

## Taxonomic results of the BRYOTROP-Expedition to Zaire and Rwanda

### 3. Description of Collecting Sites.

#### The Vegetation of Kahuzi-Biega-National Park/Zaire, Nyungwe Forest and Virunga volcanoes/Rwanda

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**Abstract.** During the BRYOTROP-Expedition in 1991, 71 collecting sites could be visited. These are situated in the Kahuzi-Biega-National Park/Zaire, the Nyungwe Forest and the Virunga volcanoes/Rwanda. This paper provides a short description of the vegetation in these three areas and a detailed list of all collecting sites.

#### the biology

The Kahuzi-Biega National Park (Fig. 1), founded in 1970, is situated in the Eastern Part of Zaïre from the Zaïre bassin at Itebero/Utu to the western crest of the Central African Graben northwest of Bukavu between 1°36'-2°37' southern latitude and 27°33'-28°46' eastern longitude. It comprises, after an extension in 1975, about 600 000 ha and includes montane forest and a large rainforest area. Because of the geographical position and diverse relief a species-rich flora and fauna developed, among them the most spectacular representant, the mountain gorilla (*Gorilla gorilla graueri*), for whose protection the park initially was founded. While

of the gorilla is fairly well known, only little research has been done in other groups of plants and animals, even in other monkey species. The most important publications concerning the Kahuzi-National Park are listed in Richter & Bantuzeko (1986). Research on vegetation was either done punctually or during revisions or monographs of different plant taxa. A vegetation map of the old park region distinguishes only 4 types (primary forest, secondary forest, bamboo and swamp). A more detailed mapping distinguishing 12 vegetation types was done by Marius in 1976, mainly based on aerial photos. A vege-

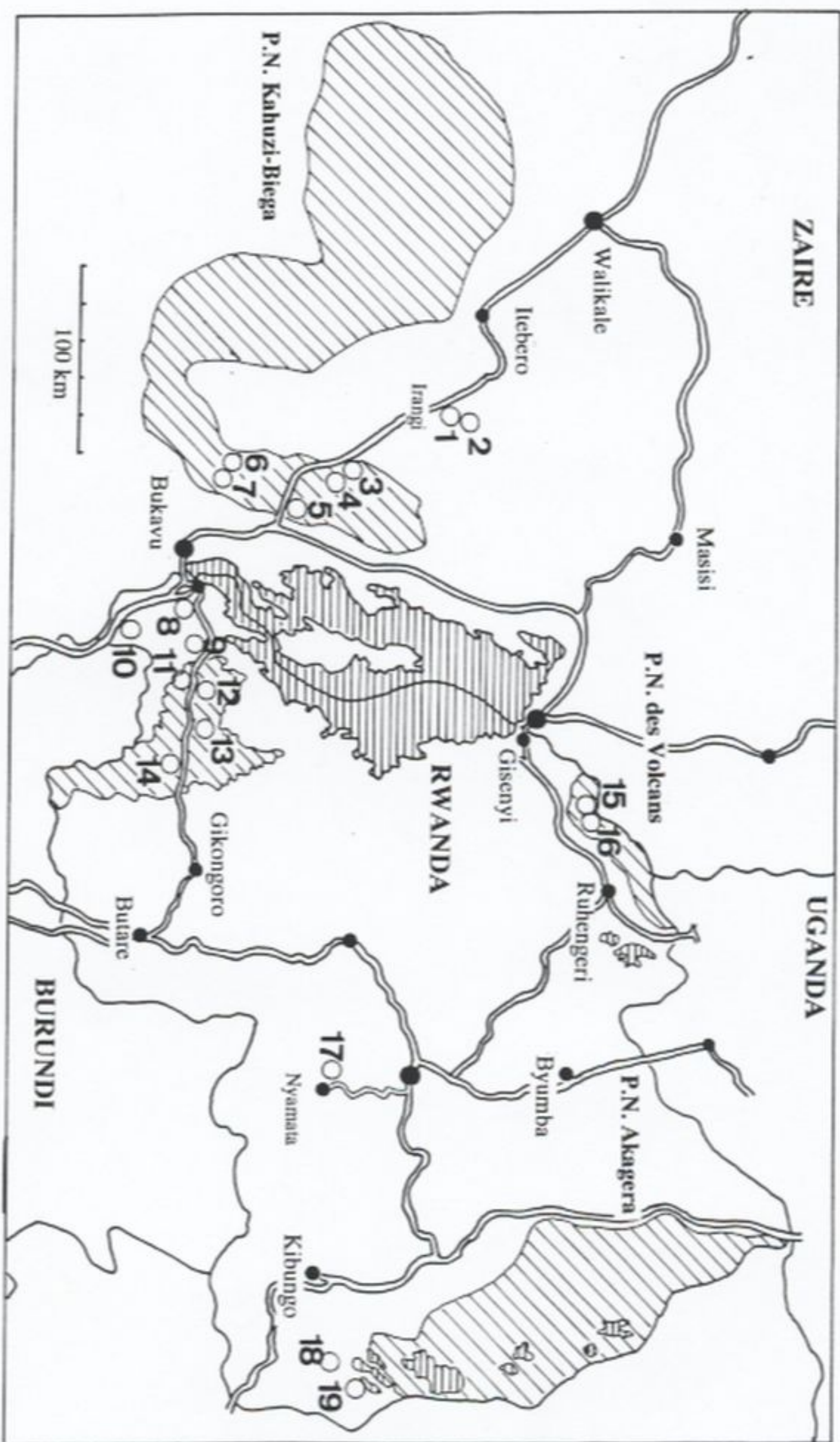


Fig. 1: The expedition area. 1-2: localities 119-129; 3: loc. 152; 4: loc. 144-150; 5: loc. 118, 151; 6-7: loc. 128-143; 8: loc. 153; 9: loc. 154; 10: loc. 117; 11: loc. 106-109, 155; 12: loc. 104, 105; 13: loc. 110-114, 156; 14: loc. 101-103, 115, 157; 15-16: loc. 158-167; 17: loc. 116; 18: loc. 170; 19: loc. 171.



tation mapping of the Kahuzi-Biega National Park in its recent borders is in preparation by the present author.

In the following paper, a short survey of primary and secondary vegetation formations of the Kahuzi-Park is presented. Additionally the vegetation of two main collecting sites of the BRYOTROP-project, the Nyungwe forest and the Mt. Karisimbi is briefly described and a list of all collecting sites with description of their vegetation is provided (Fig. 1, Fig. 2).

The mapping of vegetation was done by using the method of Braun-Blanquet (1964), uniting the relevés taken along a catena to phytosociological tables. Here only a few results concerning the BRYOTROP-Transsect can be given. Detailed publications dealing with the vegetation of Kahuzi-Park are in preparation. The nomenclature of vascular plants mainly follows Troupin (1978, 1983, 1985, 1988), and the Flore d'Afrique Centrale (formerly Flore du Congo Belge et du Ruanda-Urundi, Flore du Congo, du Rwanda et du Burundi).

A detailed description of altitudinal zonation in East Africa was provided by Hedberg (1951), who also dealt with the Virunga Volcanoes. The vegetation belts of Kahuzi-Park, not mentioned by Hedberg, shall be briefly described here. From 850 m, the lower limit of the Park to 1300 m, a mountain rainforest is developed. The Transition Forest zone can be observed from 1300 to 1700 m, followed by a montane forest from 1700 to 2300 (2400 m). From 2400 m to 2600 m the Bamboo zone is developed, intermixed with *Podocarpus*-Forest on hill summits, swamps and different montane forest communities. A *Hagenia-Hypericum* zone, which is well developed on the Virunga-Volcanoes, is lacking. The Ericaceous Belt begins at 2600 m (Mt. Biega) and reaches to 3200 m on Mt. Kahuzi. The summit of Mt. Kahuzi bears a *Senecio johnstoni-Erica*-Subparamo, which is followed by a *Helichrysum-Lobelia stuhlmannii*-Paramo. In spite of the isolate position, Mt. Kahuzi has several afroalpine species in common with the Virunga Volcanoes and the Ruwenzori. Only *Swertia macrosepala*, *Philippia johnstoni*, *Bartsia macrophylla*, *Lobelia stuhlmannii*, *Helichrysum guilelmi* and *Disa stairsii* shall be mentioned. The giant groundsel *Senecio johnstoni* proved to

be a different subspecies (ssp. *kahuzicus*).

## I. Vegetation of the Kahuzi-Biega National Park

### A. Primary rainforest communities

The primary rainforest formations mainly belong to 4 communities. Several authors stated the dominance of one species, *Gilbertiodendron dewevrei* (Caesalpinaceae) (Lebrun & Gillet 1954, Dieterlen 1978, Schmitz 1988). This species, due to a wide ecological amplitude is known from the whole Zaïre bassin and may occur even in pure stands.

#### *Gilbertiodendron dewevrei*-Community (loc. 120, 121)

This rainforest type is characterized by the dominant *Gilbertiodendron dewevrei* in tree and shrub layer. The tree layer may well reach 40 m. The herb layer consists of dominant Rubiaceae (*Stipularia*, *Geophila*), Acanthaceae and Marantaceae. Some remarkable species belong to the genus *Impatiens*, among them the epiphytic *Impatiens irangiensis* and *Impatiens paucidentata*. The *Gilbertiodendron*-community is frequent between 850 and 1100 m elevation.

#### *Uapaca*-Community (loc. 119)

Mainly near rivers and streams, a watertolerant forest community is found which is characterized by *Uapaca* species. The diversity of the epiphyte stratum is remarkable and on one tree, the author could note among others 43 species of orchids. The *Uapaca* community can be observed up to 1000 m elevation.

#### *Julbernardia-Cynometra*-Community (loc. 123)

This forest type is characterized by the dominating *Julbernardia sereti* and *Cynometra alexandri*. *Gilbertiodendron* shows only a scattered occurrence. Other typical species are *Piptadeniastrum africanum* and *Anthonota acuminata*.

#### *Cynometra alexandri-Mammea-Anningeria*-Community (loc. 124)

On mountain slopes at 1200 m s.m., *Gilbertiodendron* is replaced by some montane forest

elements, mainly *Anningeria altissima* and *Mammea africana*. The Caesalpiniaceae *Cynometra* is on the other hand a lowland element which can be observed up to 1500 m elevation.

#### B. Transition forest communities

##### ***Julbernardia-Ocotea-Community*** (loc. 126)

The summit region of different mountains in the rainforest area are covered by a forest type with many elements from mountain or cloud forest. Near Irangi Station, the Mt. Ilimu can be named as a typical habitat for this transitional forest. Among mountain species like *Ocotea michelsonii* some lowland elements do occur as well (e.g. *Julbernardia sereti*, *Staudtia stipitata*). Unfortunately the transition zone has been destroyed in most parts of the Central African Graben and today only few remnants can be found.

#### C. Vegetation of rapids and cascades

The Kahuzi Park area is rich in rapids and cascades. While members of the family Podostemonaceae have yet not been recorded, two interesting communities in the mountain rainforest could be observed.

##### ***Biophytum zenkeri-Dyschoriste perrotteti-Community***

In the whole eastern Zaïre bassin, this association is widely distributed. It is growing in cascades on wet rocks. Characteristic elements are the suffruticose *Biophytum zenkeri* (Oxalidaceae) and the Acanthaceae *Dyschoriste perrotteti*.

##### ***Elatostemma welwitschii-Utricularia striatula-Community***

In a waterfall near the Irangi Station, a community on rocks mainly dominated by bryophytes could be recorded. In the wet moss-cover, *Elatostemma welwitschii* and the carnivorous *Utricularia striatula* can be found. Another remarkable species associated is *Impatiens apiculata*.

#### D. Primary montane forest communities

##### ***Albizia gummifera-Carapa grandiflora-Parinari excelsa-Forest*** (loc. 152)

The stands of the lower montane forest belt are characterized by 2-3 distinguishable tree layers, the upper reaching 35 m. In the Kahuzi Park this forest type is very much endangered and has mostly been destroyed. Characteristic trees are *Albizia gummifera*, *Parinari excelsa*, *Entandrophragma excelsum*, *Carapa grandiflora*, *Symphonia globulifera* and *Chrysophyllum gorungosanum*. This community is found from 1800 to 2100 m elevation and it is among the most diverse in the Park.

#### Bamboo Forests

##### ***Hagenia abyssinica-Arundinaria alpina-Community*** (loc. 128)

##### ***Arundinaria alpina-Polyscias fulva-Community*** (loc. 136)

##### ***Arundinaria alpina-Community*** (loc. 130, 144, 147)

Large areas of the National Park are occupied by bamboo-forests. Some of them are of anthropogenous origin, mainly outside the climatic bamboo zone. *Arundinaria alpina*, which may reach a height of 25 m, is forming either pure stands or grows intermixed with *Hagenia abyssinica* and *Polyscias fulva*. A herb layer is generally well developed (mainly herbs like *Panicum calvum* and different ferns). At Mt. Kahuzi, the bamboo forest reaches the elevation of 3000 m and contains a lot of subalpine elements (*Impatiens superglabra*, *Carex petitiiana*).

#### Elfin Forests

At the edge of swamps and mooreland we find a type of forest, which is characterized by a permanent wet soil and a tree layer comparatively poor in species. The following communities can be distinguished.

