

PHYTOGEOGRAPHIC NOTES ON THE SAVANNA FLORA OF SOUTHERN SURINAM (SOUTH AMERICA)

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SUMMARY

The flora of the southern Surinam savannas (not completely known but probably so for the greater part) consists of 314 species collected so far. Ten of these were not found in any other region, 6 belong to the southern Guianan element, 14 to the Guianan element, the rest have a wider distribution. Fourty of the species occur in this region on the northern limit of their area and 18 of these even reach their northernmost station here.

Among the 290 species collected on savannas in central Amazonia 82 species were found also on the savannas of southern Surinam.

Northern Surinam, with a total of 288 recorded savanna species, has 183 species in common with southern Surinam. This floristic contrast can be correlated for about half of the differentiating species with ecological or geographic factors. The geographic spectra of the two regions are greatly similar.

1. INTRODUCTION

In southern Surinam the following savannas, all belonging to the basin of the Courantyne River, are known (see *fig. 1*):

1. The *Sipaliwini Savanna*, which is the Surinam part of a large savanna complex situated on both sides of the frontier between Surinam and Brazil. This frontier is formed here by the watershed between the Sipaliwini River and the West Paru River. The savanna covers an area of about 63.000 ha and consists mainly of undulating savanna land with an altitude between 275 and 375 m above sea-level. The soil is essentially loamy. On the greater part of the savanna the vegetation consists of a more or less continuous ground layer and scattered gnarled treelets. The savanna is bordered by high forest. In older Dutch literature it is called "Paroe (= Paru) Savanna". VAN LYNDEN (1939) gave a general description.
2. The *Palaime Savanna*, situated between the Palaime Creek and the Koewini Creek. It covers about 780 ha and is of the same type as the Sipaliwini Savanna. It is identical with the savanna called "Apikollo Savanna" by DE GOEJE (1908), which name figures also in several other Dutch publications and on the herbarium labels of Mr. Hulk.
3. A savanna which is nearly completely covered by the airstrip "Sipaliwini". It is flat, has a sandy soil, and is surrounded by savanna scrub and savanna wood.
4. A small savanna 1 km S of savanna nr. 3, on the southern bank of the Sipaliwini River. It is of the same type as the Sipaliwini and the Palaime Savannas.

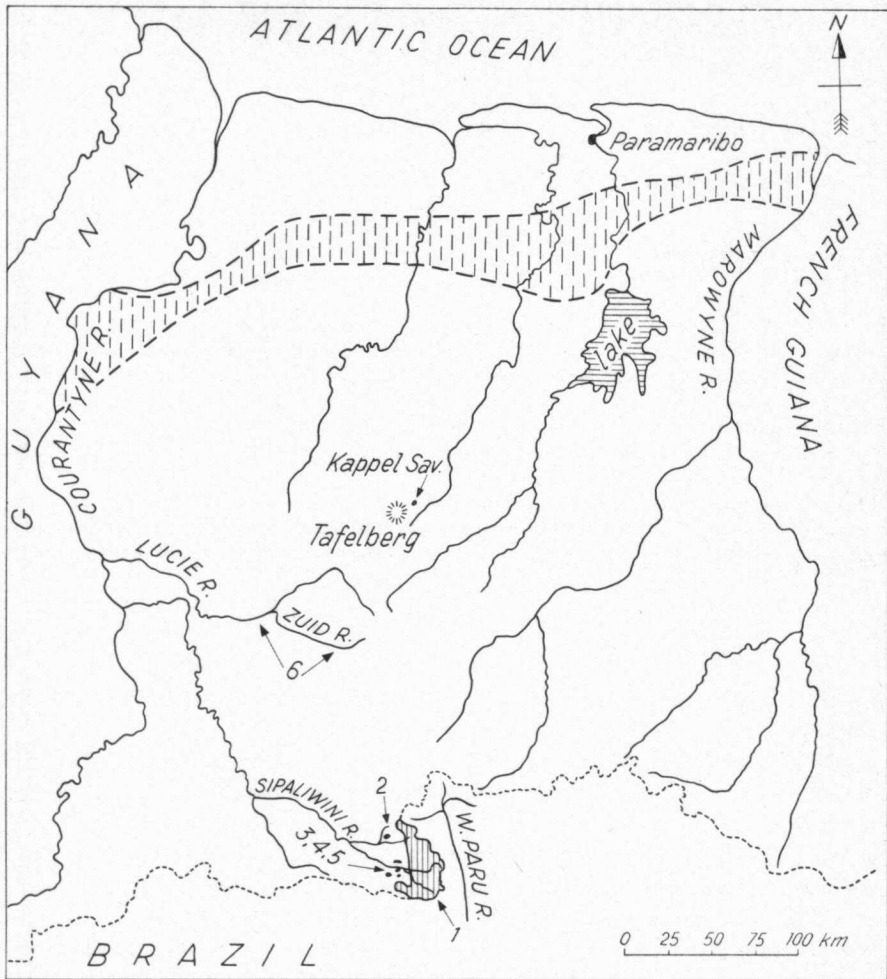


Fig. 1. Map of Surinam. Indicated are: the area in which the northern savannas are situated, the Kappel Savanna, and the southern savannas (see text).

5. Two savannas 2 km SW and S respectively of the savanna nr. 3, and of the same type as the latter. The western of the two covers about 250 ha.
6. The *Kayser Savanna* (with an airstrip) and an unknown number of other, mainly small savannas in the area of the Lucie River and the Zuid River. They have various soil types.

