

## Plants of the Tongwe East Forest Reserve (Ugalla), Tanzania

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**ABSTRACT** The Tongwe East Forest Reserve, known to primatologists as Ugalla, is one of the driest habitats in which chimpanzees (*Pan troglodytes schweinfurthii*) are known to live. As such the site is an important one for understanding the climatic and vegetation factors limiting the distribution of chimpanzees. This contribution presents a preliminary listing of plant species reported from the Ugalla area.

**Key Words:** savanna woodland / *Brachystegia* / chimpanzee / *Pan* / vegetation

The Tongwe East Forest Reserve in Tanzania is one of the driest known habitats supporting a stable population of chimpanzees. As such it has received attention from primatologists interested in the breadth of chimpanzee adaptation and in the use of such savanna-living populations in the construction of models of early hominid behavioral ecology (Itani, 1979; Kano, 1971, 1972; Moore, 1992; Nishida, 1989). Despite this interest, there has been no long-term study at the site; Itani, Kano and Nishida have made brief surveys of the region and I have visited it four times for periods ranging from *ca.* 10 days to 2.5 months. Information on the vegetation of the site is therefore comparatively limited, and data on chimpanzee use of plant resources scanty indeed. This list should be taken as preliminary only.

**Site description:** At the time of Kano's survey, chimpanzees were continuously distributed from Mahale northward through the Masito area and then eastward to the Ugalla River. The "Ugalla area" as used here is the region bounded by the Ugalla River on the East, the Malagarasi R. on the North, the Uvinza/Mpanda road on the West, and the northern edge of the Ilumba R. basin (= Niamanzi basin) to the South (Fig. 1). The area covers roughly 2,800 km<sup>2</sup>, with elevations ranging from *ca.* 1100m to 1600m. It must be emphasized that data presented here come from a small fraction of the area, and a "full description" of Ugalla is not yet available. Most of my observations and collections come from camps near the Nguya and Mufombosi "Rivers" [large streams], at *ca.* 5°12' S, 30°27' E and 5°19' S, 30°37' E respectively (locations and place names from 1:50 000 maps published by the Govt. of Tanzania, series Y742).

It is worth noting that in my 1993 field season I located an area of over 100 km<sup>2</sup> near the Ugalla River into which chimpanzees apparently rarely (if ever) venture, suggesting that while the Ugalla and Malagarasi Rivers probably do act as ultimate barriers, habitat quality falls below what is normally acceptable to chimpanzees *within* the Ugalla region.

**Geography, geology and climate:** The area consists of relatively flat plateaus intersected by

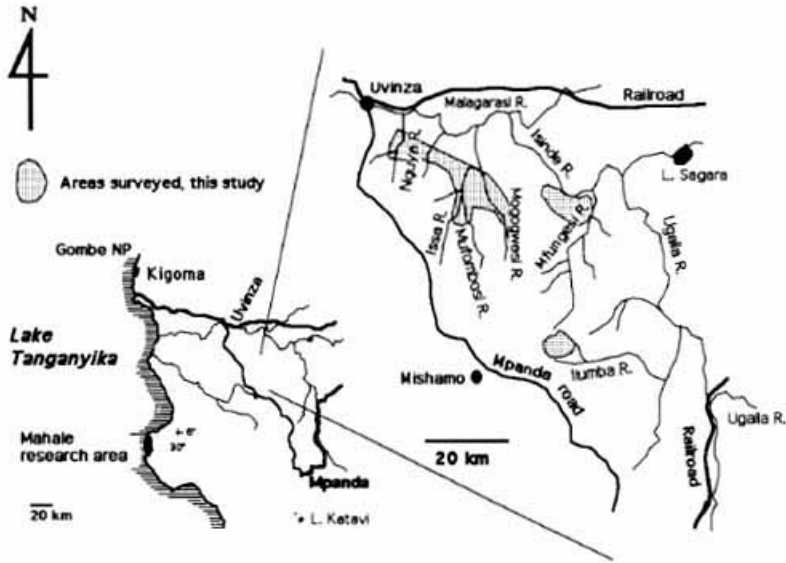


Fig. 1. Location of the Ugalla study region, Tanzania

broad valleys, often with relatively steep scarps accounting for most altitudinal change. The general drainage is to the northeast, and most streams are seasonal. The plateaus are Bukoban system PreCambrian rock, mainly quartz sandstone, and they overlie layers of shales and siltstones which are exposed in places. Valley floors are mostly alluvial soils overlying crystalline gneisses with intrusive dykes of dolerite (Sutton & Roberts, 1968). Runoff from the sandy, well-drained plateaus is often concentrated in rocky areas at the upper edges of the scarps, resulting in narrow fringes of moist forest there as well as in valley bottoms.