##### ***Podocarpus usambarensis-Syzygium rowlandi-Pilotrichella-Swamp forest*** (loc. 133, 141, 142)

The community is dominated by the trees *Podocarpus latifolius* and *Syzygium rowlandi* and its physiognomy is characterized by different Meeteoriaceae (mostly *Pilotrichella*) and *Frullania angulata*. A remarkable species of the herb layer is *Impatiens purpureo-violacea*. Several orchids do occur as epiphytes: *Chamaeangis sarcophyl-*

*la*, *Cyrtorchis arcuata*, *Polystachya vulcanica*, *Stolzia cupuligera*. A variant of the *Podocarpus*-Community at the edge of the Lushanja swamp is dominated by *Ocotea usambarensis* (Lauraceae).

***Syzygium rowlandi*-*Lobelia mildbraedii*-Community**

A closely related forest with a less dense tree layer is found on more wet soil and is characterized by *Syzygium rowlandi*, *Cyperus denudatus* and *Lobelia mildbraedii*. It is growing in connection to *Cyperus*-*Lobelia mildbraedii*-swamps (see below). Some other species growing in the tree layer are *Rapanea melanophloeos*, *Macaranga neomildbraediana* and *Balthasarea schliebenii*.

***Podocarpus usambarensis*-*Syzygium guineense*-*Psychotria mahoni*-Community** (loc. 131, 148)

The summit regions of the Kahuzi-Biega massif are covered by a characteristic, ± hard-leaved cloud forest, which profits from the rich precipitation mainly in form of fog. Dominant trees are *Podocarpus latifolius*, *Syzygium guineense* ssp. *parvifolium* and the Rubiaceae *Psychotria mahoni*. Like the swamp elfin forest, it is characterized by the large number of epiphytes. The herb layer is, however, less rich in species and consists mainly of ferns.

E. Vegetation of swamps and peat bogs

***Erica rugegensis*-*Xyris valida*-*Cyperus denudatus*-Community** (loc. 129)

In the Lushanja swamp and some parts of Musizi, a nearly pure stand of *Erica rugegensis* with *Cyperus denudatus*, *Xyris valida*, *Osmunda regalis* and several *Sphagnum* species does occur. In its physiognomy, it resembles the *Erica rugegensis*-Community on summit of Mt. Biega, but it differs in composition of herb layer and its ecology.

***Lobelia mildbraedii*-*Cyperus latifolius*-*Cyperus denudatus*-Community** (loc. 140)

This community, more abundant in the montane forests of Rwanda, is rare in the Kahuzi-area. Typical species are *Lobelia mildbraedii*, *Cype-*

*rus denudatus* and *Cyperus latifolius*. Shrubs like *Hypericum revolutum* only show a scattered occurrence. Among the bryophytes, *Haplomitrium blumei* is most noteworthy and the species seems to be restricted to this type of habitat.

***Cyperus denudatus*-*Cyperus latifolius*-*Alchemilla ellenbeckii*-Community**

***Cyperus latifolius*-*Alchemilla ellenbeckii*-*Hypericum revolutum*-Community**

***Cyperus latifolius*-*Anagallis angustiloba*-Community**

***Cyperus latifolius*-*Ludwigia*-Community**

***Cyperus denudatus*-*Cyperus nigricans*-Community**

All those swamp communities have in common the dominance of *Cyperus*-species (*C. latifolius*, *C. denudatus*, *C. nigricans*) and the rare occurrence of shrubs. In the field they can be distinguished by their characteristic combination of species.

The *Cyperus denudatus*-*Cyperus latifolius*-*Alchemilla ellenbeckii*-Community grows in mesotrophic to oligotrophic places. Some other typical species, which define the association are *Cyperus nigricans* and *Gladiolus dalenii*. The *Cyperus denudatus*-*Cyperus nigricans*-Community, preferring oligotrophic habitats, totally lacks *C. latifolius* and is characterized by the dominance of *C. nigricans*. The *Cyperus latifolius*-communities are characterized by the total lack of *C. denudatus* and the occurrence of species like *Lythrum rotundifolium* and *Crepidorrhodon whytei*. They prefer ± eutrophic habitats.

***Juncus effusus*-*Sphagnum*-bog** (loc. 134)

This rare swamp community occurs in the Biega-area. Here *Juncus effusus* and *Sphagnum* species as well as *Polytrichum commune* are dominating. On the edge of the swamp, a community characterized by *Agauria salicifolia*, *Erica rugegensis* and *Rapanea melanophloeos* is found. The herb layer also contains *Juncus effusus* and *Sphagnum* species. There is a remarkable richness of epiphytic bryophytes (e.g. *Leptoscyphus cuneifolius*, *Lepidozia cupressina* etc.).

F. Subalpine Heath and Paramo vegetation

***Erica rugegensis-Vaccinium stanleyi-Breutelia stuhlmannii-Community*** (loc. 132)

The summit region of Mt. Biega is covered by a community, which is dominated by *Erica rugegensis*. Other shrubs are *Vaccinium stanleyi* and *Hedythyrus thamnoideus*. The herb layer contains only a few vascular plants, but numerous bryophytes and lichens, especially *Breutelia stuhlmannii* and *B. diffracta*.

***Philippia benguellensis-Hagenia abyssinica-Myrica salicifolia-Community*** (loc. 137, 145)

In the lower part of the Ericaceous belt, which generally follows the bamboo zone, a forest with *Philippia*, *Hagenia abyssinica* and *Myrica salicifolia* can be observed. Some other characteristic trees are *Erica rugegensis*, *Balthasarea schliebenii* and *Agauria salicifolia*. The herb layer is comparatively rich and contains as dominant species *Panicum calvum*, *Senecio mariettae* and *Asplenium friesiorum*.

***Erica rugegensis-Philippia johnstoni Forest***

Below the Subparamo, a forest with *Erica rugegensis* and *Philippia johnstoni* with a tree layer of 15-20 m height is developed. It is characterized by large moss balls and a densely moss covered soil (mainly *Breutelia* and *Sphagnum*). Between the bryophytes, *Deschampsia flexuosa* and *Lycopodium clavatum* are part of the herb layer. Among the epiphytes, large moss balls with *Plagiochila colorans*, *P. ericicola* and *Dicranum johnstoni* are dominating. The upper part of the canopy is mainly covered by *Usnea*.

***Senecio johnstoni-Subparamo*** (loc. 149)

Immediately below the summit of Mt. Kahuzi, a subparamo with the giant rosette tree *Senecio johnstoni* ssp. *kahuzicus* and the two arborescent heath species *Erica rugegensis* and *Philippia johnstoni* can be found. The herb layer is dominated by *Deschampsia flexuosa* var. *afromontana*, different species of *Helichrysum* and other afroalpine elements like *Senecio subsessilis*, *Huperzia saururus* and *Luzula abyssinica*.

***Helichrysum-Lobelia stuhlmannii-Deschampsia flexuosa-Community*** (loc. 150)

The summit of Mt. Kahuzi at 3300 m is covered by an alpine meadow with scattered *Erica* and

*Philippia* shrubs. Here, *Deschampsia flexuosa*, several *Helichrysum* species and *Huperzia saururus* are dominating. Other characteristic plants are *Festuca simensis*, *Viola eminii*, *Swertia macrosepala*, *Rubus runssorensis* and *Lobelia stuhlmannii*.

**G. Secondary montane forests**

A large part of the Kahuzi-Biega National Park consists of secondary forests. Only a brief survey will be presented here. The following forest types can be distinguished:

***Albizia-Parinari-Carapa-Secondary forest*** (loc. 143)***Macaranga neomildbraediana-Secondary forest*** (loc. 139 A)***Hagenia abyssinica-Secondary forest*** (loc. 138)***Alangium-Dombeya-Secondary forest*** (loc. 118)***Nuxia-Agauria-Secondary forest*** (loc. 135, 139 B)

Typical elements of secondary forests are the trees *Macaranga neomildbraediana*, *Dombeya goetzenii*, *Neoboutonia macrocalyx*, *Polyscias fulva* as well as *Arundinaria alpina*.

**II. Vegetation of Nyungwe Forest**

The Nyungwe forest, situated at the eastern crest of the Central African Graben shows a somewhat different vegetation mosaic. More detailed descriptions are provided by Fischer & Hinkel (1990, 1991). Here only an overview is presented. In the lower montane forest belt we find mountain forest communities with dominating *Parinari excelsa* and *Carapa grandiflora* (loc. 107, 113) as well as *Newtonia buchanani*-forest (loc. 112) with an upper tree layer of 35-40 m. As an endemic tree species, the Clusiaceae *Pentadesma reyndersii* does occur here.

Around swamps like the Kamiranzovu, a typical swamp forest with *Syzygium guineense* ssp. *parvifolium*, *Carapa grandiflora*, *Anthocleista*



*grandiflora* and *Podocarpus falcatus* (loc. 108, 155) is developed. The open cliffs and the wet flush vegetation near Karamba (loc. 106) is also remarkable and should be mentioned for their richness in bryophytes (e.g. *Sphagnum* spec., *Breutelia stuhlmannii*, *Chandonanthus hirtellus* and *Anastrophyllum piligerum*).

The middle montane forest belt is developed near Uwinka. Here forest communities with *Ocotea michelsoni*, *Syzygium guineense*, *Beilschmiedia rwandensis*, *Macaranga neomildbraediana* and *Balthasarea schliebenii* do occur (loc. 110, 111). In the eastern part of Nyungwe, secondary forests with *Macaranga* and *Neoboutonia macrocalyx* are dominating. The Rwasekoko swamp as an example of an night-cold air lake should be mentioned. Here we find an inverse profile with *Syzygium-Podocarpus-Ocotea* forest (loc. 103) on the summit of the hills, while the slopes bear *Andropogon shirensis*-grassland (loc. 102) with scattered shrubs of *Hagenia abyssinica* and *Erica rugegensis*. In the valley moorland and swamps with *Alchemilla johnstoni* (loc. 115), *Lobelia mildbraedii* and *Cyperus denudatus* (loc. 101) can be observed. Comparable swamp vegetation on more eutrophic soil is found near Pindura (loc. 114).

The upper montane forest belt consists mainly of Ericaceous woodland. The summit of Mt. Bigugu bears standings of *Erica rugegensis* and *Philippia benguellensis*.

### III. Vegetation of the Virunga Volcanoes

During the BRYOTROP-Expedition, the Mt. Karisimbi, with 4507 m the highest peak of Rwanda, was visited. The zonation of the vegetation shall be briefly described here. From 2700 to 3000 m a secondary *Dombeya*-forest with scattered *Hagenia* is developed (loc. 158), followed by a *Hagenia-Hypericum* belt from 3000 to 3300 m, where large moss balls are found (loc. 159). On the saddle of Karisimbi at 3400 m a moorland with *Senecio johnstoni* and *Philippia johnstoni* does occur (loc. 160). Around Lake Muderu, a *Sphagnum* peat bog with *Carex runsorensis* is developed (loc. 166). Above 3400 m a *Senecio johnstoni-Hypericum revolutum*-Subparamo can be observed (loc. 161). Due to acidic

soil conditions, an *Erica-Philippia* forest (loc. 167), comparable in its floristic composition with that on Mt. Kahuzi, is developed above Lake Muderu and on the steep slopes of the Susa-valley. The beginning of the Paramo is at 3600 m. It can be divided into two types, the *Senecio johnstoni-Lobelia stuhlmannii*-Paramo from 3600 to 3900 m (loc. 162) and the *Senecio johnstoni-Lobelia wollastoni*-Paramo from 3900 to 4200 m (loc. 163). Above 4200 m no more giant groundsel are found and nearly pure meadows of *Alchemilla johnstoni* (loc. 164) are developed. The summit at 4500 m is covered by an alpine desert, where bryophytes and lichens are dominating (loc. 165).

Apart from Nyungwe Forest and Karisimbi, short trips were made to the savanna-region of Rwanda (see fig. 1). A more detailed description of savanna vegetation is provided by Fischer & Hinkel (1991). During the BRYOTROP-Expedition, only rocky outcrops (loc. 116, 170), *Acacia* woodland and gallery forests (loc. 171) could be visited.

### IV. Description of collecting sites

**101**, Rwanda, Pref. de Gikongoro, Forêt de Nyungwe, Rwasekoko, 2450 m, 11.08. 1991 *Lobelia mildbraedii-Cyperus denudatus* bog with *Lobelia mildbraedii*, *Erica rugegensis*, *Anthospermum usambarense*, *Senecio nyungwensis*, *Clutia paxii*, *Hypericum revolutum*, *Cyperus nigricans*, *Cyperus denudatus*, *Alchemilla ellenbeckii*, *Kniphofia princiae*, *Cardamine pratensis*, *Xyris valida*, *Anagallis angustiloba*, *Aristea eckloni*, *Coelachne africana*, *Swertia adolfi-friderici*, *Blaeria kivuensis*, *Isotachis aubertii*, *Anthoceros spec.*, *Swertia calycina*, *Hypericum scioanum*, *Lycopodium clavatum*, *Veronica abyssinica*, *Carduus nyassanus*, *Carex conferta*, *Blechnum tabulare*, *Eriocaulon schimperii*, *Gладиолус dalenii*, *Helichrysum forskahlei*, *Helichrysum nandense*, *Sphagnum rugegensis*, *Cynorkis anacamptoides*, *Lobelia holstii*, *L. minutula*, *Satureja simensis*, *Ophioglossum vulgatum*, *Isolepis fluitans*, *Potamogeton thunbergii*, *Calitriche oreophila*, *Juncus effusus*, *Disa stairsii*, *D. eminii*, *D. robusta*.