On these savannas plants were collected by Messrs. J. F. Hulk (1911, on 2), H. E. Rombouts (1934–1935, on 1), D. C. Geijskes (1952, on 2), K. U. Kramer and W. H. A. Hekking (1961, on 6), J. G. Wessels Boer (1963, on 2 and 3), members of the New York Botanical Garden expedition to the Wilhelmina

Mountains (1963, on 6), and the author (1966, on 1 and the western one of 5). In a forthcoming paper more details on the ecological conditions and brief descriptions of some savanna vegetation-types in the Upper Sipaliwini area will be published (VAN DONSELAAR 1969).

A complete set of all these collections, of which the one by Rombouts is by far the most extensive, is placed in the herbarium of the Institute for Systematic Botany at Utrecht. The list of species included in the present study is based on these specimens. A large part of them is cited already in the "Flora of Suriname" (PULLE, LANJOUW & coll. 1928-).

The scope of the investigation is restricted to the vascular plants that in southern Surinam occur on the savanna proper, i.e. all those sites with a vegetation consisting of only a ground layer, or a ground layer with either scattered trees or more close-set (gnarled) trees, generally known under the Brazilian names of "campo limpo", "campo sujo", and "campo cerrado" (= orchard savanna), respectively. The habitat has to be dry at least for a part of the year. This means that all species are excluded that occur on the savannas only in the forest islands, in savanna scrub and separate bushes, in gallery forest, in permanently water-holding watercourses and depressions, on rocky outcrops and big rocks lying on the surface.

The selection thus defined consists of 314 registered species, subspecies and variants. It certainly does not cover the whole of the genuine savanna flora of the area under consideration, but probably the great majority of it.

The distribution of the species was established as far as possible. It should be born in mind that details of the outcome may be wrong, because several taxa are insufficiently known, incorrect data may have been published due to misidentifications, and because the taxonomic inventory of large parts of tropical America is very incomplete. However, the main lines of the results may be accepted.

2. GEOGRAPHIC ELEMENTS AND GEOGRAPHIC SPECTRUM

The majority of the species have a wide distribution. Some categories with a more restricted range may be mentioned separately.

Ten species have been recorded so far only from the Sipaliwini Savanna. It is likely that they are present also on the Brazilian side of the frontier, but the possibility should not be excluded that they are *endemics* (*E*) of the Paru-Sipaliwini savanna complex. These species are:

- | | |
|---------|---|
| Acanth. | <i>Staurogyne linearifolia</i> Brem. |
| Cyp. | <i>Cyperus pseudodistans</i> Uitt. |
| Euph. | <i>Croton sipaliwinensis</i> Lanj. |
| Gram. | <i>Axonopus pubivaginatius</i> Henr.
<i>Paspalum albidulum</i> Henr. |
| Myrt | <i>Psidium quinqueidentatum</i> Amsh. |
| Rub. | <i>Diodia pulchrestipula</i> Brem.
<i>Sabicea romboutsii</i> Brem.
<i>Sipanea glaberrima</i> (Brem). Steyerm.
<i>Tocoyena surinamensis</i> Brem. |

Six species are known from southern Surinam and from some other savanna(s) in the south of the Guianas or the extreme north of the Amazon region (i.c. the Rio Branco Savannas). This *southern Guianan element* (*sG*) comprises:

Cyp.	<i>Bulbostylis stenocarpa</i> Kük.
Dros.	<i>Drosera esmeraldae</i> (Steyerm.) Maguire et Wurdack
Euph.	<i>Manihot melanobasis</i> Lanj.
Gram.	<i>Aristida recurvata</i> H.B.K.
Lent.	<i>Utricularia lloydii</i> Merl.
Malv.	<i>Pavonia julianae</i> Uitt.

Another group consists of species with areas that cover southern as well as northern parts of the Guianas. The name "the Guianas" is used here for the whole of the area between the mouth of the Orinoco River and the Amazon River, comprising Venezuelan Guiana, Guyana (the former British Guiana), Surinam, French Guiana, and Amapa (= Brazilian Guiana). The *Guianan element* (*G*) is made up of:

Brom.	<i>Bromelia fosteriana</i> L.B. Smith
Conv.	<i>Ipomoea schomburgkii</i> Choisy
Cyp.	<i>Bulbostylis fasciculata</i> Uitt. <i>Bulbostylis lanata</i> (H.B.K.) Clarke <i>Scleria pterota</i> Presl var. <i>melaleuca</i> (C. et S.) Uitt.
Dros.	<i>Drosera cayennensis</i> Sagot
Euph.	<i>Caperonia corchorioides</i> Müll. Arg.
Gram.	<i>Schizachyrium riedelii</i> (Trin.) Camus var. <i>multirameum</i> Henr.
Melast.	<i>Aciotis ornata</i> Gleason <i>Comolia lythrioides</i> Naud. var. <i>lythrioides</i> <i>Comolia veronicaefolia</i> Benth.
Papil.	<i>Cassia tetraphylla</i> Desv. var. <i>brevipes</i> (Benth.) Irwin
Polygal.	<i>Polygala angustifolia</i> H.B.K. var. <i>latifolia</i> St. Hil. ex Chodat
Syml.	<i>Symplocos guianensis</i> (Aubl.) var. <i>guianensis</i>

Among the rest of the species the following elements may be distinguished (see also VAN DONSELAAR 1965):

- N* *Northern South-American element*: covering (part of) the Guianas, in combination with several of the following areas: the rest of Venezuela, Trinidad, Tobago, Columbia, Equador, Amazonian Peru, Amazonian Brazil (Amazonas, Pará).
- NE* *Northern-eastern South-American element*: covering any of the areas of *N* in combination with one or several of the E Brazilian states as Maranhão, Goiás, Minas Gerais, and São Paulo.
- MN* *Middle and northern South-American element*: covering any of the areas of *N* in combination with parts of Central America and/or the rest of the West Indian Islands.
- MNE* *Middle and northern-eastern South-American element*: a combination of *NE* and *MN*.

