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EPIPHYTE DIVERSITY IN PRIMARY AND FRAGMENTED FORESTS OF CAMEROON, CENTRAL AFRICA: A PRELIMINARY SURVEY

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ABSTRACT. In this study our objectives were to compare the diversity of epiphytes in undisturbed and fragmented forests, to identify the most abundant host tree species, and to collect specimens for the University of Yaounde. To protect epiphytes in villages where these plants are often perceived as parasites (especially of fruit trees), the senior author organized conservation classes for local villagers who participated in data collection at each site. Preliminary results showed that epiphytic flora was rich in disturbed forests of Cameroon and that preservation of forest fragments may benefit epiphyte conservation. The most abundant host tree species differ in both intact and disturbed habitats at each site. Human disturbance, despite reducing epiphyte population sizes, serves as a catalyst for promoting change (and perhaps a short-term increase) in diversity by increasing habitat diversity.

Key words: Africa, biodiversity, Cameroon, epiphyte, forest, orchid, tropics

INTRODUCTION

Epiphytes are components of tropical rain forests. Much information on their relative diversity and abundance exists for major equatorial forests in Mexico (Williams-Linera et al. 1995, Guevara et al. 1998) and Central America, for instance Costa Rica (Nadkarni 1986), Panama (Croat 1978), and Ecuador (Gentry & Dodson 1987). Information is very poor for Africa. Evidence suggests that forest fragments in the Neotropics may benefit epiphyte conservation (Williams-Linera et al. 1995, Guevara et al. 1998), and we speculate that this also may be true for African epiphytes.

Very little ecological information exists on epiphytes of Africa, but see Johansson (1974) on Nigeria. Preliminary epiphyte surveys carried out in Cameroon during the Radeau de Cimes Mission demonstrated that most epiphytes are located in the mid-canopy (Barthelemy 1992). A subsequent investigation at this site (Campo, Cameroon) has shown that 65% of epiphytic species are orchids and 26% are pteridophytes (Zapfack et al. 1996).

The objectives of our study follow:

- Survey the diversity of epiphytes, hemi-epiphytes, and their phorophytes in three tropical rain forests that differ in rainfall and species composition.
- Compare the epiphytic species composition in natural and disturbed forest tracts within the three tropical forests.
- Note large and conspicuous epiphytes.
- Collect voucher specimens for herbaria in Europe, Africa, and America with the first set deposited at the University of Yaounde Herbarium (YA).
- Communicate conservation needs of epiphytes to villagers in control of forest maintenance.

MATERIALS AND METHODS

Study Areas

Sites were selected in the tropical humid zone of southwestern Cameroon, including forests of three physiognomic types: evergreen, mixed, and semi-deciduous. These were the Campo Fauna Reserve, Eseka, and Mbankomo. At each station, seasonal drought occurs during two periods: November to March and July to August. The Campo Fauna Reserve, with coastal evergreen forest close to sea level (2°36′N, 10°53′E), has minimum-maximum temperatures of 23.1°C and 31.3°C. Eseka, a mixed forest with evergreen and semi-deciduous species, is located between a very humid littoral plain and dryer south plateau (3°40′N, 10°34′E) at ca. 240 m elev. Minimum and maximum temperatures of this area are 24.5°C and 29°C. Mbankomo, containing a semi-deciduous forest, is located on the south plateau (3°49′N, 11°24′E) at ca. 650 m

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TABLE 1. Epiphyte diversity at Campo, contrasting evergreen forest with open plot. Asterisk (*) denotes an epiphytic species common to both habitats.