Mean annual rainfall for the period 1973-1988, recorded at the Nyanza Salt Mine meteorological station (Uvinza; ca. 15 km NW of the Nguya camp and < 50 km from most of the area surveyed) was  $1012 \pm 139$  mm. There is a pronounced dry season from May through September, with monthly averages for June-August all below 3mm/month. Temperatures at Nyanza for 1975-1986 show the coldest mean monthly minimum (in July) as about  $13^{\circ}\text{C}$ ; the hottest mean monthly maximum (in September) was about  $30^{\circ}\text{C}$  (all climatological data from the Directorate of Meteorology, Dar es Salaam).

**Vegetation data:** The majority of the region is uniform *Brachystegia/Julbernardia* (locally, "miombo") woodland, with the 18 taxa of Leguminosae recorded along transects accounting for almost 60% of stems  $\geq 10\text{cm}$  dbh. There are local concentrations of *Acacia* scrub in valley bottoms and *Combretum/Terminalia* communities on plateau tops. About 1-2% of the region is wet *Cynometra* forest, usually thin strips only a few trees wide along streams and scarp edges but there are a few patches of  $\approx 2\text{ km}^2$  of lush tropical forest. See Itani (1979), Kano (1972) and Nishida (1989) for description of Ugalla; Suzuki (1969) provides a detailed description of the habitat and chimpanzees of the Kasakati Basin, about 60 km west of Ugalla in similar miombo woodland. Fig. 2 presents a rough indication of the homogeneity of the savanna woodland; the commonest ca. 20 tree species account for  $\approx 75\%$  of stems  $> 2\text{m}$  tall ( $N=404$  stems in seventy 5m-radius plots, total area  $\approx 0.5$  ha; this figure underestimates

\* "Cynometra" here and in Nishida (1989) has been re-identified - see Table 1

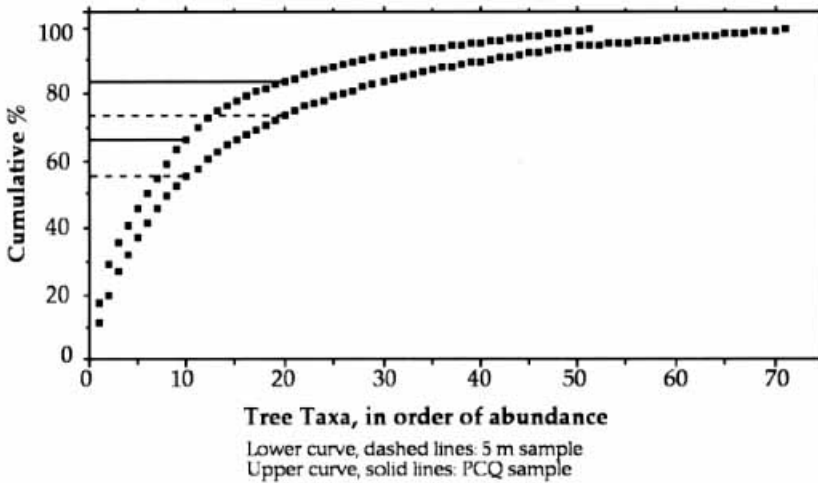


Fig. 2: Tree species diversity, Ugalla.

Data come from 7km of transects, recording at 100m intervals (a) all stems  $\geq 2\text{m}$  in height within 5m radius of the point ( $N=404$  stems), and (b) the nearest stem  $\geq 10\text{cm}$  dbh in each quadrant (point-centered quarter, PCQ;  $N=279$  stems, of which 116 are also included in the 5m sample) (Moore, unpublished data). The abundance ranking of specific taxa is different for the two samples (e.g., *Brachystegia spiciformis* ranked #5 in the 5m sample, but #10 in the PCQ sample). Dashed and solid horizontal lines indicate the cumulative per cent abundance for the top 10 and 20 taxa, 5m and PCQ samples respectively.

diversity among the commonest species because species of *Brachystegia* and *Julbernardia* were not all distinguished in the transects; Moore, unpublished data). For comparison, the 20 commonest species reported from plot samples at Kibale Forest, Uganda (primarily evergreen forest) account for  $\approx 69\%$  of stems [based on the 70 commonest species among 255 listed, subsampled to adjust for sample size] (see Wing & Buss, 1970: appendix IV).

The species listed here come from two sources: the list published by Nishida (1989), and from specimens that I have collected and identified (some with the kind assistance of Drs. Leonard Mwasumbi and Jon Lovett, University of Dar es Salaam). It is important to understand that I have no formal botanical training, and my vegetation interest has been primarily in physiognomy, not taxonomy. Also, my field seasons have all been primarily dry season, and for many plants only vegetative parts were available. The list should not be regarded as botanically definitive.

133 species are listed here, of which about 23% are riverine/wet scarp community plants. I have samples and/or notes on a further *ca.* 95 unidentified species, about 40% from the riverine/scarp community.