S South-American element: Covering any combination of South-American areas other than those indicated by the foregoing symbols.

A American element: Covering any combination of areas other than those indicated by the foregoing symbols.

The geographic spectrum of the species, subspecies and varieties sufficiently known to be included in one of these elements (283) is as follows:

<i>E</i>	10 = 4%	<i>MN</i>	9 = 3%
<i>sG</i>	6 = 2%	<i>MNE</i>	26 = 9%
<i>G</i>	14 = 5%	<i>S</i>	42 = 15%
<i>N</i>	22 = 8%	<i>A</i>	118 = 41%
<i>NE</i>	36 = 13%		

3. SPECIES AT THE NORTHERN MARGIN OF THEIR AREA

A number of the species belonging to the elements *N*, *NE* and *S* reach the northern margin of their area on one of the southern Surinam savannas. Some of them are also found in one or another more northern part of the Guianas or adjacent northern South America, but this does not disturb the general picture of the distributional area of these species. For another number, however, southern Surinam is the northernmost part of their area so far known. In the following list the species of the last-named category are indicated by x.

Alism.	<i>Echinodorus longipetalus</i> Micheli	
	<i>Echinodorus tenellus</i> (Mart.) Buche var. <i>tenellus</i>	
Apoc.	<i>Mandevilla tenuifolia</i> (Mik.) Woods.	x
Asclep.	<i>Barjonia racemosa</i> Dcne.	
Bign.	<i>Tabebuia caraiba</i> (Mart.) Bur.	x
Comp.	<i>Clibadium armani</i> (Balbis) Schultz-Bip.	x
	<i>Riencourtia oblongifolia</i> Gardn.	x
Conv.	<i>Ipomoea squamosa</i> Choisy	x
	<i>Merremia aturensis</i> (H.B.K.) Hall. f.	
Cyp.	<i>Lipocarpha sellowiana</i> Kunth	
	<i>Rhynchospora junciformis</i> (Kunth) Boeck.	x
Dros.	<i>Drosera sessiliflora</i> St. Hil.	
Erioc.	<i>Eriocaulon humboldtii</i> Kunth	
	<i>Syngonanthus anomalus</i> (Koern.) Rühl.	
	<i>Syngonanthus caulescens</i> (Poir.) Rühl.	
	<i>Syngonanthus glandulosus</i> Gleason	
Euph.	<i>Sebastiana linearifolia</i> Lanj.	x
Gent.	<i>Schultesia pohliana</i> Progel	x
Gram.	<i>Axonopus gentilis</i> Henr.	x
	<i>Ctenium cirrosum</i> (Nees) Kunth	x
	<i>Paspalum maculosum</i> Trin.	x
Irid.	<i>Sisyrinchium marchio</i> (Vell.) Steud.	
Lab.	<i>Hyptis hirsuta</i> H.B.K.	
Lycop.	<i>Lycopodium alopecuroides</i> L. var. <i>integerrimum</i> Spring.	
Lythr.	<i>Cuphea gracilis</i> H.B.K.	
Malp.	<i>Camarea affinis</i> St. Hil.	
Mar.	<i>Maranta orbiculata</i> (Koern.) K. Schum.	x
Melast.	<i>Miconia macrothyrsa</i> Benth.	
Menisp.	<i>Cissampelos ovalifolia</i> DC.	

Myrt.	<i>Psidium salutare</i> (H.B.K.) Berg	
Papil.	<i>Bowdichia virgilioides</i> H.B.K.	
	<i>Eriosema rufum</i> (H.B.K.) G. Don	
Polygal.	<i>Polygala subtilis</i> H.B.K.	
Rub.	<i>Guettarda spruceana</i> Müll. Arg.	x
	<i>Palicourea rigida</i> H.B.K.	
Schiz.	<i>Anemia ferruginea</i> H.B.K. var. <i>ahenobarba</i> (Christ) Mickel	
Til.	<i>Corchorus hirtus</i> L.	
	<i>Luehea paniculata</i> Mart. et Zucc.	x
Vit.	<i>Cissus subrhomboidea</i> (Baker) Planch.	
Voch.	<i>Salvertia convallariodora</i> St. Hil.	x
Xyr.	<i>Xyris savannensis</i> Miq. var. <i>glabrata</i> Seub.	

4. COMPARISON WITH THE SAVANNA FLORA OF CENTRAL AMAZONIA AND, IN PARTICULAR, OF NORTHERN SURINAM

To get a more complete idea about the relationships of the savanna flora of southern Surinam a comparison is made with the savanna flora of some other and better explored regions, viz. central Amazonia and northern Surinam.