Habitat	Orchidaceae	Pteridophytes	Araceae	Cactaceae	Total
Evergreen forest	*Ancistrorhynchus straussii* *Bulbophyllum distans* *Bulbophyllum* aff. *flavidum* *Bulbophyllum fractiflexum* *Bulbophyllum* sp. 1 *Bulbophyllum* sp. 2	*Asplenium africanum* *Drynaria laurentii* **Microgramma owariensis* **Microsorium punctatum* **Nephrolepis biserrata* **Phymatodes scolopendria*	**Rhektophyllum camerunense* **Rhektophyllum mirabile*	**Rhipsalis baccifera*	15 species 8 unique
Open plot	*Ancistrorhynchus capitatus* *Ancistrorhynchus clandestinus* *Bulbophyllum buntingii* *Bulbophyllum* cf. *calyptratum* *Bulbophyllum congolanum* *Bulbophyllum imbricatum* *Bulbophyllum* sp. *Calyptrochilum emarginatum* *Chamaeangis odoratissima* *Chamaeangis* sp. *Diaphananthe pellucida* *Polystachya laxiflora* *Polystachya odorata* *Polystachya polychaete* *Tridactyle tridactylites* *Tridactyle* sp.	*Asplenium currori* *Asplenium* sp. **Microgramma owariensis* **Microsorium punctatum* **Nephrolepis biserrata* *Oleandra distenta* **Phymatodes scolopendria* *Platycerium angolense* *Platycerium stemaria* *Vittaria schaeferi*	**Rhektophyllum camerunense* **Rhektophyllum mirabile*	**Rhipsalis baccifera*	29 species 22 unique

elev. Minimum and maximum temperatures are 25.6°C and 32.9°C.

Canopy Access

Two methods were used for canopy access: single rope techniques and employment of Pygmy climbers from local villages, who we trained in plant collection and observation. The senior author used binoculars to observe and control sampling by village climbers.

Collection and Identification

Voucher specimens were collected and preserved using standard techniques for herbarium collections. Epiphyte identification was facilitated by matching project collections to herbarium specimens at the University of Yaounde Herbarium (YA). To minimize conflicts between old and new name applications, we continued to use the older names, since otherwise comparisons would result in false similarities and differences

TABLE 2. Epiphyte diversity at Eseka, contrasting mixed forest with open plot. Asterisk(*) denotes an epiphytic species common to both habitats.

Habitat	Orchidaceae	Pteridophytes	Araceae	Cactaceae	Total
Mixed forest	*Angraecum* sp.	**Asplenium currori*	**Rhektophyllum mirabile*		18 species
	Bulbophyllum distans	*Asplenium* sp. 1			10 unique
	**Bulbophyllum imbricatum*	**Microgramma owariensis*			
	Bulbophyllum sp. 1	*Microsorium punctatum*			
	Bulbophyllum sp. 2	**Phymatodes scolopendria*			
	Bulbophyllum sp. 3	**Platycerium angolense*			
	Polystachya affinis	**Platycerium stemaria*			
	Polystachya odorata	**Vittaria schaeferi*			
	Polystachya sp.				
Open plot	*Angraecum birrimense*	**Asplenium currori*	**Rhektophyllum mirabile*	*Rhipsalis baccifera*	30 species
	Angraecum sp. 2	*Asplenium* sp. 2			22 unique
	Angraecum sp. 3	*Asplenium* sp. 3			
	Bulbophyllum fuscum	*Davallia chaerophylloides*			
	**Bulbophyllum imbricatum*	*Drynaria volkensii*			
	Bulbophyllum teretifolium	*Lomariopsis guineensis*			
	Bulbophyllum sp. 4	**Microgramma owariensis*			
	Bulbophyllum sp. 5	*Nephrolepis biserrata*			
	Calyptrochilum emarginatum	*Oleandra distenta*			
	Chamaeangis odoratissima	**Phymatodes scolopendria*			
	Podangis dactyloceras	**Platycerium angolense*			
	Polystachya sp. 1	**Platycerium stemaria*			
	Polystachya sp. 2	*Pleopeltis lanceolata*			
	Vanilla africana	**Vittaria schaeferi*			

between study sites. All specimens at available herbaria in Cameroon need to be reviewed in the light of modern revisions. Relatively well-known host trees were field identified, and others were identified using manuals. A list of 58 manuals and papers that served as identification aids is available on request. The main voucher collection was deposited at YA (APPENDIX).

Sampling Methods

Two 1-ha plots were established at each study area (except at the disturbed Campo plot): one plot was selected in the undisturbed forest and the other within a plantation or disturbed area. At Campo, phorophytes were selected randomly within the village, because the available fragments were substantially smaller than 1 ha. Only phorophytes with diameters of 5 cm or more were sampled.

