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PHYTOSOCIOLOGICAL STUDY OF *TREMA ORIENATALIS* AND *VERNONIA AURICULIFERA* HIGHLAND COMMUNITY IN SOUTHWESTERN UGANDA (EAST AFRICA)

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Abstract. A phytosociological study of a community dominated by *Trema orientalis* and *Vernonia auriculifera* in Kibale National Park, southwestern Uganda, was carried out in 2002. This plant community was found growing in an area of abandoned farmland. In total, 131 species were recorded; most of them are phanerophytes, zoochorous and widely distributed in tropical Africa. The community is characterized by two main strata: the upper one, 4–10 m high, is dominated by *Trema orientalis* and *Vernonia auriculifera* and other shrub species; the lower one, 1–1.5 m high, comprises mostly herbaceous species and seedlings and saplings of secondary and mature forest tree species. The *Trema orientalis* and *Vernonia auriculifera* community is described as a new early forest succession association, *Tremo-Vernonietum auriculiferae* ass. nova It is ascribed to the alliance of *Lobelion gibberoae* Lebrun & Gilbert 1954, which includes forest fallow plant communities occurring in highlands.

Key words: *Trema orientalis* and *Vernonia auriculifera* community, phytosociology, Kibale National Park, Uganda

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INTRODUCTION

A phytosociological study of the *Trema orientalis* and *Vernonia auriculifera* community was carried out in Kibale National Park, southwestern Uganda, during our field work in 2002. This community is found in forest gaps and abandoned farmland around the Park.

Fig. 1. Location of Kibale Forest National Park in southwestern Uganda in East Africa.

Several botanical studies have been carried out in Kibale National Park (Skorupa & Kasenene 1984; Hamilton *et al*. 1986; Chapman & Chapman 1999; Chapman *et al*. 1999; Duncan & Chapman 2003; Lwanga 2003; Zanne *et al.* 2005), but none have addressed the phytosociological aspects of the *Trema orientalis* and *Vernonia auriculifera* community. We conducted a phytosociological study of this plant community, placing special emphasis on its floristic composition, phytogeographical, biological and synecological structure, and dynamic aspects.

STUDY AREA

The study was carried out in the Kibale National Park (Fig. 1) around the Makerere Biological Field Station at Kanyawara village in southwestern

Uganda, 24 km east of the Ruwenzori Mountains, at 1100–1600 m a.s.l. (0°13′–0°41′N/30°19′–30°32′E). Total annual precipitation is *ca* 1750 mm; annual mean daily temperature is *ca* 23°C, with a minimum of 15.1°C.

The Kibale forest is a medium-altitude moist tropical forest consisting of a mosaic of vegetation types which vary with the topography and altitude (Howard 1986; Zanne & Chapman 2005). According to Chapman and Lambert (2000), Kibale National Park is composed of mature forest (57%), colonizing forest (19%), grassland (15%), woodland (4%), swamp (4%) and plantations of exotic trees (1%). Natural disturbances often occur, causing treefall gaps which are common in the forest (Skorupa & Kasenene 1984). Early and secondary plant communities are found in forest clearings and on abandoned farmland. In the study area the following well-known tropical aggressive colonizers are absent: *Musanga* spp. and *Cecropia* spp. (Zanne *et al*. 2005), but other early successional species are present and form good stands of almost homogenous communities (e.g., *Polyscias fulva*, *Trema orientalis*). Our study was focused on the *Trema orientalis* community which grows on old farmland.

Material and methods

Six phytosociological relevés were made using the Zürich – Montpellier School method as described by Braun-Blanquet (1932) and Mueller-Dombois and Ellenberg (1974). Special emphasis was placed on the floristic composition, synecological structure and dynamic aspects of the vegetation. The biological spectrum of the plant community was analyzed following the plant life form classification described by Raunkiaer (1934):

Phanerophytes (Ph) – woody plants, essentially trees (MgPh; MsPh), tall shrubs (McPh), and shrubs (NnPh) and climbers (Phcl) > 50 cm high,

Chamaephytes (Ch) and climbing chamaephytes (Chcl) – small shrubs and herbs that grow close to the ground,

Geophytes (G) – perennial plants that regenerate from rhizomes (Gr), bulbs (Gb), corms and tubers that are completely buried in the soil,

Hemicryptophytes (Hc) – herbaceous perennial plants dying back at the end of the growing season, with the buds protected by the withered leaves and soil,

Therophytes (Th) and climbing therophytes (Thcl) – annual plants that regenerate from seeds each year.

The dispersal spectrum (DIS) was analyzed following Dansereau and Lems' (1957) classification:

Sclerochores (Scl) – unfleshy and slight diaspores,

Desmochores (Des) – adhesive and clinging diaspores,

Ballochores (Ball) – diaspores dispersed by any plant itself,

Sarcochores (Sar) – totally of fleshy diaspores,

Pterochores (Pter) – winged plant diaspores,

Pogonochores (Pogo) – diaspores having plumes to facilitate transport by wind.

The phytogeographical distribution and syntaxonomic rank of the plant species recorded were determined according to the geographical area of each species as described in many publications: Lebrun and Gilbert (1954), Mullenders (1954), Lubini (1986), White (1986), Schmitz (1988), Mandango (1988), Habiyaremye (1997), Mosango (1991), Mosango and Lejoly (1987, 1988) and Mosango *et al*. (2001a, b). The following phytogeographical elements were identified:

Pantropical (Pan) – plant species growing throughout the tropics;

Paleotropical (Pal) – plants growing in tropical Africa, Madagascar, Asia and Australia;

Afro-tropical (At) – plants growing throughout tropical Africa;

Afro-Malagasy (AM) – plants found in Africa and Madagascar;

Afro-American (Aa) – plants found in tropical Africa and tropical America;

Omni-Guinean (G) – plants growing in the Guinean region;

Centro-Guinean (GC) – plants found in the central part of the Guinean region;

Sudano-Zambesian (SZ) – plants distributed in the Sudanian and Zambesian regions;

East African montane (EAMo) – plants distributed in the East Africa montane domain;

Afro-montane (Mo) – plants found in the Afro-montane domain.

Cosmopolitan (Cos) – plants spread worldwide.

We also referred to the *International Code of Phytosociological Nomenclature* as published by Weber *et al*. (2000) in order to describe the studied association.

Results

The *Trema orientalis* and *Vernonia auriculifera* community is described here as a new association,

Tremo-Vernonietum auriculiferae Mosango & Majaliwa *ass. nova.* This association is ascribed to the alliance *Lobelion gibberoae* Lebrun & Gilbert 1954, the order *Polyscietalia fulvae* Lebrun & Gilbert 1954 and the class *Musango-Terminalietea* Lebrun & Gilbert 1954.

Tremo-Vernonietum auriculiferae Mosango & Majaliwa ***ass. nova***

TYPE OF THE ASSOCIATION NAME: Table 1, relevé 1 (typus).

DIAGNOSTIC SPECIES COMBINATION: *Trema orientalis, Vernonia auriculifera, Crassocephalum vittelinum, Clerodendrum rotundiflorum*.