From two savanna complexes in the centre of Amazonian Brazil a list of species, though not complete, was published. DE ANDRADE LIMA (1959) summed up all his records and those of others from the savannas near Monte Alegre and Vigiá. A similar list was presented by EGLER (1960) from the savannas in the area of the Ariramba River, a little to the west of the complex near Monte Alegre. Together the two lists comprise about 290 species belonging to the category of plants under consideration. From this number 82 species were also found on the savannas of southern Surinam. The two regions are separated from one another by a stretch of about 300 km of forested land.

The savanna flora of northern Surinam is fairly well known from many collections and taxonomic studies (see PULLE, LANJOUW & coll. 1928-) and a nearly complete list of it was published recently (VAN DONSELAAR 1965). If some corrections and additions are taken into account it appears that the savanna flora of northern Surinam consists of about 288 species of which 183 were found on the savannas of southern Surinam so far. The distance from the northern Surinam savannas to the Paru-Sipaliwini complex and the Kayser Savanna is about 300 and 220 km respectively. Between the savannas of northern and southern Surinam there are some small savannas situated closely together, viz. on the flat top of Tafelberg (1080 m) and the Kappel Savanna at the foot of this mountain. The relationships of the flora of the latter savanna will be dealt with in future by KRAMER & VAN DONSELAAR (in the press).

The above data show that the savanna flora of southern Surinam is likely to be more closely related to the savanna flora of northern Surinam than to the one of central Amazonia. An attempt to compare and interpret the floras of more Guianan and Amazonian savanna regions has to be delayed till more data are available.

The following may be said about the 105 species found on northern but not on southern Surinam savannas.

a. Twenty-four of the 46 species that in northern Surinam are (nearly) res-

stricted to white-sand savannas have not been found so far on southern Surinam savannas, although their areas extend to the south of the latter region. It seems likely that the unequal distribution of the species under consideration is influenced by ecological (i.c. edaphic) factors, since the occurrence of white sand is restricted in southern Surinam to some small savannas in the Lucie River area.

b. Six northern Surinam savanna species occurring on several soils other than white sand have a northern Guianan distribution, and do not occur in southern Surinam.

c. Seven other species combine both aspects mentioned above: they are restricted to northern Guiana and there they occur only on white-sand savannas.

d. There are ten species that in northern Surinam occur (mainly) on savannas but in southern Surinam are found only on rock flats, even if these are surrounded by savanna, as on the Sipaliwini Savanna.

A similar situation is found in twelve species that in northern Surinam are present both on and outside savannas but in southern Surinam are found only outside savannas. Two of them belong also to the category mentioned under (a).

e. If one takes together all species from the groups mentioned above there remain 48 species that belong to the savanna flora of northern Surinam and have a distribution reaching in a southern direction beyond the southern boundary of the Amazon region, but have not been found so far in southern Surinam, either on or outside savannas.

The 131 species present on the southern Surinam but absent from the northern Surinam savannas may be treated in the same way.

a. A habitat encountered on the savannas of southern but not of northern Surinam is characterized by a very wet soil of coloured sand. Some of the species confined to these sites have a distribution comprising at least Guiana, so that their absence from the northern Surinam savannas may be explained only by ecological factors. The four species involved are:

- | | |
|---------|---|
| Cyp. | <i>Cyperus unioloides</i> R. Br. |
| | <i>Rhynchospora armerioides</i> Presl |
| Melast. | <i>Acisanthera limnobios</i> (DC.) Triana |
| Ochn. | <i>Sauvagesia tenella</i> Lam. |

b. The species having a presently known area which does not include northern Surinam are listed in section 2 (endemics and southern Guianan element) and section 3, altogether 56 species.

c. From the latter category three species are found only on the type of soil mentioned under (a), viz.:

- | | |
|-------|---|
| Cyp. | <i>Rhynchospora junciformis</i> (Kunth) Boeck. |
| Dros. | <i>Drosera esmeraldae</i> (Steyerm.) Maguire et Wurdack |
| | <i>Drosera sessiliflora</i> St. Hil. |

d. There are species from the southern Surinam savannas that in northern Surinam are found only outside savannas. In the latter region the majority

of them occurs in wet, open localities. The whole group, containing 26 species, can be extracted from the annotated list of species in section 6 (group b).

e. The rest of the southern Surinam savanna flora that does not occur on northern Surinam savannas consists of 46 species. These may also be extracted from section 6. From six of the species (*Lentibulariaceae* and *Orchidaceae*) it is not certain whether they really belong to this group.

In the following survey the geographic spectra of the northern and southern Surinam savannas are compared:

	northern Surinam	southern Surinam
<i>E</i>	0%	4%
<i>nG</i>	2	-
<i>sG</i>	-	2
<i>G</i>	8	5
<i>N</i>	10	8
<i>NE</i>	14	13
<i>MN</i>	2	3
<i>MNE</i>	11	9
<i>S</i>	9	15
<i>A</i>	44	41

It is clear that there is hardly any shifting. The main difference lies in the occurrence of a northern and a southern Guianan element in the two areas respectively. One might expect that the northern savanna flora should contain more species with an area extending to the north beyond South America. This group of species (the sum of the elements MN, MNE, and A) makes up 57% of the northern Surinam savanna flora and 54% of the southern Surinam savanna flora. This difference is not significant and may be neglected.

5. CONCLUSIONS

The savanna flora of southern Surinam so far known has a stronger bound with the one of northern Surinam than with the one of central Amazonia, which perhaps means that it is in general more Guianan than Amazonian.