Epiphytes and hemi-epiphytes were sampled in accessible zones of phorophytes according to techniques described by Johansson (1974). A checklist of identified epiphytes was made and also a list of their phorophytes. We determined absolute abundance of each phorophyte species

TABLE 3. Epiphyte diversity at Mbankomo, contrasting semideciduous forest with open plot. Asterisk (*) denotes an epiphytic species common to both habitats.

Habitat	Orchidaceae	Pteridophytes	Araceae	Cactaceae	Begoniaceae	Total
Semideciduous forest	*Angraecum* sp. 1	**Asplenium currori*	*Rhektophyllum camerunense*			20 species 9 unique
	Bulbophyllum sp. 1	*Asplenium* sp. 1	**Rhektophyllum mirabile*			
	Chamaeangis sp. 1	*Davalia chaerophylloides*				
	**Polystachya odorata*	**Drynaria laurentii*				
	Polystachya sp.	*Drynaria volkensii*				
	**Tridactyle tridactylites*	*Lomariopsis* sp.				
		**Microsorium punctatum*				
		**Nephrolepis biserrata*				
		**Oleandra distenta*				
		**Phymatodes scolopendria*				
		**Platycerium angolense*				
		**Platycerium stemaria*				
Open plot	*Angraecum birrimense*	*Arthropteris palisoti*	**Rhektophyllum mirabile*	*Rhipsalis baccifera*	*Begonia polygonoides*	40 species 29 unique
	Angraecum sp. 2	**Asplenium currori*				
	Ansellia africana	*Asplenium* sp. 2				
	Bulbophyllum buntingii	*Davallia chaerophylloides*				
	Bulbophyllum sp. 2	**Drynaria laurentii*				
	Calyptrochilum christyanum	*Microgramma owariensis*				
	Calyptochilum emarginatum	**Microsorium punctatum*				
	Chamaeangis vesicata	**Nephrolepis biserrata*				
	Chamaeangis sp. 2	**Oleandra distenta*				
	Cytorchis cf. *chailluana*	**Phymatodes scolopendria*				
	Podangis sp.	**Platycerium angolense*				
	Polystachya adansoniae	**Platycerium stemaria*				
	Polystachya alpina					
	Polystachya coriscensis					

TABLE 3. Continued.

Habitat	Orchidaceae	Pteridophytes	Araceae	Cactaceae	Begoniaceae	Total
	Polystachya elegans					
	Polystachya fractiflexa					
	**Polystachya odorata*					
	Polystachya paniculata					
	Polystachya cf. *tenuissima*					
	Polystachya tessellata					
	Rangaeris muscicola					
	Rangaeris sp.					
	Summarhaysia laurentii					
	Tridactyle anthomaniaca					
	**Tridactyle tridactylites*					

by counting individuals of conspecifics encountered within the sample areas.

Checklists of epiphytes and hemi-epiphytes were prepared for comparison within each pair of sample areas. The senior author educated villagers by organizing meetings and reinforcing conservation principles by involving local people in specimen and data collection.

RESULTS

TABLES 1–3 summarize the results of the epiphyte surveys at each site. Orchids and ferns were the main groups of epiphytes, and epiphyte flora was relatively diverse in open disturbed areas at each site. Considerable overlap was apparent among pteridophytes and non-orchids in both intact and disturbed plots, but no or little overlap was observed among the orchids. These results initially suggested that human disturbance actually enhances epiphyte diversity, but see the discussion below. Orchids and ferns were the main components of the epiphytic flora in each of the six plots sampled, but two massive species of Araceae, *Rhektophyllum mirabile* N.E. Br. and *R. camerunense* Ntepe-Nyame, were the largest and most conspicuous epiphytes in both the intact and fragmented forests at Eseka and Mbankomo. Neither the taxonomically diverse Orchidaceae nor the pteridophytes were conspicuous elements.

TABLES 4–6 show host tree dominance differing greatly from site to site. Within each area, the most abundant host species of intact and disturbed plots were totally different. Only a single species from all three areas common to both intact and disturbed plots exhibited an absolute abundance above one in more than one plot, i.e., *Cola acuminata* Schott & Endl. at Mbankomo.