PLANT COMPOSITION. A total of 131 plant species were recorded in the *Tremo-Vernonietum auriculiferae* association (Table 1). *Trema orientalis*, *Vernonia auriculifera, Crassocephalum vittelinum* and *Clerodenrum rotundifolium* are identified as the character species of the association.

Trema orientalis is the dominant species of this association. It has the highest abundance-dominance coefficient (3–4) and average cover (50%). This is a heliophilous, nitrophilous and widely distributed species in tropical Africa. It is a fast-growing woody species which occurs in forest clearings and abandoned farmland in the early stage of secondary plant succession. This widely distributed plant species is well developed in the *Tremo-Vernonietum auriculiferae* association, where it forms an almost homogenous community.

Vernonia auriculifera is a microphanerophyte and an Afro-montane species of tropical East Africa. It is a heliophilous and nitrophilous species closely associated with *Trema orientalis* in the upper layer.

Crassocephalum vittelinum is also an Afro-montane species which occurs in tropical East Africa. It is the dominant herbaceous and nitrophilous species in the lower stratum.

Clerodendrum rotundifolium is a nanophanerophyte and Afro-montane species of East tropical Africa also found to grow in the understorey.

Vernonia auriculifera, *Crassocephalum vittelinum* and *Clerodendrum rotundifolium* are referred to here as local character species of the community.

ECOSOCIOLOGICAL GROUPS. The following ecosociological groups were identified in the *Tremo-Vernonietum auriculiferae* association: the first group includes 35 montane forest fallow species of the alliance *Lobelion gibberoae* Lebrun & Gilbert 1954, of which 4 are characteristic species of the association (e.g., *Trema orientalis*, *Vernonia auriculifera*); the second group consists of 56 secondary forest species belonging to the class *Musango-Terminalietea* Lebrun & Gilbert 1954, of which 13 are characteristic species of montane secondary forests belonging to the order *Polyscietalia fulvae* Lebrun & Gilbert 1954 (e.g., *Polyscias fulva, Myrianthus holstii*, *Bridelia brideliifolia*); the third group consists of 6 species of tropical East Africa montane primary forests belonging to the order *Ficalhoo-Podocarpetalia* Lebrun & Gilbert 1954; the fourth group comprises 23 lowland primary forest species of tropical Africa belonging to the class *Strombosio-Parinarietea* Lebrun & Gilbert 1954; the fifth group includes 2 transgressive species of swamp vegetation belonging to the class *Mitragynetea* Lebrun & Gilbert 1954; the sixth group comprises 26 agrestials of the class *Soncho-Bidentetea* Hoff 1991; and the last group consists of 17 ruderal and postcultivation species belonging to the class *Ruderali-Manihotetea* Léonard in Taton 1949.

COMMUNITY STRUCTURE. *Tremo-Vernonietum auriculiferae* presents itself as a closed forest fallow community consisting of two different strata. The upper one, 4–10 m high, forms an almost homogenous layer with average cover of 82.5%. It is essentially dominated by *Trema orientalis,* a fast-growing woody species having average cover of 50%. *Vernonia auriculifera* also occurs in the upper layer but has average cover of 3.33%.

The lower stratum is 1.0–1.5 m high and has higher average cover (94%) than the upper layer. It is comprised of many shrubs (e.g., *Cassia floribunda*), herbs (e.g., *Aspilia asperifolia*), herbaceous climbers (e.g., *Lagenaria abyssinica*) and seedlings and saplings of secondary and late stages of forest reconstitution such as *Myrianthus hol-*

Table 1. *Tremo-Vernonietum auriculiferae* montane association in Kibale Forest National Park (Uganda). LF – life form, DIS – dispersal spectrum, GD – geographical distribution, P – species constancy, AV – average cover; (*) – species also found in either of the following close known associations of the alliance of *Caloncobo-Tremion* Lebrun and Gilbert 1954: *Vernonio-Trematum orientalis* Lubini 1986, *Vernonio-Trematum orientalis* subass. *Solanosetum torvi* Lubini 1986 and *Caloncobo-Trematum orientalis* Mandango 1988 (cf. Table 6).

LF	DIS	GD	Relevé no.	1	2	3	4	5	6	P	AV
			Area (m^2)	500	500	500	500	500	250		
			Height (m)	6	7	8	6	7	6		
			Cover (%)								
			Upper stratum	90	85	85	80	80	80		
			Lower stratum	100	90	100	95	95	85		
			Number of species	54	39	44	51	52	41		
			Characteristic species of the association								
			Trees, shrubs and herbs								
McPh	Sar	Pal	*Trema orientalis* (L.) Blume*	4	3	3	4	3	4	V	50.00
McPh	Pog	Mo (EA)	*Vernonia auriculifera* Hiern	1	–	1	–	2	–	III	3.33
Td	Pog	Mo (EA)	*Crassocephalum vittelinum* (Benth.) S. Moore	2	2	2	1	1	–	V	8.33
NnPh	Sar	SZ-Mo	*Clerodendrum rotundifolium* Oliv.	1	–	1	–	1	–	II	1.25
			Characteristic species of the alliance *Lobelion giberroae*								
			Trees and shrubs								
NnPh	Pog	Mo (EA)	*Lobelia gibberoa* Hemsl.	–	1	+	–	–	+	I	0.48
NnPh	Ball	Pan	*Cassia floribunda* Cav.	–	+	–	–	–	–	I	0.03
McPh	Ball	Pal	*Sesbania sesban* (L.) Merr.	–	–	–	–	+	–	I	0.03
McPh	Sar	AM	*Harungana madagascariensis* Lam. *ex* Poir.*	+	–	–	–	–	–	I	0.03
McPh	Sar	Pal	*Rhus natalensis* Bernh. *ex* Krauss	+	–	–	–	–	–	I	0.03
			Climbers								
Chcl	Sar	Mo-SZ	*Stephania abyssinica* Walp.	1	–	–	1	+	–	III	0.87
Thcl	Sar	Pal	*Luffa cylindrica* Roem.	+	–	+	1	–	–	III	0.48
Phcl	Sar	CG-SZ	*Rubus rigidus* Sm.	–	–	–	–	1	1	II	0.83
Phcl	Sar	At	*Clerodendrum formicarum* Gürke	–	–	–	+	1	–	II	0.45
Thcl	Des	AM	*Melanthera scandens* (Schum. & Thonn.) Roberty	–	–	–	–	1	+	II	0.45
Thcl	Sar	Pal	*Hewittia scandens* (Koen *ex* Milne) Mabb.	–	2	–	2	–	–	II	5.00
Phcl	Pog	AM (Mo)	*Mikania capensis* DC.	2	–	–	–	–	–	I	2.50
Ch	Pog	At	*Crassocephalum montuosum* (S. Moore) Milne-Redh.	–	–	–	–	–	+	I	0.03
			Under-shrubs and herbs								
Ch	Sar	SZo	*Acalypha bipartita* Müll. Arg.	2	2	1	1	2	2	V	12.5
Chd	Pog	At	*Vernonia adoensis* Sch. Bip. *ex* Walp.	1	1	2	2	1	+	V	6.28
Hc	Scl	Pan	*Setaria verticillata* (L.) P. Beauv.	2	1	1	1	1	1	V	2.67
Chd	Sar	SZo	*Pentas parvifolia* Hiern f.	+	–	1	+	2	–	IV	2.98
NnPh	Ball	At	*Acanthus pubescens* (Thomson *ex* Oliv.) Engl.	2	–	–	–	–	1	II	2.92
NnPh	Sar	Pan	*Lantana camara* L.	2	–	1	–	–	–	II	2.92
Thd	Des	SZo	*Aspilia asperifolia* O. Hoffm.	1	–	–	–	1	–	II	0.83
NnPh	Des	SZ-Mo	*Vernonia lasiopus* O. Hoffm.	–	–	–	–	1	+	II	0.45
Chd	Ball	Cos	*Malva verticillata* L.	1	–	–	+	–	–	II	0.45
Th	Ball	Pan	*Indigofera hirsuta* L.	–	1	–	+	–	–	II	0.45
Thd	Des	At	*Lapportea aestuans* (L.) Chew	–	–	–	+	–	1	II	0.45
NnPh	Sar	Pan	*Solanum anguivii* Lam.	–	+	+	–	–	–	II	0.07
NnPh	Des	AM	*Pavonia urens* Cav.	–	–	–	+	–	+	II	0.07
Thd	Sar	At	*Phyllanthus ovalifolius* Forssk.	–	–	–	–	+	+	II	0.07
NnPh	Des	Mo	*Microglossa densiflora* Hook.f.	–	–	–	–	2	–	I	2.50
Thd	Sar	Mo	*Alchemilla johnstonii* Oliv.	–	–	–	1	–	–	I	0.42
Chd	Des	Pan	*Triumfetta rhomboidea* Jacq.	–	–	–	–	+	–	I	0.03
Gr	Sar	AM-Mo	*Rumex abyssinicus* Jacq.	–	–	–	+	–	–	I	0.03
			Montane secondary forest species (order *Polyscietalia fulvae*)								
			Trees and shrubs								
MsPh	Sar	Mo	*Polyscias fulva* (Hiern) Harms	1	2	1	2	2	–	V	8.33
MsPh	Sar	CG	*Croton silvaticus* Hochst.	+	–	–	–	+	–	II	0.07
MsPh	Ball	At	*Erythrina abyssinica* Lam.	–	+	+	–	–	–	II	0.07