The floristic contrast between the savanna floras of southern and northern Surinam can only partly be connected with geographic or ecological circumstances. For about half of the species that were found only in one of the two areas, the absence in the other area cannot be correlated so far with any factor. It is likely that the difference can be attributed to the limited area of the species in 56 cases on the side of southern Surinam and in only 6 cases on the side of northern Surinam. In general the distribution of all species involved levels down the differences between the two areas so far that their geographic spectra greatly cover each other.

6. ANNOTATED LIST OF SPECIES

- Capitals geographic elements (see section 2)
a also found in northern Surinam, on savannas
b also found in northern Surinam, not on savannas
c also found on savannas in central Amazonia
(P) in southern Surinam only found on the Palaime Savanna
(L) in southern Surinam only found on savannas in the area of the Lucie and the Zuid River
(S) in southern Surinam only found on the sand savanna 2 km SW of the airstrip "Sipaliwini"

ACANTHACEAE: *Dipteracanthus angustifolius* (Nees) Brem. *Na*; *Staurogyne linearifolia* Brem. *E*.

ALISMACEAE: *Echinodorus latifolius* (Seub.) Rataj *A*; *E. longipetalus* Micheli *S*.

AMARYLLIDACEAE: *Curculigo scorzoneraefolia* (Lam.) Baker *Aa*.

APOCYNACEAE: *Mandevilla scabra* (R. et S.) K. Schum. *NEa* var. *pubiflora* Müll. Arg.; *M. tenuifolia* (Mik.) Woods. *NE*; *Odontadenia nitida* (Vahl) Müll. Arg. *Sa*.

ARACEAE: *Montrichardia arborescens* (L.) Schott *Aa*.

ASCLEPIADACEAE: *Barjonia racemosa* Dcne. *NE*.

BIGNONIACEAE: *Tabebuia caraiba* (Mart.) Bur. *Sc*.

BROMELIACEAE: *Bromelia fosteriana* L. B. Smith *Gb(P)*.

BURMANNIACEAE: *Burmannia bicolor* Mart. *MNEac*; *B. capitata* (J. F. Gmel.) Mart. *Aac*; *B. flava* Mart. *Aa*.

CAMPANULACEAE: *Lobelia aquatica* Cham. *MNEb*.

COMMELINACEAE: *Commelina erecta* L. emend. Clarke *MNEa*.

COMPOSITAE: *Baccharis varians* Gardn. *Sa*; *Chaptalia nutans* (L.) Polakowsky *A*; *Clibadium armani* (Balbis) Schultz-Bip. *S*; *Conyza chilensis* Spreng. *Aa*; *Elephantopus angustifolius* Sw. *Aac*; *Eleutheranthera ruderalis* (Sw.) Schultz-Bip. *Ab*; *Erechthites hieracifolia* (L.) Raf. ex DC. var. *cacalioides* (Fisch. ex Spreng.) Griseb. emend. Belcher *Ab*; *Eupatorium amygdalinum* Lam. *Aa*; *E. laevigatum* Lam. *Aa*; *Ichthyothere terminalis* (Spreng.) Malme *NEac*; *Riencourtia oblongifolia* Gardn. *NE*; *Vernonia remotiflora* L. C. Rich. *Aac*.

CONVOLVULACEAE: *Aniseia cernua* Moricand *NEa(P)*; *Evolvulus sericeus* Sw. *A*; *Ipomoea schomburgkii* Choisy *G*; *I. squamosa* Choisy *NE*; *Merremia aturensis* (H.B.K.) Hall. f. *NE*.

CUCURBITACEAE: *Melothria fluminensis* Gardn. *Ab*.

CYPERACEAE: *Bulbostylis capillaris* (L.) Kunth var. *capillaris* *Aa*; *B. fasciculata* Uitt. *Ga*; *B. junciformis* (H.B.K.) Kunth *Aac*; *B. lanata* (H.B.K.) Clarke *Ga*; *B. spadicea* (H.B.K.) Kük. *MNEac*; *B. stenocarpa* Kük. *sG*; *B. vestita* Kunth *Aa*; *Cyperus flavus* (Vahl) Nees *Aa*; *C. haspan* L. ssp. *juncoides* (Lam.) Kük. var. *juncoides* *Aac*; *C. pseudodistans* Uitt. *E*; *C. unioides* R. Br. *A*; *Dichromena ciliata* Vahl *Aa*; *Eleocharis retroflexa* (Poir.) Urb. *Ab*; *Fuirena umbellata* Rottb. *Aa*; *Lagenocarpus amazonicus* (Clarke) Pfeiff. *Na(L)*; *L. tremulus* Nees *MNEac(P)*; *Lipocarpa humboldtiana* Nees; *L. sellowiana* Kunth *S*; *Rhynchospora armerioides* Presl *A*; *R. barbata* (Vahl) Kunth var. *barbata* *MNEac*; *R. cephalotes* (L.) Vahl *Aac*; *R. curvula* Griseb. *Aac(S)*; *R. glauca* Vahl *Aa*; *R. globosa* (H.B.K.) R. et S. *Aac*; *R. graminea* Uitt. *Naac*; *R. junciformis* (Kunth) Boeck. *N(S)*; *R. podosperma* C. Wright *MNEa(S)*; *R. rufa* (Nees) Boeck. *Na*; *R. tenerima* Nees ex Spreng. *b(L)*; *R. viridi-lutea* Clarke *Nb*; *Scleria bracteata* Cav. *Aa*; *S. cyperina* Willd. *Sac*; *S. hirtella* Sw. *Aa*; *S. microcarpa* Nees *Aa*; *S. micrococca* (Liebm.) Steud. *Aa*; *S. pterota* Presl var. *pterota* *Ab*; var. *melaleuca* (C. et S.) Uitt. *Gb*; *S. setacea* Poir. *Aa*.