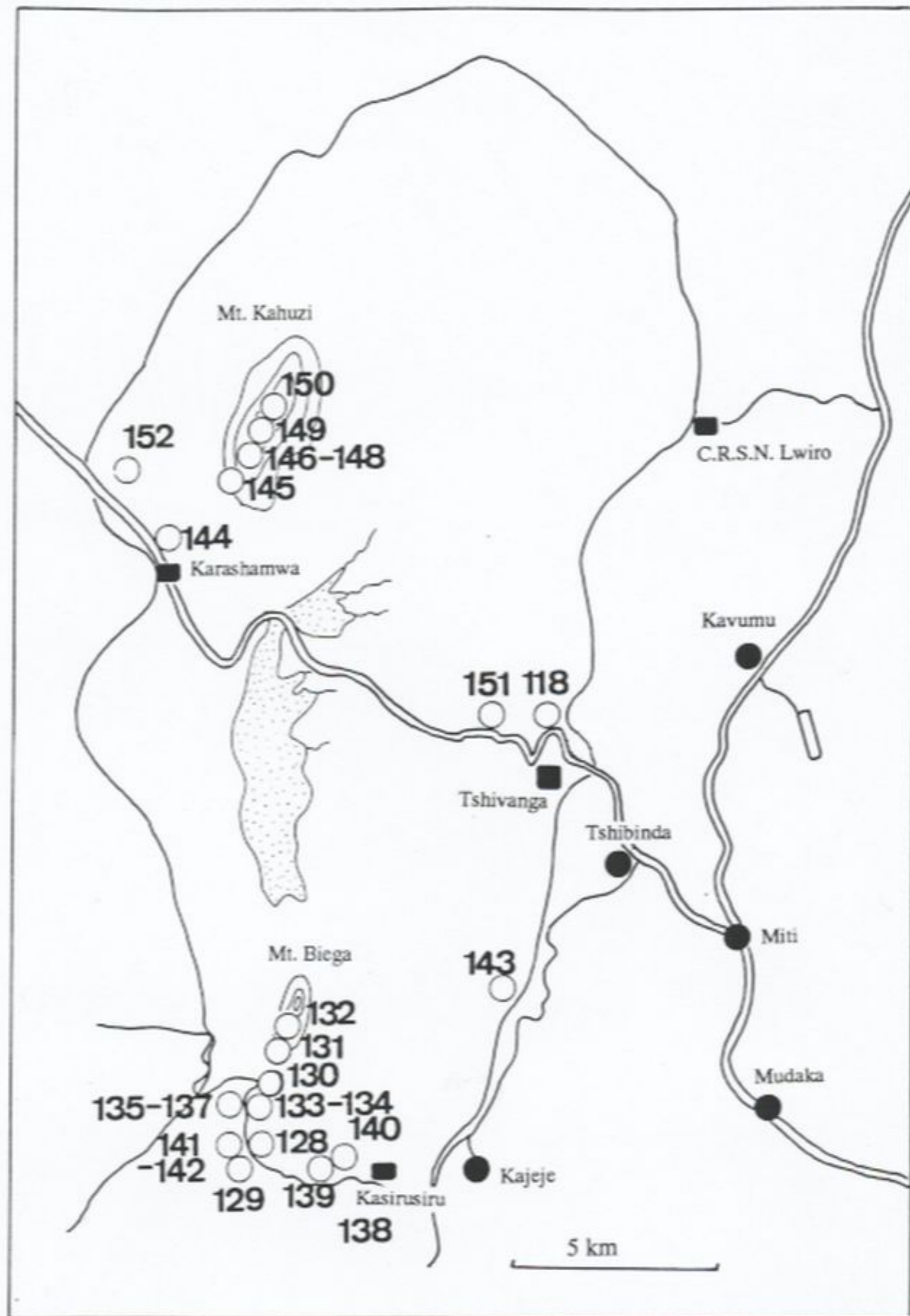


Fig. 2: Eastern part of Kahuzi-Biega National Park with locality numbers.



**102**, Rwanda, Pref. de Gikongoro, Forêt de Nyungwe, Rwasesenkoko, 2500 m, 11.08. 1991  
Ericaceous heath with *Andropogon shirensis*, *Andropogon shirensis*, *Lycopodium clavatum*, *Blechnum tabulare*, *Deschampsia flexuosa*, *Viola abyssinica*, *Lobelia holstii*, *Pteridium aquilinum*, *Senecio nyungwensis*, *Hagenia abyssinica*, *Blaeria kivuensis*, *Clusia paxii*, *Pennisetum clandestinum*, *Cliffortia nitidula*, *Helichrysum longiramus*, *Ardisiandra wettsteinii*, *Eragrostis spec.*, *Rubus kirungensis*, *Anthospermum usambarense*, *Gladiolus dalenii*, *Agauria salicifolia*

**103**, Rwanda, Pref. de Gikongoro, Forêt de Nyungwe, Rwasesenkoko, 2500 m, 12.08. 1991  
Montane Forest  
Trees and shrubs  
*Podocarpus latifolius*, *Ocotea usambarenis*, *Hagenia abyssinica*, *Hypericum revolutum*, *Erica rugegensis*, *Cliffortia nitidula*, *Xymalos monospora*, *Clusia paxii*, *Maytenus acutifolia*, *Rubus inedulis*, *Symphonia globulifera*, *Rapanea melanophloeos*, *Nuxia floribunda*  
Herbs  
*Lycopodium clavatum*, *Veronica abyssinica*, *Blechnum tabulare*, *Cyperus denudatus*, *Kniphofia princiae*, *Blaeria kivuensis*, *Pteridium aquilinum*, *Ardisiandra wettsteinii*, *Sibthorpia europaea*, *Deschampsia flexuosa*, *Thalictrum rhynchocarpum*, *Asplenium friesiorum*, *Sanicula elata*, *Impatiens burtonii*, *Otiophora pauciflora ssp. burttii*  
Climbers  
*Jasminum abyssinicum*, *Stephania cyanantha*

**104**, Rwanda, Pref. de Cyangugu, Forêt de Nyungwe, waterfall ca. 3 km E of Pindura, 2400 m, 12.08.1991

**105**, Rwanda, Pref. de Cyangugu, Forêt de Nyungwe, ca. 7 km E of Pindura along highway from Butare to Cyangugu, 2370 m, 12.08.1991

**106**, Rwanda, Pref. de Cyangugu, Forêt de Nyungwe, Karamba, rocky slopes in heath forest along abandoned road to Burundi, 2000 m, 13.08.1991  
Rocky slopes dominated by *Breutelia*, *Sphagnum*, *Chandonanthus hirtellus* and different *Frullania*

and *Campylopus*-species.

Shrubs

*Erica rugegensis*, *Polygala ruwenzoriensis*, *Vernonia scaettae*, *Ficalhoa laurifolia*, *Dichae-tanthera corymbosa*

Herbs

*Elaphoglossum aubertii*, *Lycopodium cernuum*, *Cynorkis anacamptoides*, *Otiophora pauciflora ssp. burttii*, *Blechnum tabulare*

Climbers

*Rhynchostigma racemosum*

**107**, Rwanda, Pref. de Cyangugu, Forêt de Nyungwe, Karamba, montane forest with *Dicranoloma billardiei*-mossballs in canopy, 2000 m, 13.08.1991

Canopy trees and medium-sized trees

*Symphonia globulifera*, *Parinari excelsa*, *Carapa grandiflora*, *Syzygium guineense*, *Pentadesma reyndersii*, *Podocarpus latifolius*, *Chrysophyllum gorungosanum*

Small trees and woody shrubs

*Jaundea pinnata*, *Garcinia volkensii*, *Rytigynia spec.*, *Memecylon walikalense*, *Lasianthus kilimandscharicus*, *Psychotria magnistipula*, *Ilex mitis*, *Dracaena laxissima*, *Schefflera goetzenii*, *Pentadesma reyndersii*, *Mimulopsis solmsii*

Climbers

*Smilax kraussiana*, *Monanthes orophila*

Herbs

*Impatiens purpureo-violacea*, *Impatiens niam-niamensis*, *Anisosepalum humbertii*, *Asplenium monanthes*, *Asplenium friesiorum*, *Symphonia globulifera juv.*, *Rhus spec.*, *Chlorophytum spec.*, *Memecylon walikalense juv.*

Epiphytes

*Culcasia falcifolia*, *Peperomia fernandopoiana*, *Impatiens keilii*, *Asplenium sandersonii*, *Asplenium mannii*, *Drynaria volkensii*, *Elaphoglossum aubertii*

**108**, Rwanda, Pref. de Cyangugu, Forêt de Nyungwe, Kamiranzovu, 2000 m, 13.08.1991

*Carapa grandiflora*-*Syzygium* swamp forest

Canopy trees and medium-sized trees

*Anthocleista grandiflora*, *Syzygium guineense*, *Podocarpus latifolius*, *Carapa grandiflora*, *Tabernaemontana johnstoni*, *Chrysophyllum gorungosanum*.

Small trees and woody shrubs

*Dichaetanthera corymbosa*, *Hymenodictyon floribundum*, *Mimulopsis arborescens*, *Syzygium rowlandii*, *Schefflera myriantha*, *Canthium oligocarpum*, *Garcinia volkensii*, *Memecylon walikalense*, *Xymalos monospora*, *Lasianthus kilimandscharicus*, *Tricalysia niarniamensis*, *Alliophylus chaunobotrys*.

Epiphytes

*Elaphoglossum spec.*, *Bulbophyllum bequaertii*, *Oleandra distenta*, *Canarina eminii*, *Impatiens nyungwensis*, *Asplenium theciferum*, *A. sandersonii*, *Hymenophyllum capillare*, *Peperomia fernandopoiana*, *Polystachya virginea*, *Diaphanthe burtii*, *Polystachya vulcanica*, *Senecio kanzibiense*, *Angraecum spec.*

Herbs

*Impatiens niarniamensis*, *I. purpureo-violacea*, *I. mildbraedii*, *I. bequaertii*, *I. stuhlmannii*, *Dissotis trothae*, *Tristemma leiocalyx*, *Begonia meyeri-johannis*, *B. scapigera*, *Isoglossa vulcanica*, *Marattia fraxinea*, *Oplismenus hirtellus*, *Aframomum mildbraedii*, *Calanthe sylvatica*, *Chlorophytum sp.*, *Selaginella sp.*, *Blotiella stipitata*.

**109**, Rwanda, Pref. de Cyangugu, Forêt de Nyungwe, Kamiranzovu, 1,5 km E of locality 108, roadside with waterfall along road from Butare to Cyangugu, 2100 m, 13.08.1991

**110**, Rwanda, Pref. de Cyangugu, Forêt de Nyungwe, Uwinka station along road from Butare to Cyangugu, 2400 m, 14.08.1991

Mesic montane evergreen forest

Canopy trees and medium-sized trees

*Hagenia abyssinica*, *Parinari excelsa*, *Erica rugegensis*, *Faurea saligna*, *Symphonia globulifera*, *Ocotea michelsoni*, *Syzygium guineense*, *Ficalhoa laurifolia*, *Balthasaria schliebenii*.

Small trees and woody shrubs

*Macaranga neomildbraediana*, *Stapfiella lucida*, *Chassalia subochreatea*, *Polygala ruwenzoriensis*, *Maytenus acuminata*, *Rytigynia lebruni*, *Mimulopsis solmsii*, *Psychotria mahoni*.

Epiphytes

*Vittaria volkensii*, *Asplenium theciferum*, *A. sandersoni*, *Hymenophyllum capillare*, *Phragmanthera rufescens*.

Herbs

*Impatiens purpureo-violacea*, *Anisosepalum*

*humbertii*, *Liparis epiphytica*, *Asplenium anisophyllum*, *Begonia meyeri-johannis*, *Rhynchosigma racemosum*, *Disperis anthoceros*, *Pteridium aquilinum*, *Panicum spec.*

**111**, Rwanda, Pref. de Cyangugu, Forêt de Nyungwe, Uwinka station along road from Butare to Cyangugu, 2300 m, 14.08.1991

Mesic montane evergreen forest

Canopy trees and medium-sized trees

*Parinari excelsa*, *Beilschmiedia rwandensis*, *Ficalhoa laurifolia*, *Ocotea usambarensis*, *Carapa grandiflora*, *Symphonia globulifera*, *Podocarpus latifolius*

Small trees and woody shrubs

*Jaundea pinnata*, *Ilex mitis*, *Chassalia subochreatea*, *Lasianthus kilimandscharicus*, *Carapa grandiflora*, *Zanthoxylum mildbraedii*, *Myrianthus holstii*

Herbs

*Dryopteris squamiseta*, *Acacia montigena*, *Blotiella stipitata*, *Cyperus spec.*, *Macaranga neomildbraediana juv.*, *Chlorophytum spec.*, *Chloachne oplismenoides*, *Rubus steudneri*, *Impatiens bequaertii*, *Impatiens purpureo-violacea*, *Cinncinobotrys oreophila*, *Asplenium friesiorum*, *Otiophora pauciflora ssp. burtii*

Climbers

*Begonia meyeri-johannis*, *Mikania cordata*, *Mikaniopsis scandens*, *Monanthes orophila*

**112**, Rwanda, Pref. de Cyangugu, Forêt de Nyungwe, Uwinka station along road from Butare to Cyangugu, 2100 m, 14.08.1991

Montane forest in valley with treeferns near waterfall

Canopy trees and medium-sized trees

*Newtonia buchanani*, *Strombosia scheffleri*, *Carapa grandiflora*, *Cassipourea gummiflua*, *Cleistopholis polyanthus*, *Entandrophragma excelsum*

Small trees and woody shrubs

*Carapa grandiflora*, *Teclea nobilis*, *Ilex mitis*, *Zanthoxylum gillettii*, *Zanthoxylum mildbraedii*, *Mimulopsis solmsii*, *Pavetta pierlotii*, *Cyathea manniana*

Herbs

*Dryopteris spec.*, *Asplenium friesiorum*, *Asplenium monanthes*, *Parinari excelsa juv.*, *Culcasia falcifolia*, *Anisosepalum humbertii*, *Doryop-*

*teris spec.*, *Newtonia buchanani* juv., *Blotiella stipitata*, *Impatiens bequaertii*, *Saintpauliopsis lebrunii*

Climbers

*Acacia montigena*

**113**, Rwanda, Pref. de Cyangugu, Forêt de Nyungwe, Uwinka station along road from Butare to Cyangugu, 2000 m, 14.08.1991 (Fig. 4).