Table 1. *Continued.*

LF	DIS	GD	Relevé no.	1	2	3	4	5	6	P	AV
MsPh	Ball	At	*Millettia dura* Dunn	–	–	–	–	+	–	I	0.03
McPh	Sar	Mo	*Myrianthus holstii* Engl.	–	–	–	–	–	+	I	0.03
MsPh	Sar	At	*Cordia millenii* Baker	–	–	–	–	–	+	I	0.03
MsPh	Ball	SZ-Mo	*Bridelia brideliifolia* (Pax) Fedde.	+	–	–	–	–	–	I	0.03
Gr	Sar	AM	*Aframomum angustifolium* K. Schum.	2	–	–	1	–	–	II	2.92
Chd	Ball	At	*Phaulopsis angolana* S. Moore	–	–	–	–	–	1	I	0.42
			Lowland secondary forest species (class *Musango-Terminalieta*)								
			Trees and shrubs								
MsPh	Sar	G	*Funtumia africana* Stapf	1	+	+	1	+	–	V	0.93
MsPh	Sar	CG	*Zanthoxylum gilletii* (De Wild.) Waterman	+	+	+	–	1	–	IV	0.52
MsPh	Sar	G	*Antiaris toxicaria* Lesch.	–	1	+	–	–	–	II	0.45
MsPh	Sar	G-SZ	*Ficus vallis-choudae* Delile	–	+	–	–	–	–	I	0.03
MsPh	Sar	PRA	*Ficus exasperata* Vahl	–	–	–	–	–	+	I	0.03
McPh	Sar	At	*Triumfetta cordifolia* A. Rich.	1	–	–	+	–	–	I	0.45
			Climbers								
Phcl	Sar	At	*Urera hypselodendron* (Engl.) Wedd.**	–	–	1	–	–	–	I	0.42
			Under-shrubs and herbs								
Gr	Sar	G	*Marantochloa leucantha* (K. Schum.) Milne-Redh.	–	1	2	1	2	1	V	5.87
			Montane primary forest species (order *Ficalhoo-Podocarpetalia*)								
			Trees and shrubs								
MsPh	Sar	Mo	*Teclea nobilis* Delile	+	–	+	–	+	–	III	0.10
MsPh	Sar	Mo	*Prunus africana* (Hook.f.) Kalkman	+	–	+	–	+	–	III	0.10
MsPh	Ball	Mo	*Markhamia platycalix* Sprague	+	–	–	–	–	+	II	0.07
MgPh	Ball	AM	*Albizia gummifera* C. A. Sm.	+	–	–	–	+	–	II	0.07
MsPh	Sar	Mo	*Newtonia buchananii* (Baker) G. C. C. Gilbert & Boutique	–	–	–	–	+	–	I	0.03
MsPh	Sar	SZ-Mo	*Bosqueia phoberos* Baill.	–	–	–	–	–	+	I	0.03
			Lowland primary forest species (class *Strombosio-Parinarietea*)								
			Trees and shrubs								
MsPh	Ball	G	*Albizia grandibracteata* Taub.	1	1	+	1	+	–	V	1.32
MsPh	Sar	At	*Celtis africana* Burm.f.	+	–	–	+	1	–	III	0.48
MsPh	Sar	AM	*Celtis gomphophylla* Baker	–	1	–	–	–	+	II	0.45
MgPh	Sar	G	*Blighia unijugata* Baker	–	+	–	–	+	–	II	0.07
MsPh	Sar	G	*Monodora myristica* Dunal	+	–	–	–	–	–	I	0.03
MsPh	Sar	At	*Diospyros abyssinica* (Hiern.) F. White	+	–	–	–	–	–	I	0.03
MsPh	Sar	CG	*Pterygota mildbraedii* Engl.	–	–	–	–	–	+	I	0.03
MgPh	Sar	G	*Lovoa swynnertonii* Baker f.	–	–	–	+	–	–	I	0.03
MsPh	Sar	G	*Maesopsis eminii* Engl.	–	+	–	–	–	–	I	0.03
			Climbers								
Phcl	Pter	At	*Combretum racemosum* P. Beauv.	+	–	–	–	–	–	I	0.03
Phcl	Sar	At	*Culcasia scandens* P. Beauv.	–	–	–	–	–	+	I	0.03
Phcl	Sar	G	*Piper guineense* Schumach. & Thonn.	–	–	–	–	–	+	I	0.03
			Under-shrubs and herbs								
Thd	Des	G	*Cyathula orthacantha* Schinz	–	–	1	–	1	–	II	0.83
Gr	Sar	G	*Palisota schweinfurthii* C. B. Clarke	–	–	–	1	–	+	II	0.45
Ch	Scl	Pan	*Oplismenus hirtellus* (L.) P. Beauv.	–	–	–	–	–	2	I	2.50
Gr	Sar	SZ	*Aframomum zambesiacum* (Bak.) K. Schum.	–	–	–	–	–	1	I	0.42
Chd	Sar	Pal	*Rivina humilis* L.	–	–	–	–	–	1	I	0.42
Chd	Scl	G	*Pollia condensata* C. B. Cl.	–	–	–	–	–	1	I	0.42
Gr	Scl	AM	*Loxogramme lanceolata* (Sw.) Presl	–	–	1	–	–	–	I	0.42
NnPh	Sar	At	*Dracaena fragrans* Ker-Gawl	–	–	–	–	–	+	I	0.03
Thd	Des	At	*Cyathula cylindrica* Moq.	–	–	–	–	+	–	I	0.03
Gr	Scl	At	*Pteris atrovirens* Willd.	–	–	–	–	–	+	I	0.03
NnPh	Scl	AM	*Hoslundia opposita* Vahl	2	2	1	1	1	+	V	6.28
			Swamp species (class *Mitragynetea*)								
Chcl	Sar	At	*Ficus asperifolia* Miq.	1	1	1	1	1	1	V	0.20
Gr	Sar	At	*Renealmia congolana* De Wild. & T. Durand	–	–	–	–	–	+	I	0.03