DILLENACEAE: *Curatella americana* L. *Aac*.

DROSERACEAE: *Drosera capillaris* Poir. *Aa*; *D. cayennensis* Sagot *Ga(P)*; *D. esmeraldae* (Steyerm.) Maguire et Wurdack *sG(S)*; *D. sessiliflora* St. Hil. *NE(S)*.

- ERIOCAULACEAE: *Eriocaulon humboldtii* Kunth *S*; *Syngonanthus anomalus* (Koern.) Ruhl. *N (L)*; *S. biformis* (N. E. Brown) Gleason *c (L)*; *S. caulescens* (Poir.) Ruhl. *S c*; *S. glandulosus* Gleason *S*; *S. gracilis* (Bong.) Ruhl. *a c*; *S. umbellatus* (Poir.) Ruhl. *NE a c (S)*.
- EUPHORBIACEAE: *Caperonia corchorioides* Müll. Arg. *G b*; *C. palustris* (L.) St. Hil. *A b*; *Croton glandulosus* L. *a*; *C. sipaliwinensis* Lanj. *E*; *Euphorbia brasiliensis* Lam. *A a*; *Manihot melanobasis* Müll. Arg. *sG*; *Phyllanthus stipulatus* (Raf.) Webster *a*; *Sebastiania linearifolia* Lanj. *N c*, fo. *linearifolia*, fo. *pilosa* Lanj.
- FLACOURTIACEAE: *Casearia silvestris* Sw. var. *lingua* (Camb.) Eichl. *S a*.
- GENTIANACEAE: *Coutoubea ramosa* Aubl. fo. *ramosa* *N a*, fo. *racemosa* Benth. *NE a (P)*; *C. spicata* Aubl. *A a*; *Curtia tenuifolia* (Aubl.) Knobl. *A a*; *Lisianthus coerulescens* Aubl. *NE a*; *L. grandiflorus* Aubl. (*P*); *L. uliginosus* Griseb. var. *guianensis* Griseb. *N a*; *Schultesia brachyptera* Cham. *NE a*; *S. pohliana* Progel *S*.
- GESNERIACEAE: *Reichsteineria incarnata* (Aubl.) Lwbg. *N*.
- GRAMINEAE: *Acroceras zizanoides* (H.B.K.) Dandy *S a*; *Andropogon bicornis* L. *A a*; *A. leucostachyus* H.B.K. *A a*; *A. selloanus* (Hack.) Hack. *A a (L)*; *Aristida recurvata* H.B.K. *sG*; *A. tinctoria* Trin. et Rupr. *NE a c*; *Arundinella hispida* (Willd.) O.K. *NE a (P)*; *Axonopus chrysites* (Steud.) Kuhlm. *NE a*; *A. gentilis* Henr. *N c*; *A. pubivaginatus* Henr. *E*; *A. pulcher* (Nees) Kuhlm. *A a*; *A. purpusii* (Mez) Chase *A a*; *Coelorachis aurita* (Steud.) Henr. *A*; *Ctenium cirrosum* (Nees) Kunth *NE*; *Echinolaena inflexa* (Poir.) Chase *NE a c*; *Elyonurus adustus* (Trin.) Ekman *S a*; *Erianthus trinii* Hack. *A*; *Eriochrysis cayennensis* P. Beauv. *A a*; *Hackelochloa granularis* (L.) O. Ktze. *A a*; *Homolepsis isocalycina* (Meyer) Chase *MN*; *Hypogynium virgatum* (Desv.) Dandy *A a*; *Imperata brasiliensis* Trin. *A a*; *I. contracta* (H.B.K.) Hitchc. *b (P)*; *Ischaemum guianense* Kunth *N a*; *Leptocoryphium lanatum* (H.B.K.) Nees *A a c*; *Mesosetum cayennense* Steud. *S a*; *M. loliforme* (Hochst.) Chase *MNE a c (L)*; *M. tenuifolium* Swallen *NE a*; *Panicum cyanescens* Nees *A a*; *P. laxum* Sw. *A a (P)*; *P. nervosum* Lam. *A a c*; *P. olyroides* H.B.K. *a*; *P. parvifolium* Lam. *A a c*; *P. rudgei* R. et S. *A a c*; *P. siccaneum* Trin. (*S*); *P. stenoides* Hubbard *MN a*; *Paspalum albidulum* Henr. *E*; *P. contractum* Pilger *MN a*; *P. gardnerianum* Nees *NE a c*; *P. maculosum* Trin. *NE*; *P. pectinatum* Nees *MNE a*; *P. plicatulum* Michx. *A a*; *P. polychaetum* Mez *NE a (L)*; *P. pulchellum* Kunth *MN a*; *P. serpentinum* Hochst. et Steud. (*L*); *Raddiella nana* (Doell.) Swallen *NE a c*; *Sacciolepis myuros* (Lam.) Nees *A a*; *Schizachyrium brevifolium* (Sw.) Nees *MNE a*; *S. riedelii* (Trin.) A. Camus var. *riedelii* *NE a*, var. *multirameum* Henr. *G a*; *Setaria geniculata* (Lam.) Beauv. *A a c*; *Sorghastrum stipoides* (H.B.K.) Nash *A*; *Sporobolus cubensis* Hitchc. *A a*; *Trachypogon plumosus* (H. et B.) Nees *A a*; *Thrasya petrosa* (Trin.) Chase *MNE a*; *Tripsacum dactyloides* (L.) L. *A*.
- HUMIRIACEAE: *Humiria balsamifera* (Aubl.) St. Hil. *N a c*.
- IRIDACEAE: *Sisyrinchium marchio* (Vell.) Steud. *S*.
- LABIATAE: *Hyptis atrorubens* Poit. *MNE a*; *H. hirsuta* H.B.K. *S*; *H. lantanaefolia* Poit. var. *lantanaefolia* *A a c*; *H. microphylla* Pohl *S a/b*.
- Lauraceae: *Cassytha filiformis* L. *MNE a c*.
- LENTIBULARIACEAE: *Utricularia adpressa* St. Hil.; *U. amethystina* St. Hil. *a*; *U. fimbriata* Kunth *a*; *U. lloydii* Merl. *sG*; *U. pusilla* Vahl; *U. subulata* L. *a c*; *U. triloba* Benj.
- LYCOPODIACEAE: *Lycopodium alopecuroides* L. var. *integerrimum* Spring. *S*; *L. cernuum* L. *A a*.
- LYTHRACEAE: *Cuphea gracilis* H.B.K. *NE*.
- MALPIGHIACEAE: *Byrsonima coccolobaefolia* Kunth *A a*; *B. crassifolia* (L.) L. C. Rich. *A a c*; *B. verbascifolia* (L.) L. C. Rich. var. *villosa* Griseb. fo. *spatulata* Ndz. *MNE a*; *Camarea affinis* St. Hil. *S*; *Tetrapteris squarrosa* (Griseb.) Griseb. *N a (L)*.
- MALVACEAE: *Hibiscus furcellatus* Desr. *a*; *Pavonia julianae* Uitt. *sG*; *P. sessiliflora* H.B.K. *MNE*; *P. speciosa* H.B.K. var. *hostmannii* Gürke *MNE a*; *Sida linifolia* Cav. *A a c*.
- MARANTACEAE: *Maranta orbiculata* (Koern.) K. Schum. *S c*; *Myrosma cannifolia* L. f. *S a*.
- MELASTOMACEAE: *Aciotis ornata* Gleason *G b*; *A. purpurascens* Triana *MN b*; *Acisanthera crassipes* (Naud.) Wurdack *MN (L)*; *A. limnobios* (DC.) Triana *A*; *A. recurva* (L. C. Rich.) Griseb. *A a*; *Clidemia capitellata* (Bonpl.) D. Don var. *dependens* (D. Don) Macbr. *A b*;