Meetings organized at the three sites produced an average attendance of 50 villagers, who learned the importance of biodiversity and sustainable forest products. They also learned to distinguish between epiphytes and harmful parasites. Some of the phorophytes have local uses such as *Erythrophloeum suaveolens* (Guillem. & Perrott) Brenan used to "test truth." *Irvingia gabonensis* Baill. Ex Lauener, *Uapaca guineensis* Müll. Arg., and *Cola acuminata* are used for food. Medicines prepared from *Alstonia boonei* De Wild, *Bombax buonopozense* Beauv., and *Celtis mildbraedii* Engl. provide further incentive for protecting these epiphytes. When villagers requested follow-up meetings, we left the region convinced that the local host trees and their epiphytes would be better protected.

DISCUSSION

Results showing that orchids and ferns predominate in the epiphytic flora are consistent with other studies in Africa. Biedinger and Fisher (1996) found that epiphytic floras in the Democratic Republic of the Congo (formerly Zaire)

TABLE 4. Survey of phorophytes at Campo, in order of absolute abundance. Asterisk (*) denotes a species common to both intact evergreen forest and open plot.

Habitat	Species	Family	Absolute abundance
Evergreen forest	*Dialium pachyphyllum*	Caesalpiniaceae	11
	Anthonotha fragrans	Caesalpiniaceae	10
	Hymenostegia afzelii	Caesalpiniaceae	9
	**Uapaca guineensis*	Euphorbiaceae	6
	Strombosia pustulata	Olacaceae	4
	Pachypodanthium staudtii	Annonaceae	3
	Strombosiopsis tetrandra	Olacaceae	3
	Coula edulis	Olacaceae	3
	Dichostemma glaucescens	Euphorbiaceae	3
	**Erythrophloeum suaveolens*	Caesalpiniaceae	2
	Santaloidella gilletii	Connaraceae	2
	Sacoglottis gabonensis	Humiriaceae	2
	Drypetes afzelii	Euphorbiaceae	1
	Tabernaemontana crassa	Apocynaceae	1
	Afzelia bipindensis	Caesalpiniaceae	1
	Gilbertiodendron preussii	Caesalpiniaceae	1
	Gilletiodendron pierreanum	Caesalpiniaceae	1
	Garcinia kola	Clusiaceae	1
	Mammea africana	Clusiaceae	1
	Symphonia globulifera	Clusiaceae	1
	Neuropeltis acuminata	Convolvulaceae	1
	Angylocalyx pynaertii	Fabaceae	1
	**Irvingia gabonensis*	Irvingiaceae	1
	Guarea cedrata	Meliaceae	1
	Trichilia sp. 1	Meliaceae	1
	Trichilia sp. 2	Meliaceae	1
	Aubrevillea kerstingii	Mimosaceae	1
	Anisophyllea sp.	Rhizophoraceae	1
	Pausinystalia yohimba	Rubiaceae	1
	Cola pachycarpa	Sterculiaceae	1
Open plot	*Mangifera foetida*	Anacardiaceae	7
	**Irvingia gabonensis*	Irvingiaceae	5
	Avicennia africana	Avicenniaceae	2
	Sterculia tragacantha	Sterculiaceae	2
	Monodora sp.	Annonaceae	1
	Cocos nucifera	Arecaceae	1
	Spathodea campanulata	Bignoniaceae	1
	Anthonotha sp.	Caesalpiniaceae	1
	**Erythrophloeum suaveolens*	Caesalpiniaceae	1
	Lebrevillea klainei	Caesalpiniaceae	1
	Terminalia superba	Combretaceae	1
	Bridelia micrantha	Euphorbiacae	1
	**Uapaca guineensis*	Euphorbiaceae	1
	Anthocleista sp.	Loganiaceae	1
	Lophira alata	Ochnaceae	1
	Citrus sinensis	Rutaceae	1

and Rwanda include 52% orchids and 33% ferns. Zapfack et al. (1996) similarly found 65% orchids and 26% ferns.