Submontane forest

Canopy trees and medium-sized trees

*Albizia gummifera*, *Parinari excelsa*, *Carapa grandiflora*, *Entandrophragma excelsum*, *Strombosia scheffleri*, *Symphonia globulifera*, *Tabernaemontana johnstoni*, *Myrianthus holstii*, *Casipourea gummiflora*

Small trees and woody shrubs

*Zanthoxylum gillettii*, *Vernonia auriculifera*, *Alangium chinense*, *Marattia fraxinea*, *Mimulopsis solmsii*, *Cyathea manniana*

Herbs

*Dryopteris spec.*, *Piper capense*, *Chloachne oplismenoides*, *Impatiens bequaertii*, *Impatiens purpureo-violacea*, *Schizoboea kamerunensis*, *Elatostemma spec.*, *Palisota mannii*, *Selaginella auquieri*, *Brillantaisia cicatricosa*, *Chlorophytum spec.*

Epiphytes

*Drynaria volkensii*

**114**, Rwanda, Pref. de Gikongoro, Forêt de Nyungwe, 1,5 km S of Pindura along road from Butare to Cyangugu, 2300 m, 15.08. 1991

*Lobelia mildbraedii*-*Cyperus denudatus* bog  
*Lobelia mildbraedii*, *Hypericum revolutum*, *Rapanea melanophloeos*, *Senecio maranguensis*, *Cyperus denudatus*, *Epipactis africana*, *Satyrium crassicaule*, *Alchemilla ellenbeckii*, *Brillantaisia cicatricosa*, *Basella alba*, *Begonia meyeri-johannis*, *Englerina woodfordioides*, *Osmunda regalis*, *Carduus nyassanus*, *Cuscuta kilimanjarica*, *Coelachne africana*, *Cyclosorus spec.*

**115**, Rwanda, Pref. de Gikongoro, Forêt de Nyungwe along road from Butare to Cyangugu at border of prefect., 2330 m, 15.08. 1991

*Lobelia mildbraedii*-*Cyperus denudatus* bog  
*Cyperus denudatus*, *Alchemilla johnstoni*, *Hypericum revolutum*, *Callitriche oreophila*, *Iso-*

*lepis fluitans*, *Potamogeton thunbergii*, *Cliffortia nitidula*, *Cyperus latifolius*, *Cyperus nigricans*, *Anagallis angustiloba*, *Aristea ecklonii*

**116**, Rwanda, Pref. de Kigali, on the ridge of Bugesera N of Nyamata, 1450 m, 17.08.1991

Very degraded *Acacia* woodland with rocky outcrops

*Microchloa kunthii*, *Aeollanthus repens*, *Cyanotis lanata*, *Lindernia philcoxii*, *Craterostigma lanceolatum*, *Monechma subsessile*, *Evolvulus alsinoides*, *Scilla kirkii*, *Caralluma duemmeri*, *Polygala kagerensis*, *Marsilea minuta*, *Isoetes abyssinica*, *Rotala tenella*, *Kyllinga bulbosa*

**117**, Rwanda, Pref. de Cyangugu, hot springs 9 km NE of Bugarama near Nyakabuye Cement Factory, 1150 m, 19.08.1991

Surroundings of spring (38°C temp.)

*Nymphaea thermarum*, *Cyperus spec. A*, *Cyperus spec. B*, *Phragmites mauritianus*, *Crassocephalum spec.*, *Hydrocotyle sibthorpioides*, *Nitella spec.*, *Pluchea ovalis*, *Asystasia gangetica*, *Berula erecta*.

**118**, Zaïre, Prov. Kivu, Kahuzi-Biega National Park, Tshivanga Park Station 30 km NW of Bukavu, 2200 m, 20.08.1991

Mesic montane forest

Canopy trees and medium-sized trees

*Neoboutonia macrocalyx*, *Grewia mildbraedii*, *Milletia dura*, *Bridelia brideliifolia*, *Maesa lanceolata*, *Polyscias fulva*, *Dombeya goetzenii*, *Tabernaemontana johnstoni*, *Myrianthus holstii*, *Dracaena steudneri*

Small trees and woody shrubs

*Mimulopsis arborescens*, *Lindackeria kivuensis*, *Albizia gummifera*, *Pseudospondias microcarpa*, *Volkensia glomerata*, *Piper capense*, *Senecio mannii*, *Canthium oligocarpum*, *Allophylus chaunobotrys*, *Macaranga neomildbraediana*, *Solanum aculeatissimum*, *Maesa lanceolata*, *Chassalia subochreatea*, *Xymalos monospora*, *Rutidea fuscescens*, *Myrianthus holstii*, *Jaundea pinnata*, *Tabernaemontana johnstoni*, *Bersama abyssinica*, *Acanthus pubescens*, *Bothriocline ugandensis*, *Neoboutonia macrocalyx*, *Dombeya goetzenii*, *Vernonia auriculifera*, *Triumfetta cordifolia*, *Rubus kirungensis*

Herbs



*Girardinia bulbosa*, *Arisaema mildbraedii*, *Triumfetta rhomboidea*, *Pennisetum spec.*, *Impatiens burtoni*, *Blotiella stipitata*, *Thalictrum rynchocarpum*, *Kalanchoe integrifolia*, *Brillantaisia cicatricosa*, *Basella alba*, *Vernonia auriculifera*, *Gloriosa simplex*, *Chlorophytum spec.*, *Asplenium anisophyllum*, *Kosteletzkya spec.*, *Elatostemma monticola*, *Carduus leptacanthus*, *Geranium aculeolatum*, *Momordica foetida*, *Culcasia falcifolia*, *Acalypha villicaulis*, *Aegopodium podagraria*, *Piper capense*, *Dracaena laxissima*, *Bidens pilosa*, *Desmodium spec.*, *Setaria latifolia*, *Dalbergia lactescens*, *Pilea johnstoni*, *Selaginella spec.*, *Crassocephalum vitellinum*, *Urera cameroonensis*, *Vernonia amygdalina*, *Cyperus spec.*, *Commelina spec.*, *Albizia gummifera juv.*, *Euphorbia schimperiana*, *Ardisiandra wettsteini*, *Gynura scandens*, *Justicia flava*, *Achryanthes aspera*, *Polygonum salicifolium*, *Ranunculus multifidus*, *Hypoestes triflora*, *Pteridium aquilinum*, *Rubia cordifolia*, *Hypolepis spec.*, *Galinsoga ciliata*, *Riccia stricta*, *Dumortiera hirsuta*

#### Climbers

*Sericostachys scandens*, *Urera hypselodendron*, *Clerodendron fuscum*, *Smilax kraussiana*, *Clematis simensis*, *Cyphostemma mildbraedii*, *Thunbergia alata*

#### Epiphytes

*Pleopeltis schraderi*, *Drynaria volkensii*, *Asplenium sandersonii*, *Asplenium blastophorum*, *Culcasia falcifolia*, *Canarina eminii*, *Angraecum humile*.

**119**, Zaïre, Prov. Kivu, Irangi Forest Station 110 km NW of Bukavu, primary tropical rainforest along Luhoho stream, 850 m, 22.08.1991

#### Riverine forest

##### Canopy trees and medium-sized trees

*Uapaca benguelensis*, *Uapaca kirkiana*, *Albizia gummifera*, *Zanthoxylum gillettii*, *Pentadesma lebrunii*, *Annonidium mannii*, *Cynometra alexandri*, *Lebrunia bushaje*, *Julbernardia sereti*, *Gilbertiodendron dewevrei*, *Staudtia stipitata*, *Anthonota macrophylla*

##### Small trees and woody shrubs

*Rauwolfia mannii*, *Rinorea brachypetala*, *Thomandersia hensii*, *Alchornea cordifolia*, *Zanthoxylum gillettii*, *Tricalysia niarniamensis*,

*Albizia gummifera*, *Cyathea aethiopica*, *Piptadeniastrum africanum*

#### Herbs

*Stipularia spec.*, *Albizia gummifera juv.*, *Cyperus spec.*, *Palisota brachythyrsa*, *Geophila spec.*, *Geophila obvallata*, *Puelia spec.*, *Impatiens niarniamensis*, *Selaginella vogelii*, *Selaginella spec.*, *Aframomum laurentii*, *Panicum spec.*, *Anubias spec.*, *Renealmia congoensis*, *Sclerosperma mannii juv.*, *Marantochloa leucantha*, *Costus edulis*, *Marattia fraxinea*, *Lea guineensis*, *Impatiens clavigalcar*, *Impatiens erecticornis*, *Aframomum zambesiacum*, *Piper umbellatum*, *Aneilema spec.*, *Brillantaisia patula*, *Stephania abyssinica*, *Begonia zairensis*, *Isoglossa runsorica*, *Dorstenia spec.*

#### Epiphytes

*Culcasia scandens*, *Rhaphidophora africana*, *Bulbophyllum spec.*, *Begonia ampla*, *Polystachya babyloni*, *Anapeltis owariensis*

**120**, Zaïre, Prov. Kivu, Irangi Forest Station 110 km NW of Bukavu, primary tropical rainforest on slope, 900 m, 22.08.1991

#### Canopy trees and medium-sized trees

*Gilbertiodendron dewevrei*, *Uapaca benguelensis*, *Symphonia globulifera*, *Mammea africana*, *Khaya anthotheca*, *Cola acuminata*, *Omphalocarpum spec.*, *Zanthoxylum gillettii*, *Pentadesma lebrunii*, *Annonidium mannii*, *Cynometra alexandri*, *Lebrunia bushaje*, *Julbernardia sereti*, *Pentaclethra spec.*, *Staudtia stipitata*, *Myrianthus arboreus*, *Pycnanthus angolensis*, *Klainedoxia gabonensis*, *Irvingia gabonensis*.

#### Small trees and woody shrubs

*Rinorea brachypetala*, *Thomandersia hensii*, *Memecylon walikalense*, *Alchornea cordifolia*, *Angylocalyx pynaertii*, *Tricalysia niarniamensis*, *Cyathea aethiopica*, *Schefflera kivuensis*, *Gilbertiodendron dewevrei*, *Barteria spec.*, *Polyscias kivuensis*, *Pausinystylia ituriensis*, *Mezoneuron spec.*, *Sclerosperma mannii*, *Kigelia aethiopica*, *Voacanga spec.*

#### Herbs

*Stipularia spec.*, *Palisota brachythyrsa*, *Geophila spec.*, *Geophila obvallata*, *Puelia spec.*, *Impatiens niarniamensis*, *Selaginella vogelii*, *Selaginella spec.*, *Aframomum laurentii*, *Melastomataceae*, *Anubias spec.*, *Renealmia congoensis*, *Marantochloa leucantha*, *Albizia gum-*

*mifera* juv., *Costus edulis*, *Marattia fraxinea*, *Impatiens erecticornis*, *Begonia spec.*, *Isoglossa runssorica*, *Blotiella stipitata*, *Uapaca benguelensis* juv., *Gilbertiodendron dewevrei* juv., *Oplismenus spec.*, *Commelina spec.*, *Hypoestes spec.*, *Dracaena laxissima*, *Coleus spec.*, *Nephyptis spec.*, *Haumannia danckelmanniana*, *Halopegia azurea*.

#### Climbers

*Smilax kraussiana*, *Afromendocia spec.*, *Dioscorea spec.*

#### Semi-parasites

*Tapinanthus spec.*

#### Epiphytes

*Culcasia scandens*, *Rhaphidophora africana*, *Bulbophyllum spec.*, *Begonia ampla*, *Begonia spec.*, *Polystachya babyloni*, *Peperomia rotundifolia*, *Medinilla mannii*, *Angraecum distichum*, *Oleandra distenta*, *Drynaria volkensii*, *Anapeltis owariensis*, *Asplenium sandersonii*, *Impatiens irangiensis*, *Impatiens paucidentata*, *Loxogramme spec.*, *Rhipsalis baccifera*.