PHYTOGEOGRAPHIC NOTES ON THE SAVANNA FLORA OF SOUTHERN SURINAM

- C. hirta* (L.) D. Don var. *elegans* (Aubl.) Griseb. *a*; *C. rubra* (Aubl.) Mart. *A a c*; *Comolia lythrioides* Naud. var. *lythrioides* *G a*; *C. veronicaefolia* Benth. *G a*; *Desmocelis villosa* (Aubl.) Naud. *S a*; *Miconia alata* (Aubl.) DC. *S a c*; *M. ibaguensis* (Bonpl.) Triana *A b*; *M. macrothyrsa* Benth. *S*; *M. racemosa* (Aubl.) DC. *A a*; *M. rubiginosa* (Bonpl.) DC. *A a c*; *M. rufescens* (Aubl.) DC. *S a*; *M. stenostachya* DC. *A b*; *Rhynchanthera grandiflora* (Aubl.) DC. *S a*; *Tibouchina aspera* Aubl. *NE a*.
- MENISPERMACEAE: *Cissampelos ovalifolia* DC. *S c*.
- MIMOSACEAE: *Calliandra surinamensis* Benth. *NE b*; *C. tenuiflora* Benth. *c*; *Mimosa invisiva* Mart. *MN a*.
- MUSACEAE: *Heliconia psittacorum* L. f. *A a*.
- MYRTACEAE: *Eugenia puniceifolia* (H.B.K.) DC. *N a c*; *Psidium quinqueidentatum* Amsh. *E*; *P. salutare* (H.B.K.) Berg *N*.
- OCHNACEAE: *Sauvagesia erecta* L. *A a*; *S. rubiginosa* St. Hil. *N a c*; *S. sprengelii* St. Hil. *NE a c*; *S. tenella* Lam. *N c*.
- ONAGRACEAE: *Jussiaea nervosa* Poir. *A a*; *J. rigida* Miq. *NE a*.
- ORCHIDACEAE: *Cleistes rosea* Lindl. *a*; *Cytropodium cristatum* Lindl. *a*; *C. parviflorum* Lindl. *a* or *b*; *Galeandra juncea* Lindl. *a*; *Habenaria amazonica* Schltr.; *H. trifida* H.B.K.; *Otostylis brachystalix* (Reichb. f.) Schltr. (*S*).
- OXALIDACEAE: *Oxalis barrelieri* L. *b*.
- PALMAE: *Mauritia flexuosa* L. f. *S a c*.
- PAPILIONACEAE: *Aeschynomene hystrix* Poir. *MNE a c*; *A. paniculata* Willd. ex Vog. *A a c*; *Bowdichia virgilioides* H.B.K. *NE c*; *Calopogonium mucunoides* Desv. *A a*; *Cassia hispidula* Vahl *MNE a c*; *C. patellaria* DC. *A a*; *C. penelliana* Amsh. *MN*; *C. ramosa* Vog. var. ?; *C. tetraphylla* Desv. var. *brevipes* (Benth.) Irwin *G a*; *Centrosema brasilianum* (L.) Benth. *S a c*; *Clitoria guianensis* (Aubl.) Benth. *A a c*; *C. laurifolia* Poir. *A c*; *C. rubiginosa* Juss. *c (L)*; *Crotalaria anagyroides* H.B.K. *A b*; *C. maypurensis* H.B.K. *MNE c*; *C. pterocaula* Desv. *A a*; *Desmodium axillare* (Sw.) DC. var. *acutifolia* Kuntze *A*; *D. barbatum* (L.) Benth. *A a c*; *D. cajanifolium* (H.B.K.) DC. *A*; *Dioclea guianensis* Benth. *A a*; *Eriosema crinitum* (H.B.K.) G. Don *A a c*; *E. rufum* (H.B.K.) G. Don *S c*; *E. simplicifolium* (H.B.K.) G. Don *A a c*; *E. violaceum* (Aubl.) G. Don *A a*; *Phaseolus linearis* H.B.K. *MNE A c*; *P. longepedunculatus* H.B.K. *A a c*; *P. peduncularis* H.B.K. var. *clitorioides* (Benth.) Hassl. *S a*; *P. trichocarpus* Wright *MNE a*; *Stylosanthes guianensis* (Aubl.) Sw. var. *guianensis* *A a c*, var. *gracilis* (H.B.K.) Vog. *A a*; *Tephrosia purpurea* (L.) Pers. *A a*; *T. sessiliflora* (Poir.) Hasse *MNE a*.