These results suggest that epiphyte diversity is greater in open disturbed areas than in intact forests. Although orchids are usually regarded as denizens of undisturbed habitats, at least some orchids are opportunistic in disturbed sites (Gillespie 2002). Light availability created from disturbance may foster a larger number of sun-loving and perhaps weedy epiphytes. Our results, however, may reflect short-term observations in the wake of relatively recent clearing. It is uncertain whether these epiphyte populations will persist over time, particularly if their seed sources for colonization decline with further degradation of the intact forest. Although epiphytes may be fostered through human disturbance, they are imperiled through the intense destruction of bush fires and tree felling. With human-

TABLE 5. Survey of phorophytes at Eseka, in order of absolute abundance. Asterisk (*) denotes a species common to both mixed forest and open plot.

Habitat	Species	Family	Absolute abundance
Mixed forest	*Panda oleosa*	Pandaceae	5
	Drypetes capillipes	Euphorbiaceae	3
	Drypetes gossweileri	Euphorbiaceae	3
	Polyathia suaveolens	Annonaceae	2
	Strombosia pustulata	Olacaceae	2
	Strombosiopsis tetrandra	Olacaceae	2
	Poga oleosa	Rhizophoraceae	2
	Afrosersalisia cerasifera	Sapotaceae	2
	Gambeya lacourtiana	Sapotaceae	2
	Trichoscypha acuminata	Anacradiaceae	1
	Mammea africana	Clusiaceae	1
	Amphimas pterocarpoides	Caesalpiniaceae	1
	Diospyros crassiflora	Ebenaceae	1
	Diospyros sp. 1	Ebenaceae	1
	Diospyros sp. 2	Ebenaceae	1
	Diospyros sp. 3	Ebenaceae	1
	Diospyros sp. 4	Ebenaceae	1
	Diospyros sp. 5	Ebenaceae	1
	Uapaca sp.	Euphorbiaceae	1
	Angylocalyx pynaertii	Fabaceae	1
	Entandrophragma cylindricum	Meliaceae	1
	**Pycnanthus angolensis*	Myristicaceae	1
	Manilkara argentea	Sapotaceae	1
	Cola rostrata	Sterculiaceae	1
Open plot	*Alstonia boonei*	Apocynaceae	5
	Desbordesia glaucescens	Irvingiaceae	2
	Bridelia sp.	Euphorbiaceae	1
	Sacoglottis gabonensis	Humiriaceae	1
	Irvingia gabonensis	Irvingiaceae	1
	Nesogordonia papaverifera	Sterculiaceae	1
	**Pycnanthus angolensis*	Myristicaceae	1

induced disturbance recent among the study sites, the source of all epiphytes in the disturbed sites is ultimately the intact forest where patterns of epiphyte distribution may be quite different. Our study suggests that disturbed sites may play a role in maintaining epiphytic diversity, especially if neighboring forests are severely degraded, a result consistent with those recorded in Mexico by Williams-Linera et al. (1995) and Guevara et al. (1998).

TABLE 6. Survey of phorophytes at Mbankomo, in order of absolute abundance. Asterisk (*) denotes a species common to both semi-deciduous forest and open plot.

