 1988). The herbarium of some 60,000 specimens is stored electronically (completed in 1988) in the data bank AUBLET.

*Flora of the Guianas.* An international consortium of nine botanical institutions formed in 1983 to produce a written account of the plants of the Guianas. The Flora project has its editorial center at the University of Utrecht, The Netherlands. Some of the contributors to this checklist are also participating in the Flora of the Guianas project; however, this checklist is not part of the Flora nor is it associated with it in any way.

*Flora of Central French Guiana.* A joint project by the New York Botanical Garden and ORSTOM to produce a flora of 50,000 hectares of rainforest near Saül, French Guiana.

*Iwokrama International Rainforest Programme.* Located in the center of Guyana, the principal aim of the Iwokrama Programme is to demonstrate, through scientific research, methods of sustainable utilization of the forest for timber and other extractive resources while conserving biological diversity.

*Conservation International.* Operates a "Guianas Regional Program" (consisting of Surinam and Guyana) to assist these countries in conservation matters and to conduct ethnobotanical studies.

### **EXPLANATION OF CHECKLIST AND EDITORIAL NOTES**

The checklist includes the vascular plants and bryophytes of Guyana, Surinam and French Guiana. Although the checklist does not cover most algae, the Characeae are included. The lichens and fungi are not included. As this checklist is preliminary, the quality and coverage

of the families varies widely depending on the availability of recent floristic and/or monographic literature and the participation of specialists. However, contributing specialists sometimes have supplied data that could not be verified from the literature. At this point it isn't always clear what is new and/or unpublished information and what is based on literature the editors have not seen.

Family circumscriptions of the flowering plants follow Cronquist (1981), except our recognition of the family Bonnetiaceae on the recommendation of A. Weitzman (personal communication). Pteridophytes follow the classification in the United States National Herbarium (US), as arranged by D. Lellinger. Other groups are as arranged by their respective contributors.

Author abbreviations, when used, follow Stafleu and Cowan (1976-1988). "H.B.K." is cited throughout the checklist as "Kunth".

A few taxon names are included in the list that we have been unable to verify. Some may be new records, most are probably misidentifications or synonyms and still others are names from the literature that the editors cannot verify. The "unverified names" were not contributed by the specialists.

Sources of Information: Several sources were used for the data presented in the checklist: 1) the literature: see references at the end of each family and in the General Reference section; 2) contributions by specialists, either as provided by an individual and therefore listed as "contributed by..." or a list compiled by the editors was reviewed or proofread by a specialist in that group, in which case it is listed as "reviewed by..."; 3) databases: Centre Technique Forestier Tropical - France, Herbarium of Cayenne - ORSTOM, Biological Diversity of the Guianas Program - Smithsonian Institution; and 4) herbarium records, i.e., specimens at: BRG, CAY, US, MO. All abbreviations for herbaria follow Holmgren et al. (1990). Families listed without contributors or reviewers were compiled by the editors.

The bibliographies are not exhaustive. Only recent monographic and floristic literature (generally after 1900) relevant to the covered

geographic area was surveyed (see references following the introduction and with each family). Family references have been added by the editors as an aid to the user of the checklist. Families without corresponding specialists have more extensive literature citations. If a family had a recent treatment (e.g., in the Flora of the Guianas (Görts-van Rijn 1985 - ), Flora of Suriname (Pulle et al. 1932-1984), Botany of the Guayana Highland (Maguire and Collaborators 1953-1989), Flora Neotropica, or family monographs) then little additional work was done for the present list.

In a few cases (Cyperaceae, Myrtaceae, some parts of Orchidaceae), separate lists were provided by more than one specialist. In all such cases, the lists were not 100% in agreement and the list presented is an amalgamation of the two. In the species lists in general, and the synonymies in particular (see below), it should be noted that different systematists will have different opinions on the status of particular names.

Taxa collected on Mt. Roraima have caused a problem because this table-mountain is located on the borders of Guyana, Venezuela and Brazil. Specimens from this area may lack a country designation or it may be incorrect or unknown, especially in historical collections. To prevent confusion, taxa known in the Guianas only from Mt. Roraima have been listed as "Mt. Roraima" rather than Guyana. However, as we continue to explore the Pakaraima Mountains, some taxa previously known only from Mt. Roraima may also be found in Guyana.

*Included and excluded names:* This checklist includes indigenous taxa and naturalized taxa (so noted when possible) as well as taxa from neighboring areas that may be expected in the Guianas. Intraspecific taxa at the level of subspecies and variety are included at the discretion of the contributors. Intraspecific taxa at the level of "forma" are excluded as well as names of varietal status not currently considered to be distinct from the "typical" variety.

We have excluded taxa known only in cultivation in the Guianas. Although some of these may be found as escapees, they are

generally not well-established. DeFilipps (1992) has listed many of the cultivated plants in his recent publication.

*Synonymies and taxa not known in the Guianas:* The synonymy is not meant to be exhaustive. We have included synonyms only if the synonymized name is found in recent literature. Because some of the synonymies are taken from the literature they may not all conform to the taxonomic concepts of the contributing specialist for that family.

In many cases, a species has been reported from the Guianas either because of a broad species circumscription that has since been restricted (or as an infraspecific taxon that has since been raised to species status), or due to misidentifications or other errors. In either case, the name is listed at the end of the family with the notation "not in Guianas".

## ACKNOWLEDGMENTS

Once again, we thank the many specialists who have contributed to this checklist. It would not have been possible without their assistance. Their names are listed at the beginning of the family list with which they assisted as well as in Appendix A. Sally Adkins, Keitha Dattilo, Susan Grose, Marilyn Hansel, Tom Hollowell, Mark Strong, and Fernanda Zermoglio assisted with the proofreading and final preparation of the manuscript. We also thank Robert A. DeFilipps and Jan C. Lindeman for their numerous comments on the entire checklist. We have received comments, corrections, and encouragement from many sources, and regret that we can not name them all. In addition we thank D. B. Lellinger and L. E. Skog for being especially helpful with the overall project

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