Table 1. *Continued.*

LF	DIS	GD	Relevé no.	1	2	3	4	5	6	P	AV
			Agrestials (class *Soncho-Bidentetea*)								
Thd	Pog	Pan	*Conyza sumatrensis* (Retz) E. Walker*	1	1	1	1	1	–	V	2.08
Thd	Des	Pan	*Bidens pilosa* L.	1	1	+	+	1	–	V	1.32
Thcl	Sar	Pal	*Mukia maderaspatana* (L.) M. Roem.	–	–	1	1	–	–	II	0.34
Thcl	Ball	Aa	*Pueraria phaseolides* (Roxb.) Benth. var. *javanica* (Benth.) Baker	–	–	–	1	–	–	I	0.42
Chd	Ball	G-SZ	*Crotalaria cleomifolia* Welw. *ex* Baker	–	–	–	–	1	–	I	0.42
Thd	Scl	Pan	*Drymaria cordata* (L.) Willd. *ex* Schult.	–	–	1	–	–	–	I	0.42
Thcl	Ball	Pan	*Calopogonium mucunoides* Desv.	–	–	–	1	–	–	I	0.42
Gb	Scl	Pan	*Oxalis latifolia* Kunth	–	–	–	1	–	–	I	0.42
Thd	Des	AM	*Hyptis lanceolata* Poir.	–	–	–	1	–	–	I	0.42
Thd	Pog	Pal	*Crassocephalum crepidioides* (Benth.) S. Moore**	–	–	–	–	–	+	I	0.03
NnPh	Sar	Pan	*Ricinus communis* L.	–	–	+	–	–	–	I	0.03
NnPh	Sar	Cos	*Datura stramonium* L.	–	–	+	–	–	–	I	0.03
Hc	Scl	PRA	*Panicum trichocladum* Hack. *ex* K. Schum.	–	–	+	–	–	–	I	0.03
Thd	Ball	Pal	*Hibiscus furcatus* Willd.	–	–	–	–	+	–	I	0.03
			Ruderals (class *Ruderali-Manihotetea*)								
Chcl	Sar	PRA	*Momordica foetida* Schumach.	2	2	2	2	1	–	V	10.41
Ch	Des	Pal	*Achyranthes aspera* L.	1	2	1	+	1	2	V	6.67
Chcl	Des	Pal	*Ipomoea involucrata* P. Beauv.*	2	1	1	1	1	–	V	2.63
Ch	Ball	Pal	*Centella asiatica* (L.) Urb.	–	–	+	1	1	–	III	0.87
Ch	Ball	SZ	*Dyschoriste radicans* (Hochst. *ex* A. Rich.) Nees	2	–	–	–	2	–	II	5.00
Thpr	Des	Pan	*Desmodium adscendens* (Sw.) DC.	1	–	1	–	–	–	II	0.83
Gr	Scl	Pan	*Kyllinga erecta* Shumach.	–	–	–	1	+	–	II	0.45
Th	Scl	Pal	*Digitaria abyssinica* (Hochst. *ex* A. Rich.) Stapf	1	+	–	–	–	–	II	0.45
Gr	Scl	Cos	*Pteridium aquilinum* (L.) Kuhn *subsp centrali-africanum* Hieron.	–	–	+	–	–	+	II	0.07
Ch	Ball	Pan	*Cassia occidentalis* L.	+	+	–	–	–	–	II	0.07
Ch	Ball	Pal	*Hibiscus surattensis* L.	–	–	–	–	–	1	I	0.42
Hc	Scl	At	*Hydrocotyle mannii* Hook.f.	–	–	–	–	–	1	I	0.42
Thd	Ball	Pan	*Sida alba* L.	–	1	–	–	–	–	I	0.42
Th	Scl	PRA	*Brachiaria deflexa* (Schumach.) C. E. Hubb. *ex* Robyns	+	–	–	–	–	–	I	0.03
Th	Scl	Pan	*Eleusine indica* (L.) Gaertn.	–	+	–	–	–	–	I	0.03
Th	Scl	Cos	*Eragrostis aspera* (Jacq.) Nees	–	+	–	–	–	–	I	0.03
Thd	Ball	SZ	*Crotalaria glauca* Willd.	–	+	–	–	–	–	I	0.03
			Subspontaneous species								
Phcl	Des		*Passiflora edulis* Sims	–	–	–	1	1	–	II	0.34

Location of relevés

Relevé 1. Kibale National Park, old farmland, *ca* 320 m south of Kanyawara /Makerere University Biological Station. 23 March 2002.

Relevé 2. Kibale National Park, old farmland, *ca* 450 m south of Kanyawara /Makerere University Biological Station. 25 March 2002.

Relevé 3. Kibale National Park old farmland, *ca* 600 m south-west of Kanyawara/Makerere University Biological Station. 27 March 2002.

Relevé 4. Kibale National Park, old farmland, 550 m south-west of Kanyawara/Makerere University Biological Station. 02 April 2002.

Relevé 5. Kibale National Park, old farmland, 700 m south-east of Kanyawara/Makerere University Biological Station. 05 April 2002.

Relevé 6. Kibale National Park, old farmland, 850 m south-east of Kanyawara /Makerere University Biological Station. 08 April 2002.

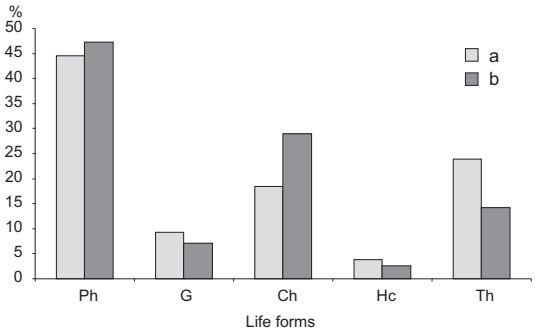

Fig. 2. Biological spectrum of *Tremo-Vernonietum auriculiferae*. Ph – phanerophytes (MgPh – megaphanerophytes, MsPh – mesophanerophytes, McPh – microphanerophytes, NnPh – nanophanerophytes, Phcl – climbing phanerophytes), Ch – chamaephytes, G – geophytes, Hc – hemicryptophytes, Th – therophytes; a – gross spectrum, b – weighted spectrum.