Habitat	Species	Family	Absolute abundance
Semideciduous forest	Unidentified	Moracae	8
	Pausinystalia macroceras	Rubiaceae	5
	Polyalthia suaveolens	Annonaceae	4
	Strombosia pustulata	Olacaceae	4
	**Celtis mildbraedii*	Ulmaceae	4
	Uapaca palludosa	Euphorbiaceae	3
	Anonidium mannii	Annonaceae	3
	Celtis philippinensis	Ulmaceae	3
	Pachypodanthinum staudtii	Annonaceae	2
	Tabernaemontana crassa	Apocynaceae	2
	Voacanga africana	Apocynaceae	2
	Dacryodes buettneri	Burseraceae	2
	Dacryodes klaineana	Burseraceae	2
	Margaritaria discoidea	Euphorbiaceae	2
	Drypetes gossweileri	Euphorbiaceae	2
	Angylocalyx vermeulenii	Fabaceae	2
	Staudtia camerunensis	Myristicaceae	2
	Trichilia sp. 1	Meliaceae	2
	**Cola acuminata*	Sterculiaceae	2
	Cola pachycarpa	Sterculiaceae	2
	Cleistopholis patens	Annonaceae	1
	**Bombax buonopozense*	Bombaceae	1
	Anthonotha sp.	Caesalpiniaceae	1
	Distemonanthus benthamianus	Caesalpiniaceae	1
	Loesenera talbotii	Caesalpiniaceae	1
	Sindoropsis letestui	Caesalpiniaceae	1
	Diospyros sp. 1	Ebenaceae	1
	Diospyros sp. 2	Ebenaceae	1
	Anthostema aubryanum	Euphorbiaceae	1
	Bridelia sp. 1	Euphorbiaceae	1
	**Bridelia* sp. 2	Euphorbiaceae	1
	Drypetes afzelii	Euphorbiaceae	1
	Drypetes capillipes	Euphorbiaceae	1
	Ricinodendron heudelotii	Euphorbiaceae	1
	Uapaca sp.	Euphorbiaceae	1
	Pterocarpus soyauxii	Fabaceae	1
	Rhaphiostylis ferruginea	Icacinaceae	1
	Desbordesia glaucescens	Irvingiaceae	1
	Irvingia gabonensis	Irvingiaceae	1
	Beilschmiedia sp.	Lauraceae	1
	Entandrophragma cylindricum	Meliaceae	1
	Trichilia sp. 2	Meliaceae	1
	Trichilia sp. 3	Meliaceae	1
	Calpocalyx sp.	Mimosaceae	1
	Pentaclethra macrophylla	Mimosaceae	1
	Piptadeniastrum africanum	Mimosaceae	1
	Coelocaryon preussii	Myristicaceae	1
	Pycnanthus angolensis	Myristicaceae	1
	Strombosiopsis tetrandra	Olacaceae	1
	Canthium arnoldianum	Rubiaceae	1
	Pausinystalia johimbe	Rubiaceae	1
	Homalium longistylum	Samydaceae	1
	Chytranthus sp.	Sapindaceae	1
	Donella sp.	Sapotaceae	1
	Gluema ivorensis	Sapotaceae	1
	Leptonychia sp. 1	Steculiaceae	1

TABLE 6. Continued.

Habitat	Species	Family	Absolute abundance
	Leptonychia sp. 2	Sterculiaceae	1
	Duboscia macrocarpa	Tiliaceae	1
Open plot	*Theobroma cacao*	Sterculiaceae	39
	Dacryodes edulis	Burseraceae	10
	Triplochiton scleroxylon	Sterculiaceae	4
	Trichoscypha acuminata	Anacardiaceae	3
	Combretodendron macrocarpum	Lecythidaceae	3
	**Cola acuminata*	Sterculiaceae	3
	Alstonia boonei	Apocynaceae	2
	Newbouldia laevis	Bignoniaceae	2
	Terminalia superba	Combretaceae	2
	Phyllanthus discoides	Euphorbiaceae	2
	Albizia adianthifolia	Mimosaceae	2
	Ficus mucusa	Moraceae	2
	Elaeis guineensis	Arecaceae	1
	**Bombax buonopozense*	Bombacaceae	1
	**Bridelia* sp. 2	Euphorbiaceae	1
	Croton oligandrus	Euphorbiaceae	1
	Tetrapleura tetraptera	Mimosaceae	1
	Persea americana	Lauraceae	1
	Ongokea gore	Olacaeae	1
	Pogo oleosa	Rhizophoraceae	1
	Gambeya beguei	Sapotaceae	1
	Gambeya sp.	Sapotaceae	1
	Sterculia tragacantha	Sterculiaceae	1
	**Celtis mildbraedii*	Ulmaceae	1

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APPENDIX. Epiphyte Vouchers Deposited at the University of Yaounde Herbarium (YA)