**121**, Zaïre, Prov. Kivu, Irangi Forest Station 110 km NW of Bukavu, primary tropical rainforest on ridge, 1000 m, 23.08.1991

#### Canopy trees and medium-sized trees

*Gilbertiodendron dewevrei*, *Uapaca benguelensis*, *Omphalocarpum spec.*, *Annonidium mannii*, *Cynometra alexandri*, *Julbernardia sereti*

#### Small trees and woody shrubs

*Rinorea brachypetala*, *Thomandersia hensii*, *Alchornea cordifolia*, *Tricalysia niarniamensis*

#### Herbs

*Stipularia spec.*, *Palisota brachythyrsa*, *Geophila spec.*, *Geophila obvallata*, *Puelia spec.*, *Impatiens niarniamensis*, *Marantochloa leucantha*, *Albizia gummifera* juv., *Gilbertiodendron dewevrei* juv., *Haumannia danckelmanniana*

#### Climbers

*Smilax kraussiana*

#### Semi-parasites

*Tapinanthus spec.*

#### Epiphytes

*Culcasia scandens*, *Rhaphidophora africana*, *Bulbophyllum spec.*, *Begonia spec.*, *Polystachya babyloni*, *Anapeltis owariensis*, *Peperomia rotundifolia*, *Medinilla mannii*,

*Angraecum distichum*, *Oleandra distenta*, *Drynaria volkensii*, *Asplenium sandersonii*, *Impatiens irangiensis*, *Impatiens paucidentata*, *Loxogramme spec.*, *Rhipsalis baccifera*

**122**, Zaïre, Prov. Kivu, Irangi Forest Station 110 km NW of Bukavu, wet rock boulders and very wet rainforest near waterfalls, 900 m, 23.08.1991

**123**, Zaïre, Prov. Kivu, Irangi Forest Station 110 km NW of Bukavu, primary tropical rainforest, 1100 m, 23.08.1991

#### Canopy trees and medium-sized trees

*Julbernardia sereti*, *Anthonota acuminata*, *Musanga cecropioides*, *Piptadeniastrum africanum*, *Cynometra alexandri*, *Staudtia stipitata*

#### Small trees and woody shrubs

*Zanthoxylum gilleti*, *Alchornea cordifolia*, *Psychotria spec.*, *Voacanga spec.*, *Piptadeniastrum africanum*, *Gilbertiodendron dewevrei*, *Cola acuminata*, *Angylocalyx pynaertii*, *Annonidium mannii*, *Pavetta spec.*, *Scaphopetalum thonneri*, *Lasianthus spec.*, *Polyscias kivuensis*

#### Herbs

*Leptaspis cochleata*, *Palisota brachythyrsa*, *Palisota mannii*, *Palisota spec.*, *Thalia spec.*, *Renalmia congoensis*, *Geophila obvallata*, *Impatiens clavigalcar*, *Cyathea aethiopica*, *Stipularia africana*, *Amorphophallus bequaertii*, *Blotiella stipitata*, *Brachystephanus africanus*, *Impatiens spec. nov.*, *Marantochloa leucantha*, *Begonia zairensis*, *Culcasia scandens*, *Chloachne oplismenoides*

#### Climbers

*Accacia montigena*, *Monanthotaxis poggei*, *Cissus spec.*

#### Epiphytes

*Asplenium sandersonii*, *Anthrophytum mannii*, *Nephrolepis biserrata*, *Culcasia scandens*, *Rhaphidophora africana*

**124**, Zaïre, Prov. Kivu, Irangi Forest Station 110 km NW of Bukavu, submontane rainforest below cliffs at the SW slope of Mt. Ilimu, 1300 m, 23.08.1991

#### Canopy trees and medium-sized trees

*Anningeria altissima*, *Mammea africana*, *Cynometra alexandri*, *Julbernardia sereti*, *Gilbertiodendron dewevrei*, *Cola acuminata*, *Monodora spec.*, *Staudtia stipitata*, *Piptadeniastrum*

*africanum*

Small trees and woody shrubs

*Voacanga spec.*, *Scaphopetalum thonneri*, *Zanthoxylum mildbraedii*, *Memecylon walikalense*, *Lasianthus spec.*, *Monopetalanthus spec.*, *Piptadeniastrum africanum*

Herbs

*Thonningia sanguinea*, *Renealmia congoensis*, *Leptaspis cochleata*, *Dryopteris spec.*, *Cinnobotrys speciosa*, *Cola acuminata* juv., *Geophila obvallata*, *Blotiella stipitata*, *Stipularia africana*, *Palisota mannii*, *Maranthochloa leucantha*

Epiphytes

*Asplenium sandersonii*, *Anapeltis owariensis*, *Culcasia scandens*, *Rhaphidophora africana*

**125**, Zaïre, Prov. Kivu, Irangi Forest Station 110 km NW of Bukavu, rocky cliffs at the SW slope of Mt. Ilimu, 1300 m, 23.08.1991

**126**, Zaïre, Prov. Kivu, Irangi Forest Station 110 km NW of Bukavu, Summit forest of Mt. Ilimu, 1500 m, 23.08.1991

Transitional forest

Canopy trees and medium-sized trees

*Ocotea michelsonii*, *Symphonia globulifera*, *Julbernardia sereti*, *Polyscias kivuensis*, *Cola acuminata*, *Piptadeniastrum africanum*, *Staudtia stipitata*

Small trees and woody shrubs

*Jaundea pinnata*, *Cola acuminata*, *Symphonia globulifera*, *Rytigynia spec.*, *Zanthoxylum mildbraedii*, *Memecylon walikalense*, *Monopetalanthus spec.*

Herbs

*Dryopteris spec.*, *Doryopteris spec.*, *Symphonia globulifera* juv., *Pteris spec.*, *Palisota mannii*, *Geophila obvallata*, *Renealmia congoensis*, *Asplenium cf. friesiorum*, *Dracaena spec. juv.*, *Impatiens niarniamensis*, *Impatiens claviger*, *Stipularia africana*

Epiphytes

*Bulbophyllum kivuense*, *Anapeltis owariensis*, *Drynaria volkensii*, *Asplenium sandersonii*, *Asplenium theciferum*, *Culcasia falcifolia*

**127**, Zaïre, Prov. Kivu, Irangi Forest Station 110 km NW of Bukavu, Site surrounding the fieldstation at the S bank of Luhoho river, 850 m,

25.08.1991

**128**, Zaïre, Prov. Kivu, Kahuzi-Biega-National Park, surroundings of Camp Biega 30 km W of Bukavu, 2400 m, 28.08.1991

Bamboo forest

Trees

*Arundinaria alpina*, *Macaranga neomildbraediana*, *Hagenia abyssinica*, *Nuxia floribunda*

Shrubs

*Dracaena afromontana*, *Schefflera goetzenii*, *Xymalos monospora*, *Polyscias fulva*, *Clerodendron johnstoni*, *Macaranga neomildbraediana*, *Canthium oligocarpum*

Herbs

*Panicum calvum*, *Phyllanthus odontadenius*, *Plectranthus luteus*, *Volkensia glomerata*, *Lobelia gibberoa*, *Polygala ruwenzoriensis*, *Asplenium friesiorum*, *Asplenium monanthes*, *Ipomoea involucrata*, *Selaginella spec.*

Epiphytes

*Polystachya cultrella*, *Bolusiella iridifolia*

Climbers

*Mikaniopsis scandens*

**129**, Zaïre, Prov. Kivu, Kahuzi-Biega-National Park, surroundings of Camp Biega 30 km W of Bukavu, Marais Lushanja S of Camp Biega, 2350 m, 27.08.1991

*Cyperus denudatus*-*Erica rugegensis*-*Xyris bog Erica rugegensis*, *Cyperus denudatus*, *Xyris valida*, *Osmunda regalis*, *Sphagnum planifolium rugegense*, *Laurembergia tetrandra*, *Otiophora pauciflora burttii*, *Rapanea melanophloeos*, *Blechnum tabulare*, *Isolepis fluitans*, *Sphagnum strictum pappeanum*, *Coelachne africana*, *Alchemilla ellenbeckii*, *Hypericum revolutum*, *Arachniopsis diacantha*

**130**, Zaïre, Prov. Kivu, Kahuzi-Biega-National Park, surroundings of Camp Biega 30 km W of Bukavu, 2500 m, 28.08.1991

Bamboo thicket at S foot of Biega ridge

Trees

*Arundinaria alpina*

Small trees and woody shrubs

*Nuxia floribunda*, *Dracaena afromontana*, *Xymalos monospora*, *Polyscias fulva*

Herbs

*Blotiella stipitata*, *Phyllanthus odontadenius*,



*Asplenium monanthes*, *Pilea rivularis*, *Hypoes-  
stes triflora*, *Plectranthus luteus*, *Ipomoea invo-  
lucrata*, *Selaginella*, *Thalictrum rhynchocar-  
pum*, *Panicum calvum*

Climbers

*Mikaniopsis scandens*

**131**, Zaïre, Prov. Kivu, Kahuzi-Biega-National  
Park, Mt. Biega, 2600 m, 28.08.1991

*Podocarpus-Psychotria* forest at the upper mar-  
gin of bamboo forest

Canopy trees and medium-sized trees

*Podocarpus latifolius*, *Syzygium guineense*,  
*Psychotria mahoni*, *Rapanea melanophloeos*,  
*Xymalos monospora*, *Balthasarea schliebenii*,  
*Schefflera goetzenii*, *Arundinaria alpina*

Small trees and woody shrubs

*Xymalos monospora*, *Chassalia subochreata*,  
*Schefflera goetzenii*, *Psychotria mahoni*, *Rham-  
nus prinoides*, *Allophylus chaunobotrys*, *Dra-  
caena afromontana*, *Arundinaria alpina*, *Mimu-  
lopsis arborescens*, *Volkensia glomerata*

Herbs

*Asplenium cf. stuhlmannii*, *Rubus runssorensis*,  
*Dryopteris squamiseta*, *Pteridium aquilinum*,  
*Cyperus spec.*, *Blotiella stipitata*, *Brillantaisia  
cicatricosa*, *Isoglossa vulcanica*, *Asplenium  
anisophyllum*, *Asplenium adiantum-nigrum*,  
*Asplenium monanthes*, *Plectranthus luteus*

Climbers

*Gynura scandens*, *Rhynchostigma racemosum*,  
*Urera hypselodendron*, *Clerodendron fuscum*,  
*Begonia meyeri-johannis*

Epiphytes

*Usnea spec.*, *Loxogramme lanceolata*, *Xiphop-  
teris flabelliforme*, *Hymenophyllum polyanthos*,  
*Asplenium theciferum*, *Vittaria guineensis*,  
*Peperomia fernandopoiana*

**132**, Zaïre, Prov. Kivu, Kahuzi-Biega-National  
Park, Mt. Biega, *Erica rugegensis* stand cover-  
ing the main Biega ridge from 2600 m to the  
summit 2705 m, 28.08.1991

*Erica rugegensis*, *Vaccinium stanleyi*, *Breutelia  
stuhlmannii*, *Breutelia diffracta*, *Polygala ru-  
wenzoriensis*, *Plectranthus spec.*, *Asplenium  
spec.*, *Senecio mariettae*, *Hedythyrus  
thamnoideus*, *Lycopodium clavatum*, *Pteridium  
aquilinum*, *Schefflera myriantha*, *Myrica  
salicifolia*, *Rhamnus prinoides*, *Vernonia*

*scaettae*, *Peucedanum runssoricum*, *Luzula  
abyssinica*, *Agauria salicifolia*, *Disa stairsii*,  
*Dicranum johnstoni*, *Cladonia spec.*,  
*Leptodontium spec.*, *Peltigera spec.*, *Campylopus  
spec.*, *Sphagnum strictum pappeanum*, *Sphagnum  
planifolium*

Epiphytes

*Usnea spec.*, *Cornicularia spec.*, *Parmelia spec.*,  
*Schiffneriolejeunea pappeana*, *Leucolejeunea  
xanthocarpa*, *Herbertus subdentatus*, *Plagio-  
chila ericicola*, *Frullania angulata*, *Loxogram-  
me lanceolata*, *Polystachya spec.*

**133**, Zaïre, Prov. Kivu, Kahuzi-Biega-National  
Park, Mt. Biega, *Podocarpus-Syzygium* forest 1-  
2 km W of Camp Biega, 2470 m, 29.08.1991

Canopy trees and medium-sized trees

*Podocarpus latifolius*, *Syzygium rowlandi*, *Bal-  
thasarea schliebenii*, *Macaranga neomildbrae-  
diana*, *Agauria salicifolia*, *Arundinaria alpina*,  
*Psychotria mahoni*, *Rapanea melanophloeos*,  
*Canthium oligocarpum*

Small trees and woody shrubs

*Vaccinium stanleyi*, *Lasianthus kilimandjari-  
cus*, *Pavetta rwandensis*, *Macaranga neomild-  
braediana*, *Psychotria mahoni*, *Xymalos  
monospora*, *Schefflera goetzenii*, *Balthasarea  
schliebenii*, *Podocarpus latifolius*, *Rhamnus  
prinoides*, *Eugenia capensis*, *Chassalia  
subochreata*, *Rapanea melanophloeos*, *Maesa  
lanceolata*, *Allophylus chaunobotrys*, *Rutidea  
fuscescens*, *Tricalysia niarniamensis*, *Myrica  
salicifolia*, *Erica rugegensis*