- PIPERACEAE: *Piper amplexens* (Miq.) DC. (*P*).
- POLYGALACEAE: *Polygala adenophora* DC. *MNE a c*; *P. angustifolia* H.B.K. var. *latifolia* St. Hil. ex Chodat *G a*; *P. hygrophila* H.B.K. *A a*; *P. mollis* H.B.K. fo. *mollis* *N c*; *P. paludosa* St. Hil. *a c*; *P. subtilis* H.B.K. *S c*; *P. timoutou* Aubl. *NE a c*.
- POLYPODIACEAE: *Adiantum serrato-dentatum* Willd. *S a*; *Blechnum indicum* Burm. f. *A a*; *Pteridium aquilinum* (L.) Kuhn ssp. *caudatum* (L.) Bonap. var. *arachnoideum* (Kaulf.) Herter *A a*; *Thelypteris hostmannii* (Kl.) Morton *b*.
- PROTEACEAE: *Roupala montana* Aubl. *A a c*.
- RUBIACEAE: *Borreria capitata* (R. et P.) DC. *S a*; *B. verticillata* (L.) G. F. W. Meyer *MNE a*; *Coccocypsalum guianense* (Aubl.) K. Schum. *MNE a*; *Declieuxia fruticosa* (Willd. ex R. et S.) Kuntze *MN a*; *Diodia pulchripula* Brem. *E*; *D. sarmentosa* Sw. *b*; *Guettarda spruceana* Müll. Arg. *S c*; *Mitracarpus discolor* Miq. *NE a c*; *Palicourea rigida* H.B.K. *S c*; *Perama hirsuta* Aubl. var. *hirsuta* *NE a c*; *Sabicea romboutsii* Brem. *E*; *Sipanea pratensis* Aubl. *A a c*; *S. glaberrima* (Brem.) Steyerem. *E*; *Tocoyena surinamensis* Brem. *E*.
- SCHIZAEACEAE: *Anemia oblongifolia* (Cav.) Sw.; *A. pallida* Gard.; *A. ferruginea* H.B.K. var. *ahenobarba* (Christ) Mickel *NE*; *Lygodium venustum* Sw. *b*; *L. volubile* Sw. *a*.
- SCROPHULARIACEAE: *Buchnera palustris* (Aubl.) Spreng. *S a c*; *B. rosea* H.B.K. *NE a c*; *Gerardia hispidula* Mart. *MNE a*; *Melasma melampyroides* (L. C. Rich.) Pennell *A b*.
- SELAGINELLACEAE: *Selaginella densifolia* Spruce.
- STERCULIACEAE: *Buettneria scabra* Loefl. *A a*; *Helicteres pentandra* L. *S b*; *Melochia villosa* (Mill.) Fawc. et Rendle *A a*; *Waltheria americana* L. *A a*.

- SYMPLOCACEAE: *Symplocos guianensis* (Aubl.) Gürke var. *guianensis* G a.
 TILIACEAE: *Corchorus hirtus* L. S; *Luehea paniculata* Mart. et Zucc. S.
 TURNERACEAE: *Turnera ulmifolia* L. var. *surinamensis* (Miq.) Urb. NE a c.
 VERBENACEAE: *Amasonia campestris* (Aubl.) Moldenke NE a c.
 VITACEAE: *Cissus erosa* L. C. Rich. A b; *C. subrhomboidea* (Baker) Planch. NE.
 VOCHYSIACEAE: *Salvertia convallariodora* St. Hil. S c.
 XYRIDACEAE: *Abolboda pulchella* H. et B. NE a c; *Xyris fallax* Malme a; *X. malmeana* L. B. Smith N a c; *X. macrocephala* Vahl A b; *X. savannensis* Miq. var. *glabrata* Seub. N.

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