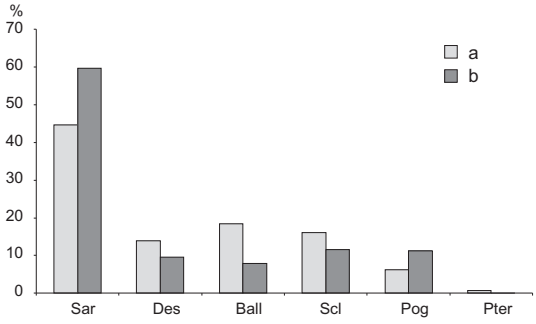

Fig. 3. Dispersal spectrum of *Tremo-Vernonietum auriculiferae*. Sar – sarcochores, Des – desmochores, Scl – sclerochores, Pog – pogonochores, Ball – ballochores, Pter – pterochores; a – gross spectrum, b – weighted spectrum.

stii, Polyscias fulva and *Bridelia brideliifolia*. The dominant plant species in this layer are *Crassocephalum vittelinum* (8.33% average cover), *Acalypha bipartita* (8.33%) and *Vernonia adoensis* (6.28%).

LIFE FORMS. As shown in Figure 2, there is great diversity of life forms in the *Tremo-Vernonietum auriculiferae* association. Phanerophytes largely dominate in terms of number of species (44.6% of total) and also average cover (47.2%). Erect phanerophytes are dominant and account for 36.1% of the total number of species. Climbing phanerophytes are relatively abundant and represent 9% of the total phanerophytes, followed by chamaephytes and therophytes. Geophytes and hemicryptophytes are also present but less abundant.

DISPERSAL. There is also great diversity of dispersal means among the plant species recorded in the *Tremo-Vernonietum auriculiferae* association (Fig. 3). Most of these plant species are sarcochorous (44.6% of the total) and have average cover of 59.7%. Other species are either sclerochorous, pogonochorous, desmochorous, ballochorous or pterochorous, but they are less abundant. This high diversity means that members of this association can be dispersed by animals (sarcochorous and desmochorous species), by wind (sclerochorous, pogonochorous and pterochorous species) or by themselves (ballochorous species).

CHOROLOGY. The chorological analysis in Figure 4 shows that the majority of the plant species of the *Tremo-Vernonietum auriculiferae* association are widespread. Eighty-two plant species (62% of total) are widespread in tropical Africa. These include Sudano-Zambesian, Guineo-Sudano-Zambesian, Guineo-Congolian, Afro-Malagasy, Afro-tropical and pluri-regional African species. The Guineo-Congolian species in this plant association are less abundant and account for 15.5% of the total number of species, with average cover of only 5.9%. The Afro-montane species account for 5.4% of the total, with relatively high average cover of 11.5%. Paleotropical, pantropical, Afro-American and cosmopolitan species together represent 39.5% of the total and are widely distributed in tropical Africa and beyond.

DISCUSSION AND CONCLUSION

Tremo-Vernonietum auriculiferae is a montane forest fallow association, growing in forest clearings and in and in areas of abandoned farmland in the early stage of secondary plant succession. It occurs just after the first stage of herbaceous pioneer plant communities and is relatively rich in plant species, with a total 131 species recorded.

In terms of ecological succession, the *Tremo-Vernonietum auriculiferae* association appears to be evolving towards a montane young secondary forest, as evidenced by the occurrence of montane

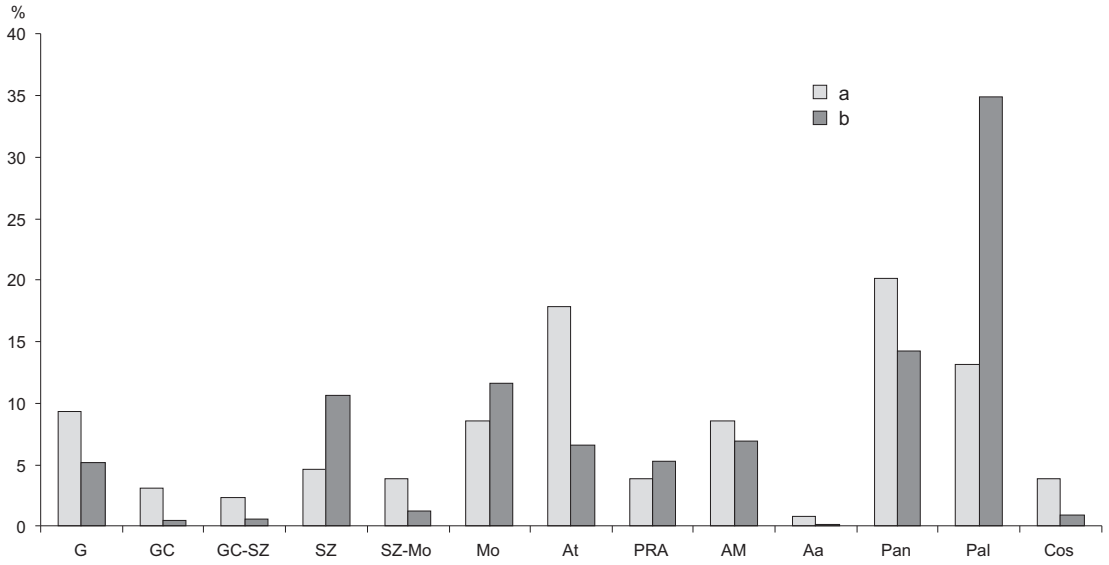

Fig. 4. Phytogeographical spectrum of *Tremo-Vernonietum auriculiferae*. Pan – pantropical, Pal – paleotropical, At – Afro-tropical, AM – Afro-Malagasy, Aa – Afro-American, G – Omni-Guinean, GC – Centro-Guinean, SZ – Sudano-Zambesian, Mo – Afro-montane, Cos – cosmopolitan, PRA – pluri-regional African; a – gross spectrum, b – weighted spectrum.

species such as *Myrianthus holstii* and *Polyscias fulva.* In fact both species are reported as characteristics of montane young secondary forest in eastern DR Congo (Lebrun & Gilbert 1954), Burundi (Lewalle 1972) and Rwanda (Habiyaremye 1997).

In terms of the biological spectrum, *Tremo-Vernonietum auriculiferae* exhibits great diversity of life forms. Nearly all life form types are represented among the species recorded, with the majority being phanerophytes. As shown in Table 2, the proportion of phanerophytes is comparable to that found by Lewalle (1972) in *Lobelietum gibberoae* but less than that found by Mosango and Lejoly (1987) and Mosango (1991) in *Caloncobo-Trametum orientalis*, a close lowland forest fallow association studied around Kisangani in D.R. Congo. It also appears from this table that the percentage of chamaephytes in the *Tremo-Vernonietum auriculiferae* association is much higher (18.5%) than in the lowland *Caloncobo-Trametum orientalis* association

Table 2. Comparison of life form spectrum of *Tremo-Vernonietum auriculiferae* ass. nova with those of *Lobelietum gibberoae* montane forest fallow association and *Caloncobo-Trametum orientalis* lowland forest fallow association of tropical East Africa. N – number of species.