Herbs

*Osmunda regalis*, *Asparagus asparagoides*,  
*Blechnum tabulare*, *Asplenium anisophyllum*,  
*Dryopteris squamiseta*, *Drymaria cordata*,  
*Panicum monticola*, *Cyperus spec.*, *Isolepis flui-  
tans*, *Impatiens purpureo-violacea*, *Rubus ki-  
rungensis*, *Asplenium monanthes*, *Lindernia  
subracemosa*, *Pilea johnstoni*, *Isolepis costatus*,  
*Phyllanthus odontadenius*, *Carex chlorosaccos*,  
*Brillantaisia cicatricosa*, *Cyclosorus dentatus*,  
*Rubus steudneri*, *Cyperus denudatus*, *Sphagnum  
planifolium*, *Cincinnobotrys oreophila*

Climbers

*Rhynchostigma racemosum*, *Coccinea mildbrae-  
dii*, *Begonia meyeri-johannis*, *Monanthotaxis  
orophila*, *Mikaniopsis scandens*, *Dracaena la-  
xissima*

## Epiphytes

*Lepidozia cupressina*, *Frullania angulata*, *Pilotrichella spec.*, *Asplenium sandersonii*, *Xiphopteris flabelliforme*, *Loxogramme lanceolata*, *Vittaria guineensis*, *Hymenophyllum polyanthos*, *Elaphoglossum aubertii*, *Polystachya spec.*, *Peperomia fernandopoiana*, *Peperomia tetraphylla*, *Cyrtorchis arcuata*, *Polystachya vulcanica*, *Tridactyle spec.*, *Chamaeangis sarcophylla*

**134**, Zaïre, Prov. Kivu, Kahuzi-Biega-National Park, Mt. Biega, *Sphagnum-Juncus effusus* bog 1-2 km W of Camp Biega, 2470 m, 29.08.1991  
*Juncus effusus*, *Cyperus nigricans*, *Sphagnum planifolium rugegensense*, *Osmunda regalis*, *Hypericum revolutum*, *Rapanea melanophloeos*, *Isolepis fluitans*, *Polytrichum commune*, *Campylopus spec.*, *Psychotria mahoni*, *Sphagnum cuspidatum*, *Otiophora pauciflora burttii*, *Asparagus asparagoides*

**135**, Zaïre, Prov. Kivu, Kahuzi-Biega-National Park, Mt. Biega, *Hagenia-Agauria* forest on the E-slopes of Biega range, 2475-2560 m, 29.08.1991

## Trees

*Hagenia abyssinica*, *Macaranga neomildbraediana*, *Afrocrania volkensii*, *Rapanea melanophloeos*, *Nuxia floribunda*, *Agauria salicifolia*

## Shrubs

*Psychotria mahoni*, *Rapanea melanophloeos*, *Canthium oligocarpum*, *Xymalos monospora*, *Polyscias fulva*, *Volkensia glomerata*, *Podocarpus latifolius*

## Herbs

*Panicum calvum*, *Senecio maranguensis*, *Pteridium aquilinum*, *Asplenium monanthes*, *Asplenium friesiorum*, *Vernonia spec.*, *Thalictrum rhynchocarpum*, *Asparagus asparagoides*, *Rubus steudneri*, *Eulophia horsfallii*, *Epipactis africana*, *Lycopodium clavatum*, *Otiophora pauciflora ssp. burttii*, *Blechnum tabulare*, *Cyperus spec.*

## Climbers

*Clerodendron buchholzii*, *Rhynchostigma racemosum*

**136**, Zaïre, Prov. Kivu, Kahuzi-Biega-National Park, Mt. Biega, bamboo stand 2 km W of Camp

Biega on the lower E-slope of the Biega range, 2500 m, 29.08.1991

## Trees

*Arundinaria alpina*, *Macaranga neomildbraediana*, *Hagenia abyssinica*, *Polyscias fulva*, *Nuxia floribunda*, *Maesa lanceolata*

## Small trees and woody shrubs

*Agauria salicifolia*, *Clerodendron johnstoni*, *Dracaena afromontana*, *Syzygium rowlandi*, *Chassalia subochreatea*, *Polyscias fulva*, *Psychotria mahoni*, *Allophylus chaunobotrys*, *Xymalos monospora*, *Rhamnus prinoides*, *Canthium oligocarpum*, *Eugenia capensis*, *Podocarpus latifolius*, *Jaundea pinnata*, *Cyathea manniana*, *Lasianthus kilimandscharicus*

## Herbs

*Asplenium anisophyllum*, *Drymaria cordifolia*, *Blechnum tabulare*, *Selaginella*, *Panicum calvum*, *Rubus kirungensis*, *Pilea rivularis*, *Phyllanthus odontadenius*, *Vernonia amygdalina*, *Volkensia glomerata*, *Asplenium monanthes*, *Plectranthus luteus*, *Lobelia gibberoa*, *Polygala ruwenzoriensis*, *Thalictrum rhynchocarpum*, *Plectranthus spec.*, *Dryopteris squamiseta*, *Desmodium spec.*, *Ardisiandra wettsteinii*, *Senecio maranguensis*, *Epipactis africana*

## Climbers

*Schefflera goetzenii*, *Ipomoea involucrata*, *Thunbergia spec.*, *Begonia meyeri-johannis*, *Gynura scandens*, *Urera hypselodendron*, *Mikania cordata*, *Clematis simensis*

## Epiphytes

*Asplenium sandersonii*, *Vittaria guineensis*, *Polystachya spec.*, *Bolusiella iridifolia*

**137**, Zaïre, Prov. Kivu, Kahuzi-Biega-National Park, Mt. Biega, *Philippia* heath on the E slopes of the southern Biega range with boulders and cliffs, 2560-2610 m, 29.08.1991

## Trees

*Philippia benguellensis*, *Hagenia abyssinica*, *Macaranga neomildbraediana*, *Myrica salicifolia*, *Balthasarea schliebenii*, *Arundinaria alpina*, *Agauria salicifolia*

## Small trees and woody shrubs

*Hypericum revolutum*, *Nuxia floribunda*, *Rapanea melanophloeos*, *Canthium oligocarpum*, *Vaccinium stanleyi*, *Macaranga neomildbraediana*

## Herbs

*Panicum calvum*, *Lycopodium clavatum*, *Virec-taria major*, *Pteridium aquilinum*, *Senecio maranguensis*, *Ardisiandra wettsteini*, *Disa stair-sii*, *Epipactis africana*, *Senecio mariettae*, *Blechnum tabulare*, *Volkensia glomerata*, *Asplenium anisophyllum*, *Asplenium monanthes*, *Rubus kirungensis*, *Drymaria cordifolia*, *Otiophora pauciflora*, *Salvia nilotica*

Climbers

*Clematis simensis*, *Rhynchosigma racemosum*

Epiphytes

*Elaphoglossum aubertii*

**138**, Zaïre, Prov. Kivu, Kahuzi-Biega-National Park, Mt. Biega, dry *Hagenia* forest and secondary grasslands near Kasirusiru park gate at the Eend of National Park, 2300 - 2370 m, 30.08.1991  
Trees

*Hagenia abyssinica*, *Bersama abyssinica*, *Agauria salicifolia*

Shrubs

*Canthium oligocarpum*, *Rapanea melanophloeos*, *Rubus kirungensis*,

*Lobelia gibberoa*, *Polygala ruwenzoriensis*, *Nuxia floribunda*

Herbs

*Panicum calvum*, *Asplenium friesiorum*, *Ipomoea involucrata*, *Asplenium monanthes*, *Senecio maranguensis*, *Pennisetum spec.*, *Commelina spec.*, *Lactuca attenuata*, *Eriosema montanum*, *Triumfetta cordifolia*

Secondary grassland with

*Eragrostis racemosa*, *Pteridium aquilinum*, *Themeda triandra*, *Dissotis brazzae*, *Berkheya spekeana*, *Blaeria kivuensis*, *Eriosema montanum*, *Protea madiensis*

**139**, Zaïre, Prov. Kivu, Kahuzi-Biega-National Park, Mt. Biega, secondary montane forest 2 km N of Kasirusiru park gate, 2550 m, 30.08.1991  
**139 A**

Trees

*Macaranga neomildbraediana*, *Maesa lanceolata*, *Rapanea melanophloeos*, *Nuxia floribunda*, *Afrocrania volkensisii*

Shrubs

*Canthium oligocarpum*, *Psychotria mahoni*, *Syzygium guineense*, *Xymalos monospora*, *Polyscias fulva*, *Jaundea pinnata*, *Cyathea manniana*, *Rubus steudneri*, *Myrianthus holstii*,

*Carapa grandiflora*, *Chassalia subochreatea*, *Dracaena laxissima*, *Maytenus acuminata*

Herbs

*Asplenium friesiorum*, *Polyscias fulva* juv., *Pilea spec.*, *Piper capense*, *Lobelia gibberoa* juv., *Drymaria cordifolia*, *Thalictrum rhynchocarpum*, *Panicum spec.*, *Commelina spec.*, *Impatiens warburgiana*

Climbers

*Begonia meyeri-johannis*, *Mikania cordata*, *Rhynchosigma racemosum*, *Clerodendron buchholzii*, *Taccazea apiculata*

Epiphytes

*Drynaria volkensisii*, *Culcasia falcifolia*, *Angraecum humile*

**139 B**

Trees

*Agauria salicifolia*, *Macaranga neomildbraediana*, *Maesa lanceolata*, *Rapanea melanophloeos*, *Hagenia abyssinica*, *Nuxia floribunda*, *Bridelia brideliifolia*, *Anthocleista grandiflora*, *Polyscias fulva*

Shrubs

*Psychotria mahoni*, *Macaranga neomildbraediana*, *Rapanea melanophloeos*, *Canthium oligocarpum*, *Xymalos monospora*, *Clutia abyssinica*, *Polyscias fulva*, *Myrica salicifolia*, *Bersama abyssinica*

Herbs

*Asplenium friesiorum*, *Panicum calvum*, *Rubus steudneri*, *Lycopodium clavatum*, *Jaundea pinnata*, *Senecio maranguensis*, *Asplenium monanthes*, *Polygala ruwenzoriensis*

Climbers

*Asparagus asparagoides*

Epiphytes

*Drynaria volkensisii*

**140**, Zaïre, Prov. Kivu, Kahuzi-Biega-National Park, Mt. Biega area, *Lobelia mildbraedii*-*Cyperus denudatus* bog in small valley 2 km N of Kasirusiru park gate, 2250 m, 30.08.1991

*Lobelia mildbraedii*, *Brillantaisia cicatricosa*, *Alchemilla ellenbeckii*, *Cyperus latifolius*, *Eulophia horsfallii*, *Hagenia abyssinica* juv., *Cyclosorus spec.*, *Canthium oligocarpum*, *Jasminum abyssinicum*, *Rapanea melanophloeos*, *Hypericum revolutum*, *Stephania abyssinica*, *Stephania cyanantha*, *Triumfetta cordifolia*,



*Satyrium crassicaule*, *Epipactis africana*, *Galium chloroionanthum*, *Carduus nyassanus*, *Epilobium stereophyllum*, *Centella asiatica*, *Afrocrania volkensii*, *Culcasia falcifolia*, *Clutia abyssinica*

**141**, Zaïre, Prov. Kivu, Kahuzi-Biega-National Park, Mt. Biega area, *Podocarpus-Ocotea* forest at the margins of Lushanja bog, SW of Camp Biega, 2400 m, 31.08.1991

Canopy trees and medium-sized trees

*Podocarpus latifolius*, *Syzygium rowlandi*, *Ocotea usambarensis*,

*Balthasarea schliebenii*, *Macaranga neomildbraediana*, *Harungana montana*, *Rapanea melanophloeos*

Small trees and woody shrubs

*Lasianthus kilimandjaricus*, *Macaranga neomildbraediana*, *Xymalos monospora*, *Schefflera goetzenii*, *Vaccinium stanleyi*, *Balthasarea schliebenii*, *Podocarpus latifolius*, *Arundinaria alpina*, *Polyscias fulva*, *Rhamnus prinoides*, *Eugenia capensis*, *Canthium oligocarpum*, *Clutia abyssinica*, *Allophylus chaunobotrys*, *Rutidea fuscescens*, *Polygala engleri*, *Rubus kirungensis*, *Salacia erecta*, *Jaundea pinnata*

Herbs

*Asparagus asparagoides*, *Asplenium anisophyllum*, *Dryopteris squamiseta*, *Drymaria cordata*, *Panicum monticola*, *Impatiens purpureo-violacea*, *Impatiens stuhlmannii*, *Pilea johnstoni*, *Chlorophytum sparsiflorum*, *Brillantaisia cica-tricosa*

Climbers

*Stephania cyanantha*, *Monanthes orophila*, *Mikaniopsis scandens*, *Gynura scandens*, *Dracaena laxissima*

Epiphytes

*Lepidozia cupressina*, *Frullania angulata*, *Pilotrichella spec.*, *Asplenium sandersonii*, *Asplenium blastophorum*, *Asplenium theciferum*, *Asplenium mannii*, *Loxogramme lanceolata*, *Hymenophyllum polyanthos*, *Hymenophyllum capillare*, *Elaphoglossum aubertii*, *Polystachya spec.*, *Peperomia fernandopoiana*, *Canarina eminii*, *Senecio kanzibiensis*, *Cyrtorchis arcuata*, *Chamaeangis sarcophylla*, *Bolusiella iridifolia*