Genus species	Collector and number
Ancistrorhynchus clandestinus (Lindl.) Schltr.	Nkongmeneck 3115, 3337
Ancistrorhynchus straussii (Schltr.) Schltr.	Nkongmeneck 3074
Angraecum sp. 1	Nkongmeneck 3156
Angraecum sp. 2	Nkongmeneck 3159
Angraecum sp. 3	Nkongmeneck 3176
Asplenium africanum Desv.	Nkongmeneck 3072
Asplenium currori Hook.	Nkongmeneck 3269
Asplenium sp. 1	Nkongmeneck 3175
Begonia polygonoides Hook.f	Nkongmeneck 3153, 3387
Bulbophyllum buntingii Rendle	Nkongmeneck 3089, 3183
Bulbophyllum calyptratum Kraenzl.	Nkongmeneck 3116
Bulbophyllum congolanum Schltr.	Nkongmeneck 3093, 3133
Bulbophyllum distans Lindl.	Nkongmeneck 3076, 3080, 3132
Bulbophyllum aff. flavidum Lindl.	Nkongmeneck 3081
Bulbophyllum fractiflexum Kraenzl.	Nkongmeneck 3077
Bulbophyllum fuscum Lindl.	Nkongmeneck 3134
Bulbophyllum imbricatum Lindl.	Nkongmeneck 3119
Bulbophyllum sp. 1	Nkongmeneck 3089
Bulbophyllum sp. 2	Nkongmeneck 3118, 3214
Bulbophyllum sp. 3	Nkongmeneck 3124
Bulbophyllum sp. 4	Nkongmeneck 3169, 3234
Bulbophyllum sp. 5	Nkongmeneck 3212
Calyptrochilum christyanum (Rchb.f.) Summerh.	Nkongmeneck 3154, 3345
Calyptrochilum emarginatum Schltr.	Nkongmeneck 3100, 3275, 3320
Chamaeangis vesicata Schltr.	Nkongmeneck 3145
Chamaeangis sp. 2	Nkongmeneck 3090, 3901, 3902, 3101
Cyrtorchis cf. chailluana (Hook.f.) Schltr.	Nkongmeneck 3166
Diaphananthe pellucida (Lindl.) Schltr.	Nkongmeneck 3103
Microgramma owariensis (Desv.) Alst.	Nkongmeneck 3073, 3105, 3121
Microsorium punctatum (L.) Copeland	Nkongmeneck 3084, 3348
Phymatodes scolopendria (Burm.f.) Ching	Nkongmeneck 3070
Platycerium stemaria (P.Beauv.) Desv.	Nkongmeneck 3123
Podangis dactyloceras (Rolfe) Schltr.	Nkongmeneck 3352, 3358, 3563, 3377, 3381, 3393, 3396, 3397
Podangis sp.	Nkongmeneck 3178
Polystachya adansoniae Rchb.f	Nkongmeneck 3149, 3187, 3260, 3344, 3565, 3566, 3372, 3379, 3390
Polystachya affinis Lindl.	Nkongmeneck 3131, 3250
Polystachya alpina Lindl.	Nkongmeneck 3148, 3186, 3188, 3190, 3193
Polystachya cf. coriscensis Rchb.f.	Nkongmeneck 3361
Polystachya elegans Rchb.f	Nkongmeneck 3147
Polystachya fractiflexa Summerh.	Nkongmeneck 3152, 3161
Polystachya laxiflora Lindl.	Nkongmeneck 3094, 3097
Polystachya odorata Lindl.	Nkongmeneck 3102, 3164, 3331
Polystachya paniculata (Sw.) Rolfe	Nkongmeneck 3180, 3303, 3355
Polystachya polychaete Kraenzl.	Nkongmeneck 3110
Polystachya tenuissima Kraenzl.	Nkongmeneck 3157, 3172
Polystachya cf. tenuissima Kraenzl.	Nkongmeneck 3354
Polystachya tessellata Lindl.	Nkongmeneck 3162, 3245, 3265, 3332, 3567, 3374, 3398
Polystachya sp. 1	Nkongmeneck 3107
Polystachya sp. 2	Nkongmeneck 3150
Rangaeris muscicola (Rchb.f) Summerh.	Nkongmeneck 3173, 3184
Rangaeris sp.	Nkongmeneck 3163
Rangaeris sp.	Nkongmeneck 3181
Rhipsalis baccifera (J.S. Mill.) Stearn	Nkongmeneck 3113
Summerhaysia laurentii (De Wild) Cribb	Nkongmeneck 3160
Tridactyle anthomaniaca (Rchb.f.) Summerh.	Nkongmeneck 3191
Vanilla africana Lindl.	Nkongmeneck 3136, 3300