Life form	Highland associations		Lowland plant association
	Tremo-Vernonietum auriculiferae[1] (N = 131)	*Lobelietum gibberoae*[2] (N = 50)	*Caloncobo-Trametum orientalis*[3] (N = 207)
Phanerophytes	44.6%	41.0%	76.3%
Chamaephytes	18.5%	42.5%	9.2%
Hemicryptophytes	3.8%	5.0%	0.5%
Geophytes	9.2%	4.0%	11.1%
Therophytes	23.8%	7.5%	2.9%

[1] – current study, [2] – Lewalle 1972, [3] – Mosango & Lejoly 1987

Table 3. Comparison of phytogeographical spectrum of *Tremo-Vernonietum auriculiferae* with those of *Lobelietum gibberoae* montane forest fallow association and *Caloncobo-Trematum orientalis* lowland forest fallow association. N – number of species.

Phytogeographical element	Highland associations		Lowland association
	Tremo-Vernonietum auriculiferae[1] (N = 131)	*Lobelietum gibberoae*[2] (N = 50)	*Caloncobo-Trematum orientalis*[3] (N = 207)
Widespread	31.0%	15%	7.3%
Tropical African	38.0%	21%	12.6%
Sudano-Zambesian	9.2%	38%	1.0%
Afromontane	5.4%	22%	0.0%
Guinean	15.5%	0%	67.6%
Endemic	0.0%	4%	11.6%

[1] – current study, [2] – Lewalle 1972, [3] – Mosango & Lejoly 1987

(9.2%) but less than in the *Lobelietum gibberoae* (42.5%). Thus, in terms of the biological spectrum, *Tremo-Vernonietum auriculiferae* differs from both *Caloncobo-Trematum orientalis* and *Lobelietum gibberoae*.

In terms of the geographical distribution of species, there is also great diversity of phytogeographical elements. This is probably related to the geographical situation of the study area. Following Langdale-Brown (1959), Lind and Morrison (1974), Schnell (1976), Howard (1986) and White (1986), the region where our study area (Kibale Forest National Park) is situated is described as the crossroads of different types of vegetation: Guineo-Congolian, Sudanian, Sudano-Zambesian and Afro-montane. This probably explains the occurrence of the different types of phytogeographical elements found in the *Tremo-Vernonietum auriculiferae* association.

As shown in Table 3, the proportion of widespread species is relatively high (69% of the total, of which 38% are found only in tropical Africa). The percentage of the Sudano-Zambesian base element is also relatively high (9.2%) compared to the 1% found in the lowland forest fallow association *Caloncobo-Trematum orientalis* around Kisangani in D.R. Congo by Mosango and Lejoly (1987) and Mosango (1991). On the other hand, the percentage of the Sudano-Zambesian base element is lower (9.2%) than that found by Lewalle (1972) in *Lobelietum gibberoae* (38%) in Burundi. Although the Guinean species occur in *Tremo-Vernonietum auriculiferae*, their proportion is much less (15.5%) than in the *Calon-*

Table 4. Comparison of dispersal spectrum of *Tremo-Vernonietum auriculiferae* with that of *Caloncobo-Trematum orientalis* lowland forest fallow association. N – number of species.

Diaspore type	Highland association	Lowland association
	Tremo-Vernonietum auriculiferae[1] (N = 131)	*Caloncobo-Trematum orientalis*[2] (N = 207)
Sarcochores	44.62%	70.0%
Desmochores	13.85%	0.5%
Ballochores	18.46%	6.8%
Sclerochores	16.15%	5.8%
Pogonochores	6.15%	3.9%
Pterochores	0.77%	1.0%

[1] – current study, [2] – Mosango & Lejoly 1987

Table 5. African montane forest fallow associations belonging to the alliance *Lobelion gibberoae* Lebrun and Gilbert 1954.

Association	Location	Ecology	Characteristic species
Tremo-Vernonietum auriculiferae Mosango & Majaliwa *ass. nova* (current study)	Uganda	Montane newly described forest fallow transitional association	*Trema orientalis* (L.) Blume *Vernonia auriculifera* Hiern *Crassocephalum vittelinum* (Benth.) S. Moore *Clerodendrum rotundifolium* Oliv.
Lobelietum gibberoae Lewalle & Schmitz 1988 (in Schmitz 1988)	Burundi	Montane forest fallow transitional association	*Lobelia gibberoa* Hemsl. *Ipomoea involucrata* P. Beauv. *Geranium arabicum* Forssk. *Vernonia kirungae* R. E. Fries *Leucas mildbraedii* Perk. *Neobutonia macrocalyx* Pax *Myrianthus holstii* P. Beauv. *Dracaena afromontana* Mildbr.
Acanthetum pubescentis Lebrun 1942	Montane D.R. Congo	Montane forest fallow transitional association	*Acanthus pubescens* (Thoms. *ex* Oliv.) Engl. *Thalictrum rhynchocarpum* Dillon *ex* A. Rich. *Panicum calvum* Stapf *P. hochstetteri* Steud. *Aneilema pedunculosum* C. B. Clarke *Rhus incana* P. Mill. *Erythrina tomentosa* R. Br. *Solanum indicum* auct. non L. subsp. *adoense* (Hochst.) Benth.
Conizo-Helicrisetum foetidi Lewalle & Schmitz 1988 (in Schmitz 1988)	Burundi	Montane forest fallow transitional association	*Helichrysum foetidum* (L.) Moench. *Conyza steudelii* Sch. Bip. *Dichrocepha integrifolia* (L. F.) Kuntze *Adenostemma mauritianum* DC. *Sonchus luxurians* (R. E. Fr.) C. Jeffrey *Lactuca capensis* Thunb. *Crassocephalum montuosum* (S. Moore) Milne-Redh.
Ensetetum ventricosi Lewalle & Schmitz 1988 (in Schmitz 1988)	Burundi	Montane natural banana fallow transitional association	*Ensete ventricosum* (Welw.) Cheesman *Alchemilla ellenbeckii* Engl. *Monopsis stellarioides* (Presl) Urban *Lysimachia ruhmeriana* Vatke *Fleurya podocarpa* Wedd.
Rubo-Clutietum abyssinicae Habiaremye 1997	Rwanda	Montane forest fallow transitional association	*Clutia abyssinica* Jaub. & Spach *Rubus rigidus* Sm. *Clerodendrum johnstonii* Oliv. *Vernonia hochstetteri* Sch. Bip. *ex* Hochst.

cobo-Tremetum orientalis (67.6%) lowland forest association. More importantly, the occurrence of Afro-montane species in *Tremo-Vernonietum auriculiferae* points up the montane aspect of this association.