**142**, Zaïre, Prov. Kivu, Kahuzi-Biega-National

Park, Mt. Biega area, small forest covered islet in the Marais Lushanja, 2350 m, 01.09.1991

Canopy trees and medium-sized trees

*Podocarpus latifolius*, *Syzygium rowlandi*, *Macaranga neomildbraediana*, *Psychotria mahoni*, *Rapanea melanophloeos*, *Canthium oligocarpum*

Small trees and woody shrubs

*Vaccinium stanleyi*, *Lasianthus kilimandjaricus*, *Pavetta rwandensis*, *Psychotria mahoni*, *Xymalos monospora*, *Rhamnus prinoides*, *Chassalia subochreatea*, *Allophylus chaunobotrys*, *Rutidea fuscescens*, *Tricalysia niamniamensis*, *Myrica salicifolia*, *Erica rugegensis*

Herbs

*Osmunda regalis*, *Asparagus asparagoides*, *Blechnum tabulare*, *Asplenium anisophyllum*, *Dryopteris squamiseta*, *Isolepis fluitans*, *Impatiens purpureo-violacea*, *Isolepis costatus*, *Rubus steudneri*, *Cyperus denudatus*, *Sphagnum planifolium*, *Cinnobotrys oreophila*

Climbers

*Rhynchosigma racemosum*, *Begonia meyeri-johannis*, *Monanthes orophila*, *Mikaniopsis scandens*, *Dracaena laxissima*

Epiphytes

*Frullania angulata*, *Pilotrichella spec.*, *Xiphopteris flabelliforme*, *Loxogramme lanceolata*, *Hymenophyllum polyanthos*, *Polystachya spec.*, *Peperomia fernandopoiana*, *Cyrtorchis arcuata*, *Polystachya vulcanica*, *Tridactyle spec.*, *Chamaeangis sarcophylla*

**143**, Zaïre, Prov. Kivu, Kahuzi-Biega-National Park, Kakenge, submontane secondary forest with many treeferns along road from Tshivanga to Kalonge, 2100 m, 02.09.1991

Canopy trees and medium-sized trees

*Parinari excelsa*, *Albizia gummifera*, *Carapa grandiflora*, *Symphonia globulifera*, *Newtonia buchanani*, *Alangium chinense*, *Macaranga neomildbraediana*

Small trees and woody shrubs

*Albizia gummifera*, *Carapa grandiflora*, *Maesa lanceolata*, *Symphonia globulifera*, *Chassalia subochreatea*, *Macaranga neomildbraediana*, *Tabernaemontana johnstoni*, *Psychotria spec.*, *Lasianthus kilimandscharicus*, *Jaundea pinnata*, *Alangium chinense*, *Teclea nobilis*, *Dalber-*





Fig. 3: Mt. Kahuzi seen from South, collecting sites 144-150. Phot. Pócs.

Epiphytes

*Cyrtorchis arcuata*, *Asplenium sandersonii*

144, Zaïre, Prov. Kivu, Kahuzi-Biega-National Park, Mt. Kahuzi, bamboo forest on the foothill near Karashamwa Post on the E slope of the main ridge, 2300 - 2600 m, 03.09.1991

Trees

*Arundinaria alpina*

Shrubs

*Canthium oligocarpum*, *Polyscias fulva*, *Triumfetta cordifolia*

Herbs

*Asplenium monanthes*, *Pilea rivularis*, *Ipomoea involucrata*, *Thalictrum rhynchocarpum*, *Panicum calvum*, *Chlorophytum sparsiflorum*, *Pteridium aquilinum*, *Viola abyssinica*, *Impatiens warburgiana*, *Desmodium spec.*, *Drymaria cordata*, *Rubus kirungensis*

Climbers

*Mikaniopsis scandens*

145, Zaïre, Prov. Kivu, Kahuzi-Biega-National Park, Mt. Kahuzi, heath vegetation on the ridge along summit trail, 2600 - 3000 m, 03.09.1991  
Small trees and woody shrubs

*Philippia benguellensis*, *Hagenia abyssinica*, *Psychotria mahoni*, *Myrica salicifolia*, *Balthasarea schliebenii*, *Agauria salicifolia*, *Erica rugegensis*, *Rapanea melanophloeos*, *Canthium oligocarpum*, *Vaccinium stanleyi*, *Psychotria mahoni*, *Peddiea orophila*, *Maesa lanceolata*, *Xymalos monospora*, *Podocarpus latifolius*, *Dracaena afromontana*

Herbs

*Panicum calvum*, *Pteridium aquilinum*, *Senecio mariettae*, *Asplenium anisophyllum*, *Asplenium monanthes*, *Rubus kirungensis*, *Otiophora pauciflora*, *Salvia nilotica*, *Vernonia scaettae*, *Hedythyrus thamnoideus*, *Bothriocline ugandensis*, *Lactuca attenuata*, *Satureja simensis*, *Dryopteris callolepis*, *Hypolepis spec.*, *Polytrichum commune*

Climbers

*Rhynchosigma racemosum*

Epiphytes

*Loxogramme lanceolata*, *Xiphopteris flabelliforme*, *Usnea spec.*

146, Zaïre, Prov. Kivu, Kahuzi-Biega-National Park, Mt. Kahuzi, open rocks with cliffs along summit trail, 2900 - 3000 m, 03.09.1991



## Climbers

*Rhynchosigma racemosum*

## Epiphytes

*Loxogramme lanceolata*, *Xiphopteris flabelliforme*, *Usnea spec.*

**146**, Zaïre, Prov. Kivu, Kahuzi-Biega-National Park, Mt. Kahuzi, open rocks with cliffs along summit trail, 2900 - 3000 m, 03.09.1991

*Deschampsia flexuosa*, *Erica rugegensis*, *Aira caryophyllaea*, *Vernonia scaetiae*, *Otiophora pauciflora ssp. burttii*, *Helichrysum nandense*, *Helichrysum mildbraedii*, *Cyanotis spec.*, *Xiphopteris flabelliforme*, *Vaccinium stanleyi*, *Bothriocline ugandensis*, *Kniphofia thomsoniae*, *Breutelia diffracta*, *Breutelia stuhlmannii*, *Campylopus flaccidus*, *Polytrichum piliferum*

**147**, Zaïre, Prov. Kivu, Kahuzi-Biega-National Park, Mt. Kahuzi, bamboo thicket on the ridge along summit trail, 3100 - 3140 m, 03.09.1991  
Trees

*Arundinaria alpina*

## Shrubs

*Rytigynia spec.*, *Psychotria mahoni*, *Maesa lanceolata*,

## Herbs

*Rubus kirungensis*, *Impatiens gesnerioides superglabra*, *Carex petitiana*, *Mikaniopsis tedlei*, *Satureja simensis*, *Dryopteris callolepis*, *Pilea bambuseti*

**148**, Zaïre, Prov. Kivu, Kahuzi-Biega-National Park, Mt. Kahuzi, Elfin forest like *Podocarpus-Syzygium* stand bamboo along summit trail, 3140 - 3200 m, 03.09.1991

## Canopy trees and medium-sized trees

*Podocarpus latifolius*, *Psychotria mahoni*, *Canthium oligocarpum*, *Syzygium guineense*

## Small trees and woody shrubs

*Volkensia glomerata*, *Vaccinium stanleyi*, *Erica rugegensis*, *Hedythyrus thamnoideus*

## Herbs

*Asplenium cf. stuhlmannii*, *Dryopteris squamisetata*, *Senecio trichopterygius*, *Impatiens gesnerioides superglabra*, *Carex petitiana*

## Epiphytes

*Plagiochila ericicola*, *Herbertus subdentatus*, *Chandonanthus hirtellus*, *Usnea spec.*, *Xiphopteris flabelliforme*, *Hymenophyllum polyanthos*

**149**, Zaïre, Prov. Kivu, Kahuzi-Biega-National Park, Mt. Kahuzi, *Erica-Senecio-Subparamo* along summit trail, 3200 - 3300 m, 03.09.1991  
*Senecio johnstoni kahuzicus*, *Erica rugegensis*, *Deschampsia flexuosa afromontana*, *Lycopodium clavatum*, *Hedythyrus thamnoideus*, *Vaccinium stanleyi*, *Senecio subsessilis*, *Disa stairsii*, *Huperzia saururus*, *Impatiens gesnerioides superglabra*, *Sphagnum strictum pappeanum*, *Breutelia stuhlmannii*, *Breutelia diffracta*, *Vernonia scaetiae*, *Luzula abyssinica*, *Isolepis setacea*, *Viola eminii*, *Carex conferta*, *Peucedanum runssoricum*, *Pityrogramma aurantiaca*, *Senecio trichopterygius*, *Kniphofia thomsoniae*, *Carpha angustissima*, *Helichrysum mildbraedii*, *Helichrysum formosissimum*, *Helichrysum forskahlei*

## Epiphytes

*Herbertus subdentatus*, *Chandonanthus cavallii*

**150**, Zaïre, Prov. Kivu, Kahuzi-Biega-National Park, Mt. Kahuzi, summit region with dwarf *Erica*, grasslands and rocks, 3307 m, 03.09.1991  
*Helichrysum mildbraedii*, *Helichrysum forskahlei*, *Helichrysum formosissimum*, *Deschampsia flexuosa afromontana*, *Senecio subsessilis*, *Festuca simensis*, *Viola eminii*, *Disa stairsii*, *Lycopodium clavatum*, *Swertia macrosepala*, *Erica rugegensis*, *Philippia johnstoni*, *Isolepis setacea*, *Huperzia saururus*, *Rubus runssorensis*, *Lobelia stuhlmannii*, *Luzula abyssinica*, *Breutelia diffracta*

**151**, Zaïre, Prov. Kivu, Kahuzi-Biega-National Park, Mt. Kahuzi, montane forest in valley S of Tshivanga-Irangi road around big swamp, 2300 m, 03.09.1991

**152**, Zaïre, Prov. Kivu, Kahuzi-Biega-National Park, Mt. Kahuzi, submontane forest in the NNE valley of Kahuzi N of the park boarder close to Tshivanga-Irangi road, 1930 - 2060 m, 06.09.1991

## Canopy trees and medium-sized trees

*Newtonia buchanani*, *Parinari excelsa*, *Albizia gummifera*, *Strombosia scheffleri*, *Carapa grandiflora*, *Symphonia globulifera*, *Chrysophyllum gorungosanum*, *Pancovia golungensis*

## Small trees and shrubs



Fig. 4: Interior of Nyungwe forest, locality number 113. Phot. Pócs.

#### Herbs

*Mimulopsis solmsii*, *Dracaena laxissima*, *Albizia gummifera* juv., *Palisota mannii*, *Chloachne oplismenoides*, *Teclea nobilis* juv., *Asplenium monanthes*, *Asplenium sandersonii*, *Renealmia congoensis*, *Geophila spec.*, *Culcasia falcifolia*, *Polyscias fulva* juv., *Anisosepalum humbertii*, *Impatiens congolensis*, *Impatiens erecticornis*, *Symphonia globulifera* juv., *Arisaema mildbraedii*, *Doryopteris concolor*, *Sclerochiton obtusi-*

*sepalum*, *Chlorophytum spec.*

#### Climbers

*Mikaniopsis scandens*, *Acacia montigena*, *Schefflera goetzenii*, *Begonia meyeri-johannis*

#### Epiphytes

*Peperomia tetraphylla*, *Peperomia fernandopiana*, *Begonia spec.*, *Culcasia falcifolia*, *Asplenium sandersonii*

153, Rwanda, Pref. de Cyangugu, Tea plantation



*sepalum*, *Chlorophytum spec.*

Climbers

*Mikaniopsis scandens*, *Acacia montigena*, *Schefflera goetzenii*, *Begonia meyeri-johannis*

Epiphytes

*Peperomia tetraphylla*, *Peperomia fernandopoiiana*, *Begonia spec.*, *Culcasia falcifolia*, *Asplenium sandersonii*

**153**, Rwanda, Pref. de Cyangugu, Tea plantation near Cyongoroka along road from Cyangugu to Butare, roadside ditch, 1600 m, 10.09.1991

**154**, Rwanda, Pref. de Cyangugu, Tea plantation near the W edge of Nyungwe forest near Gisakura, bryophytes under tea shrubs and in ditches, 1970 m, 10.09.1991

**155**, Rwanda, Pref. de Cyangugu, Forêt de Nyungwe, W edge of forest near Gisakura, very mossy forest, 2000 m, 10.09.1991

Canopy trees and medium-sized trees

*Anthocleista grandiflora*, *Syzygium guineense*, *Carapa grandiflora*, *Pentadesma reyndersii*

Small trees and woody shrubs

*Syzygium guineense*, *Psychotria palustris*, *Alchornea hirtella*, *Chassalia subochreatea*, *Hymenodictyon floribundum*, *Rapanea melanophloeos*, *Anthocleista grandiflora*, *Maesa lanceolata*, *Carapa grandiflora*, *Tricalysia niamniamentensis*, *Lasianthus kilimandscharicus*, *Rutidea orientalis*, *Rauvolfia vomitoria*, *Schefflera myriantha*