Tremo-Vernonietum auriculiferae also shows high diversity of dispersal means. The most important means of plant dispersal in this association is zoochory (*sensu* Mollinier and Muller 1938), since the proportion of sarcochorous and desmochorous species is relatively high (58.47%). However, compared with the lowland forest fallow *Caloncobo-Tremetum orientalis* association (Table 4), *Tremo-Vernonietum auriculiferae* has a lower proportion of sarcochorous species (44.6% of total). Although sarcochorous species dominate in both associations, their proportion is much higher in the lowland *Calon-*

Table 6. Vegetation type relevés of lowland forest fallow associations of the alliance *Caloncobo-Tremion* Lebrun & Gilbert 1954. * – plant species also found in the newly described *Tremo-Vernonietum auriculiferae* association in southwesten Uganda (cf. Table 1).

Vernonio-Tremetum orientalis Lubini 1986	
Character species	
Trema orientalis (L.) Blume*	4.4
Caloncoba subtomentosa Gilg	+.1
Rauvolfia vomitoria Afzel.	+.1
Vernonia conferta Benth.	+.1
Other species	
Costus lucanusianus J. Braun	3.3
Hypselodelphys scandens Louis & Mullenders	1.3
Justicia bolomboensis De Wild.*	+.1
Solanum torvum Sw.	+.1
Cnestis ferruginea DC.	+.1
Cnestis urens Gilg	+.1
Smilax kraussiana Meisn.	+.1
Manyophytum fulvum Müll. Arg.	+.1
Mostuea hirsuta (T. Anders. ex Benth. & J. D. Hook) Baill. *ex* Bak.	+.1
Maesobotrya floribunda Benth.	+.1
Tetrorchidium didymostemon (Baill.) Pax & Hoffm.	+.1
Musanga cecropioides R. Br.	2.2
Harungana madagascariensis Lam.*	+.1
Mikania chenopodifolia Willd.	1.2
Paspalum conjugatum Berg.	2.3
Conyza sumatrensis (Retz.) E. Walker*	+.1
Cyathula prostrata (L.) Blume	1.2
Ipomoea involucrata P. Beauv.*	+.1
Blighia welwitschii (Hiern) Radlk.	+.1
Trilepisium madagascariense (Bailll.) Pax & Hoffm.	+.1
Tristemma mauritianum J. F. Gmel. var. *mauritianum*	+.1
Paspalum virgatum Steud.	+.1
Bertiera aethiopica Hiern	+.1
Nephrolepis biserrata (Sw.) Schott*	+.1
Aframomum laurentii (De Wild. & T. Durand) K. Schum.	+.1
Erythrococca oleracea Prain	+.1
Pseudomussaenda stenocarpa (Hiern) Petit	+.1
Cyphostemma adenocaule Descoings *ex* Wild. & R. B. Drumm.*	+.1
Commelina capitata Benth.*	+.1
Microglossa pyrifolia (Lam.) O. Kuntze	+.1
Bridelia ndellensis De Wild.	+.1
Psychotria ealaensis De Wild.	+.1

Vernonio-Tremetum orientalis subass. *Solanosetum torvi* Lubini 1986	
Character species	
Trema orientalis (L.) Blume*	1.1
Caloncoba subtomentosa Gilg	+.1
Vernonia conferta Benth.	2.2
Differential species	
Solanum mauritianum (L.) Blume	4.5
Urera hypselodendron (Hochst.) Wedd.*	+.1
Solanum torvum Sw.	1.2
Marantochloa purpurea (Ridl.) Milne-Redh.	+.2
Other species	
Cyathea manniana Hook.	+.1
Thomandersia hensii De Wild. & T. Durand	+.1
Cnestis ferruginea DC.	+.1
Musanga cecropioides R. Br.	1.2
Harungana madagascariensis Lam.*	+.1
Bertiera aethiopica Hiern	+.1
Commelina capitata Benth.	+.1
Microglossa pyrifolia (Lam.) O. Kuntze	+.1
Jateoriza macrantha (Hook.f.) Exell & Mendonça	+.1
Chasmanthera welwitschii Troupin	+.1
Capsicum frutescens L.	+.1
Piper umbellatum L.	+.1
Clerodendrum capitatum (Willd.) Schum. & Thonn.	+.1
Leea guineensis G. Don	+.1
Coccinia ubhastata Keraudren	+.1
Macaranga spinosa Müll. Arg.	+.1
Buchnerodendron speciosum Gürke	+.1
Paspalum conjugatum Berg.*	+.1
Trilepisium madagascariense (Bailll.) Pax & Hoffm.	+.1
Mikania chenopodifolia Willd.	1.2
Conyza sumatrensis (Retz.) E. Walker*	+.1
Cyathula prostrata (L.) Blume	+.1
Paspalum virgatum Steud.	3.3
Paspalum paniculatum Steud.	+.1
Crassocephalum crepidioides (Benth.) S. Moore*	+.1
Pouzolzia denudata De Wild. & Th. Dur.	+.1
Fagara macrophylla (Oliv.) Engl. var. *preussii* Engl.	+.1
Microdesmis yafungana J. Léonard	+.1
Parinari excelsa Sabine	+.1
Carica papaya L.	+.1
Dewevrea bilabiata Micheli	+.1

Caloncobo-Tremetum orientalis Mandango 1988	
Character species	
Trema orientalis (L.) Blume*	3.2
Thomandersia hensii De Wild. & T. Durand	+.2
Mikania cordata (Burm.f.) B. L. Rob.	+.2
Gouania longepetala Hemsl.	+.2
Buchnerodendron speciosum Gürke	+.1
Vernonia conferta Benth.	+.1
Cnestis ferruginea DC.	+.1
Justicia bolomboensis De Wild.*	+.1
Alliance *Caloncobo-Tremion* species	
Selaginella myosurus (Sw.) Alston	3.3
Cissus producta Afzel.	+.3
Sabicea johnstonii K. Schum. *ex* Wernham	+.2
Pentadiplandra brazzeana Baill.	+.2
Leptoderris congolensis Dunn	+.2
Urera hypselodendron (Hochst. *ex* A. Rich.) Wedd.*	+.2
Sabicea dewevrei De Wild. & T. Durand	+.2
Chasmanthera welwitschii Troupin	+.2
Oxyanthus unilocularis Hiern	+.1
Berlinia grandiflora (Vahl) Hutch. & Dalziel	+.2
Caloncoba crepiniana Gilg	+.1
Clerodendrun formicarum Gürke*	+.1
Hugonia platysepala Welw. *ex* Oliv.	+.1
Tabernaemontana eglandulosa Stapf	+.1
Lagenaria abyssinica (Hook.f.) C. Jeffrey	+.1
Sabicea longepetiolata De Wild.	+.1
Dioscorea bulbifera L.	+.1
Adenia gracilis Harms	+.1
Entada mannii (Oliv.) Tisser.	+.1
Hibiscus rostellatus var. rostellatus (Guill. & Perr.) Hochr.	+.1
Young and old secondary species	
Entada gigas (L.) Fawc. & Rendle	+.2
Mucuna flagellipes Hook.f.	+.2
Tabernaemontana crassa Benth.	+.1
Myrianthus arborea P. Beauv.	+.1
Barteria nigritiana Hook.f. subsp. *fistulosa* (Mast.) Sleumer	+.1
Musanga cecropioides R. Br.	+.1
Maesopsis eminii Engl.	+.1