Herbs

*Impatiens purpureo-violacea*, *Impatiens niamniamentensis*, *Drynaria volkensisii*, *Cyperus denudatus*, *Hydrocotyle sibthorpioides*, *Tristemma leiocalyx*, *Phyllanthus odontadenius*, *Coelachne africana*, *Brillantaisia cicatricosa*, *Otiophora pauciflora burttii*

Climbers

*Rhynchosigma racemosum*, *Periploca spec.*, *Begonia meyeri-johannis*

Epiphytes

*Hymenophyllum triangulare*, *Xiphopteris flabelliforme*, *Oleandra distenta*, *Vittaria spec.*, *Impatiens keilii*, *Peperomia fernandopoiiana*, *Peperomia tetraphylla*, *Begonia spec.*, *Canarina eminii*, *Culcasia falcifolia*, *Aerangis muscicola*, *Polystachya troupinii*

**156**, Rwanda, Pref. de Cyangugu, Forêt de Nyungwe, along road from Cyangugu to Butare, 1 km E of Pindura, near small waterfall, 2380 m, 10.09.1991

**157**, Rwanda, Pref. de Cyangugu, Forêt de Nyungwe, along road from Cyangugu to Butare, highest point of road E of Rwasekoko, 2460 m, 11.09.1991

**158**, Rwanda, Pref. de Ruhengeri, Mt. Karisimbi, secondary forest at park gate, S-slope of Mt. Bisoke, 2700 - 3000 m, 13.09.1991

Trees

*Dombeya goetzenii*, *Hagenia abyssinica*, *Afrocarania volkensisii*

Shrubs

*Senecio mannii*, *Dombeya goetzenii*, *Girardinia bullosa*, *Vernonia auriculifera*, *Discopodium penninervum*, *Lobelia gibberoa*

Herbs

*Carduus leptacanthus*, *Plectranthus assurgens*, *Impatiens burtoni*, *Girardinia bullosa*, *Plantago palmata*, *Peucedanum spec.*, *Galium chloroionanthum*, *Parochetus communis*, *Tectaria spec.*, *Asplenium friesiorum*, *Alchemilla kivuensis*, *Hypoestes triflora*, *Geranium aculeolatum*, *Trifolium purseglovei*

Climbers

*Urera hypselodendron*, *Gynura scandens*

**159**, Rwanda, Pref. de Ruhengeri, Mt. Karisimbi, *Hagenia-Hypericum* forest (with mossballs on branches) in the saddle between Mt. Bisoke and Mt. Karisimbi, 3000 - 3300 m, 13.09.1991 (fig. 5).

Trees

*Hagenia abyssinica*, *Hypericum revolutum*

Shrubs

*Hypericum revolutum*, *Lobelia gibberoa*

Herbs

*Carduus nyassanus*, *Carex petitiana*, *Carex mildbraediana*, *Carex conferta*, *Carex johnstoni*, *Parochetus communis*, *Echinops hoehneli*, *Hydrocotyle sibthorpioides*, *Ranunculus cf. multifidus*, *Laportea ovalifolia*, *Selaginella spec.*, *Galium chloroionanthum*, *Geranium aculeolatum*, *Callitriche vulcanica*, *Alchemilla kivuensis*, *Alchemilla cryptantha*, *Lobelia gibberoa juv.*, *Senecio maranguensis*, *Hypolepis centrali-*



**Fig. 5:** Hagenia-Hypericum forest with mossballs at Mt. Karisimbi, locality no. 159. Phot. Pócs.

*sii*, *Polystachya kermesina*

160, Rwanda, Pref. de Ruhengeri, Mt. Karisimbi, moorland with giant *Senecios* along trail from Karisoke to Mt. Karisimbi, 3350 m, 13.09.1991

*Helichrysum globosum*, *Carex conferta*, *Peucedanum kersteni*, *Alchemilla johnstoni*, *Hydrocotyle mannii*, *Luzula abyssinica*, *Poa leptoclada*, *Carex petitiana*, *Senecio johnstoni* ssp. *refrak-*

*tisquamatus*, *Hypericum revolutum*, *Lobelia minutula*, *Swertia macrosepala*, *Ranunculus oreophytus*, *Isolepis fluitans*, *Isolepis setacea*, *Isolepis costata*, *Juncus dregeanus*, *Subularia monticola*, *Montia fontana*, *Anagallis angustiloba*, *Huperzia saururus*, *Hypericum scioanum*, *Festuca engleri*, *Breutelia stuhlmannii*

161, Rwanda, Pref. de Ruhengeri, Mt. Karisimbi, *Hypericum-Senecio* subparamo at the E-slopes along trail to summit, 3400 - 3600 m, 13.09.1991



*Senecio johnstoni* ssp. *refractisquamatus*, *Hypericum revolutum*, *Lobelia stuhlmannii*, *Lobelia wollastonii* juv., *Helichrysum helothamnus*, *Alchemilla johnstoni*, *Festuca engleri*, *Deschampsia flexuosa*, *Subularia monticola*, *Erigeron spec.*, *Callitriche vulcanica*, *Carex conferta*, *Isolepis setacea*, *Isolepis fluitans*, *Romulea congoensis*, *Luzula johnstoni*, *Luzula abyssinica*, *Lobelia minutula*, *Swertia macrosepala*, *Galium ruwenzoriense*, *Rubus runssorensis*, *Parochetus communis*, *Carduus nyassanus*, *Alchemilla ellenbeckii*, *Poa annua*, *Viola eminii*, *Helichrysum formosissimum*, *Breutelia stuhlmannii*

**162**, Rwanda, Pref. de Ruhengeri, Mt. Karisimbi, *Senecio-Lobelia stuhlmannii* paramo on the E-slopes along trail to summit, 3600 - 3900 m, 14.09.1991

*Senecio johnstoni* ssp. *refractisquamatus*, *Lobelia stuhlmannii*, *Lobelia gibberoa*, *Philippia johnstoni*, *Hypericum revolutum*, *Alchemilla johnstoni*, *Festuca engleri*, *Deschampsia flexuosa*, *Subularia monticola*, *Carex conferta*, *Carex petitiana*, *Isolepis setacea*, *Isolepis fluitans*, *Luzula johnstoni*, *Luzula abyssinica*, *Cardamine africana*, *Cerastium afromontanum*, *Montia fontana*, *Swertia macrosepala*, *Galium ruwenzoriense*, *Ranunculus stagnalis*, *Rubus runssorensis*, *Poa leptoclada*, *Agrostis quinque-seta*, *Sibthorpia europaea*, *Peucedanum kersteni*, *Viola eminii*, *Helichrysum guilelmi*, *Huperzia saururus*, *Breutelia stuhlmannii*

**163**, Rwanda, Pref. de Ruhengeri, Mt. Karisimbi, open *Senecio-Lobelia wollastonii* paramo at the E slope along trail to summit, 3900 - 4200 m, 14.09.1991

*Senecio johnstoni* ssp. *refractisquamatus*, *Lobelia wollastonii*, *Alchemilla johnstoni*, *Festuca abyssinica*, *Deschampsia flexuosa*, *Subularia monticola*, *Luzula johnstoni*, *Luzula abyssinica*, *Cardamine africana*, *Cerastium afromontanum*, *Montia fontana*, *Ranunculus oreophytus*, *Ranunculus stagnalis*, *Callitriche vulcanica*, *Poa annua*, *Poa muhavurensis*, *Poa schimperiana*, *Romulea congoensis*, *Peucedanum kersteni*, *Viola eminii*, *Helichrysum guilelmi*, *Helichrysum nandense*, *Helichrysum newii*, *Breutelia stuhlmannii*

**164**, Rwanda, Pref. de Ruhengeri, Mt. Karisimbi, *Alchemilla* mats interrupted by boulders on the E slope in the alpine belt, 4200 - 4400 m, 14.09.1991  
*Alchemilla johnstoni*, *Poa muhaburensis*, *Cerastium afromontanum*, *Poa schimperiana*, *Agrostis taylori*, *Andraea mildbraedii*, *Polytrichum piliferum*, *Campylopus nivalis*

**165**, Rwanda, Pref. de Ruhengeri, Mt. Karisimbi, summit region. Alpine desert with large boulders, 4400 - 4507 m, 14.09.1991  
*Alchemilla johnstoni*, *Poa muhaburensis*, *Andraea mildbraedii*, *Andraea firma*, *Polytrichum piliferum*, *Anastrophyllum auritum*, *Marsupella africana*, *Campylopus nivalis*

**166**, Rwanda, Pref. de Ruhengeri, Mt. Karisimbi, Lac Muderu Crater Lake W of Susa river surrounded by *Sphagnum-Carex* peat bog, 3400 m, 14.09.1991

*Carex runssorensis*, *Sphagnum strictum* ssp. *pappeanum*, *Breutelia stuhlmannii*, *Swertia macrosepala*, *Disa stairsii*, *Lobelia wollastonii*, *Senecio johnstoni* ssp. *refractisquamatus*, *Peucedanum kerstenii*, *Subularia monticola*, *Huperzia saururus*, *Senecio subsessilis*, *Eriocaulon schimperi*, *Helichrysum nandense*, *Isolepis fluitans*, *Alchemilla johnstoni*, *Agrostis taylori*, *Carex johnstoni*, *Carex conferta*

**167**, Rwanda, Pref. de Ruhengeri, Mt. Karisimbi, *Erica* forest SW of Susa river with large mossballs, ground covered with *Breutelia* and *Sphagnum*, 3500 m, 14.09.1991

Trees and shrubs

*Erica arborea*, *Philippia johnstoni*, *Senecio johnstoni* ssp. *refractisquamatus*, *Lobelia stuhlmannii*

Herbs

*Senecio mariettae*, *Deschampsia flexuosa*, *Ca-*

*rex johnstoni*, *Luzula johnstoni*, *Alchemilla johnstoni*, *Xiphopteris flabelliforme*, *Huperzia saururus*, *Disa stairsii*, *Sibthorpia europaea*, *Galium ruwenzoriense*, *Breutelia stuhlmannii*, *Breutelia diffracta*, *Sphagnum spec.*, *Chandonanthus hirtellus ssp. giganteus*

**168**, Rwanda, Pref. de Gisenyi, N end of Gishwati forest between Ruhengeri and Gisenyi W of Gakarara, pasture with boulders, 2500 m, 16.09.1991

**169**, Rwanda, Pref. de Ruhengeri, Tea plantation near Mukamira between Ruhengeri and Gisenyi, banks of ditches, 2500 m, 16.09.1991

**170**, Rwanda, Pref. de Kibungo, E-edge of Rwanda plateau near Rugarama, NE escarpment with quartzitic rocks and dry grassland vegetation, 1500 m, 18.09.1991

*Polystachya dendrobitiflora*, *Sopubia simplex*, *Sopubia conferta*, *Streptocarpus bindseili*, *Microchloa kunthii*, *Pellaea calomelanos*, *Crassula alba*, *Selaginella niarniamensis*, *Asplenium stuhlmannii*, *Aeollanthus repens*, *Vernonia perrotteti*, *Boophone disticha*, *Parinari curatellifolia*, *Indigofera asparagoides*, *Albuca abyssinica*, *Sporobolus festivus*, *Aloe bukobana*, *Crateostigma lanceolatum*, *Loudetia simplex*, *Cassia mimosoides*

**171**, Rwanda, Pref. de Kibungo, E-edge of Rwanda plateau, Lake Mpanga region S of Akagera National Park, mosaic of dry *Acacia* woodland, dry forest and gallery forest, 1300 m, 18.09.1991

**171 A**, Dry forest

Small trees and woody shrubs

*Haplocoelum gallaense*, *Strychnos usambarensis*, *Canthium lactescens*, *Nuxia congesta*, *Albizia antunesiana*, *Lannea fulva*, *Croton dichogamus*, *C. macrostachys*, *Teclea trichocarpa*, *Rhus longipes*, *Securidaca longepedunculata*, *Lannea stuhlmannii*, *Grewia platyclada*, *Obetia radula*, *Aloe volkensii*, *Capparis sepiaria var. rivae*.

Epiphytes

*Usnea sp.*, *Frullania ericoides*, *Microcoelia guyoniana*, *Aerangis verdickii*, *A. kotschyana*.

Herbs

*Sansevieria parva*, *S. intermedia*, *Asplenium*

*aethiopicum*, *Pellaea adianthoides*, *Asparagus falcatus*, *Peperomia blanda*, *Dioscorea prae-hensilis*, *Stephania abyssinica*, *Setaria megaphylla*, *Oplismenus compositus*, *O. hirtellus*, *Sarcostemma viminalis*, *Justicia flava*, *Hibiscus ludwigii*.

**171 B**, Gallery forest

Canopy trees and medium-sized trees

*Markhamia lutea*, *Pancovia golungensis*, *Ekebergia capensis*, *Ficus vallis-choudae*, *Ficus lutea*, *Phoenix reclinata*.

Small trees and woody shrubs

*Allophylus macrobotrys*, *A. africanus*, *Grewia platyclada*, *Mimusops bagshawei*, *Salacia erecta*, *Bridelia scleroneura*, *Dracaena steudneri*, *Strychnos usambarensis*, *Clerodendron rotundifolium*.

Herbs

*Acalypha bipartita*, *Cissus petiolata*, *Zehneria petiolata*, *Oplismenus compositus*, *Commicarpus plumbagineus*, *Haemanthus multiflorus*, *Setaria kagerensis*.

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