Table 6. *Continued.*

Vernonio-Tremetum orientalis Lubini 1986	
Capsicum frutescens L.	+.1
Macaranga spinosa Müll. Arg.	+.1
Palisota ambigua (P. Beauv.) C. B. Clarke	2.2
Roureopsis obliquifoliolata (Gilg) Schellenb.	+.1
Ricinodendron heudelotii (Baill.) Pierre & Heckel subsp. *africanum* (Müll. Arg.) J. Léonard	+.1
Buchnerodendron speciosum Gürke	+.1
Pentaclethra macrophylla Benth.	+.1
Cola bruneeli De Wild.	+.1
Rothmannia whitfieldii (Lindl.) Dandy	+.1

Vernonio-Tremetum orientalis subass. *Solanosetum torvi* Lubini 1986	
Agelaea hirsuta De Wild.	+.1
Cnestis hirsuta Troupin	+.1
Agelaea rubiginosa Gilg	+.1
Aframomum laurentii (De Wild. & Th. Dur.) K. Schum.	+.1

Caloncobo-Tremetum orientalis Mandango 1988 *continued*	
Leptonychia multiflora K. Schum.	+.1
Ruderali-Manihotetea species	
Paspalum conjugatum P. J. Bergius*	+.3
Setaria chevalieri Stapf & C. E. Hubb.	+.2
Costus edulis De Wild. & T. Durand	+.2
Costus lucanusianus J. Braun & K. Schum.	+.1
Tristemma mauritianum J. F. Gmel.	+.1
Caloncobo-Tremetum orientalis Mandango 1988	
Ipomoea involucrate P. Beauv.*	+.1
Aframomum laurentii K. Schum.	+.1
Triumfetta cordifolia A. Rich. var. *pubescens* R. Wilzek	+.1
Subspontaneous species	
Carica papaya L.	+.1

Caloncobo-Tremetum orientalis Mandango 1988	
Baphia pubescens Hook.f.	+.1
Albizia zygia (DC.) J. F. Macbr.	+.1
Xylopia aethiopica (Dunal) A. Rich.	+.1
Phyllanthus discoideus (Baill.) Müll. Arg.	+.1
Alstonia congensis Engl.	+.1
Morinda morindoides (Baker) Milne-Redh.	+.1
Rothmania hispida (K. Schum.) Fagerl.	+.1
Primary forest species	
Cola griseiflora De Wild.	+.3
Cyperus fertilis Boeck.	+.3
Dewevrea bilabiata Micheli	+.2
Scaphopetalum thonneri De Wild.	+.2
Penianthus longifolius Miers	+.2
Cola marsupium K. Schum.	+.1
Strombosia grandifolia Hook.f. *ex* Benth.	+.1
Cola nitida (Vent.) Schott & Endl.	+.1
Anthonotha fragrans Baker f.) Exell & Hillc.	+.1
Piptadeniastrum africanum (Hook.f.) Brenan	+.1
Cola sciaphila Louis *ex* R.Germ.	+.1
Tridesmostemon omphalocarpoides Engl.	+.1
Gaertnera parvipaniculata E. M. A.Petit	+.1
Alsodeiopsis rowlandii Engl.	+.1
Roureopsis obliquifoliolata G. Schellenb.	+.1
Manniophyton fulvum Müll. Arg.	+.1
Millettia duchesnei De Wild.	+.1
Icacina mannii Oliv.	+.1
Chlamydocarya thompsoniana Baill.	+.1
Trichostachys microcarpa K. Schum.	+.1
Cyathogyne viridis Müll. Arg.	+.1
Triclisia gilletii De Wild.) Staner	+.1
Swamp species	
Renealmia Africana Benth.	+.3
Alchornea cordifolia (Schumach. & Thonn.) Müll. Arg.	+.1
Cleistopholis patens (Benth.) Engl. & Diels	+.1
Eremospatha haullevilleana Wildem	+.1
Ficus mucuso Welw. *ex* Ficalho	+.1
Dialium corbisieri Staner	+.1
Campylospermum densiflorum (De Wild. & T. Durand) Farron.	+.1

cobo-Tremetum orientalis association (70%). On the other hand, there are twice as many species dispersed by wind in *Tremo-Vernonietum auriculiferae* (23%) as in *Caloncobo-Tremetum orientalis* (10.7%). These associations differ in their dispersal spectra.

In order to define the phytosociological position of the *Tremo-Vernonietum auriculiferae* association, we referred to the ecological classification of the tropical rain forests of D.R. Congo elaborated by Lebrun and Gilbert (1954). Lebrun and Gilbert (1954) described the class *Musango-Terminalietea* of early secondary succession. This class includes two orders: *Musangetalia cecropioidis* Lebrun & Gilbert 1954 and *Polyscietalia fulvae* Lebrun & Gilbert 1954. The order *Musangetalia cecropioidis* Lebrun & Gilbert 1954 consists of lowland forest fallows and young secondary forests, whereas the order *Polyscietalia fulvae* Lebrun and Gilbert 1954 includes montane forest fallows and young secondary forests.

The order *Musangetalia cecropioidis* consists of three alliances: 1 – *Caloncobo-Tremion* Lebrun & Gilbert 1954, which includes lowland forest fallow associations; 2 – *Musangion cecropioidis* Lebrun & Gilbert 1954, which consists of lowland young secondary forest associations; and 3 – *Macarango-Anthocleistion* Lubini 1982 (1986), which comprises lowland swamp secondary forest associations.

The order *Polyscietalia fulvae* Lebrun & Gilbert 1954 is composed of two alliances: 1 – *Lobelion gibberoae* Lebrun & Gilbert 1954, which consists of montane forest fallow association; and 2 – *Polyscion fulvae* Lebrun & Gilbert 1954, which encompasses montane young secondary forest associations.

On the basis of its ecology and floristic composition, the *Tremo-Vernonietum auriculiferae* association can be placed in the alliance *Lobelion gibberoae* Lebrun & Gilbert 1954 rather than in the *Caloncobo-Tremion* Lebrun & Gilbert 1954. A comparison with other associations of the alliance *Lobelion gibberoae* reported in Table 5 shows that the *Tremo-Vernonietum auriculiferae* is a new association, as it differs from them in terms of characteristic species. No characteristic species of *Tremo-Vernonietum auriculiferae* is found in any other plant associations of the alliance *Lobelion gibberoae*.

A comparison with the floristic composition of close lowland forest fallow associations of the alliance *Caloncobo-Tremion* listed in Table 6 also distinguishes *Tremo-Vernonietum auriculiferae* as a separate association, since so few species are shared. Only six species of the *Tremo-Vernonietum auriculiferae* association are found in *Vernonio-Tremetum orientalis* Lubini 1986, six in *Vernonio-Tremetum orientalis* subass. *Solanetosum torvi* Lubini 1986, and five in *Caloncobo-Tremetum orientalis* Mandango 1988.

This study enabled us to describe a new plant association, *Tremo-Vernonietum auriculiferae*, which develops in montane areas of southwest Uganda in East Africa. This association appears as a transitional community occurring in the early stage of montane secondary plant succession and evolving towards montane young secondary forest of *Polyscias fulva*. It differs from known close lowland and montane forest fallow associations in terms of floristic composition, life form, dispersal and phytogeographical spectra.

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