**Sample identification:** I obtained the KiTongwe or KiSwahili name for specimens from my field assistants (primarily from Mr. Ramadhani Bilali of Uvinza) whenever possible; these are listed, phonetically spelled. Field names in the list were given to me as KiTongwe unless KiSwahili is indicated by (S). In cases for which no field name is available, collection codes are listed (e.g. "88/75"). In 1988 some specimens were identified at the herbarium, University of Dar es Salaam. Additional identifications come from my own efforts with Hubbard *et al.* (1952). In a number of cases, I was able to match a field name to lists for Mahale (Nishida & Uehara, 1981) and/or Gombe (J. Wallis, pers. comm.) and then cross-check the specimen with the account in the Flora; if the specimen matched I considered it identified without further

Table 1. Plants of the Tongwe East Forest Reserve (Ugalla)

KEY to columns 1-6:

- 1: Field name / collection number  
 2: x = identified by cross-referencing field name  
 3: Growth form (h: herb, s: shrub, l: liana, t: tree)  
 4: Habitat (r: riverine, s: upper scarp edge, p: plateau, [no entry]: woodland)  
 5: Fed on by-- p: people, m: monkey (1 or more of *P. cynocephalus*, *C. aethiops*, *C. ascanius*, *C. mitis*), c: chimpanzee, a: all primates; b: birds, d: duiker, e: elephant, N: Nishida (1989) reports chimpanzee feeding  
 6: Seeds identified in chimpanzee feces

Plant Name	1	2	3	4	5	6
<b>PTERIDOPHYTA</b>						
<b>Dennstaedtiaceae</b>						
<i>Peridium</i> (poss. <i>Arthropteris</i> [Davalliaceae]) sp.	[bracken]		h			
<b>ANGIOSPERMAE</b>						
<b>DICOTYLEDONEAE</b>						
<b>Anacardiaceae</b>						
<i>Heeria mucronata</i> Krauss	mwembe poli (S)	x	t	r		
<i>Lannea</i> sp.	muhenya, 881116		t			
<i>Ozoroa reticulata</i>	88/129		t			
<i>Sorindeia</i> sp.	88/138		t	r		
<b>Annonaceae</b>						
<i>Annona senegalensis</i> Ers.	mkanda/nimkahda		t		N?	
<i>Annona</i> sp.	88/57		t			
<i>Artabotrys monteiroae</i> or <i>stolzii</i>	92/7		l	r	c	
<i>Monanthes poggei</i> Engl. & Dirls	bukienkende		s		c,m	
? <i>Monanthes</i> sp.	88/43		t			
<i>Monodora angolensis</i> Welw.	88/140		t	s		
<i>Monodora</i> cf. <i>junodii</i>	mtopetope wa masitu (S)		t/l	s	c,m	y
<b>Apocynaceae</b>						
<i>Diplorhynchus condylocarpon</i> (Muell.-Arg.) Pichon	msongate/nimsongache		t			
<i>Landolphia ?stolzii</i> Busse	ibungu	x	l	r	a	
<i>Saba</i> sp.			l		c,m	
? <i>Strophanthus</i> sp.	msunkute, 9310		s			
? <i>Tabernaemontana</i> sp.	88/144		t	r		
<i>Voacanga lutescens</i> Stapf	(Nishida 1989)					
<b>Bignoniaceae</b>						
<i>Kigelia aethiopica</i> Decne.			t			
<i>Markhamia ?obusifolia</i> (Baker) Sprague	88/118		t	r		
? <i>Markhamia</i> sp.	88/119		t			
<b>Boraginaceae</b>						
<i>Cordia africana</i> Lam.	(Nishida 1989)				N	
<b>Burseraceae</b>						
? <i>Commiphora</i> sp.	88/136		t			
<b>Caesalpinaceae</b>						
<i>Azelia cuanzensis</i> Welw.	(Nishida 1989)		t		m	
<i>Brachystegia allenii</i> Burtt-davy & Hutch.	(Nishida 1989)		t			
<i>Brachystegia boehmii</i> Taub.	msisi		t			
<i>Brachystegia bussei</i> Harms	miombo / mitundu		t			
<i>Brachystegia ?microphylla</i> Harms	88/27		t			
<i>Brachystegia</i> cf. <i>boehmii</i>	88/68		t			
<i>Brachystegia</i> cf. <i>bussei</i>	mitundu / miombo, 88/72		t			
<i>Brachystegia spiciformis</i> Benth.	88/33		t			
<i>Brachystegia</i> × ? <i>longifolia</i> Benth.	88/96		t			
? <i>Burkea ?africana</i> Hook.	mpala / mkala, 88/127		t			
<i>Cynometra</i> sp. 1	kabamba, 88/3		t	s/r	m, c?	
<i>Cynometra</i> sp. 2	kabamba jike, 88/15		t	s		
<i>Erythrophleum africanum</i> Harms	88/39		t			

\*  
 (note  
 added  
 2007)

\* C. sp 1 = *Julbernardia unijugata*; C. sp 2 = *Monopetalanthus richardsiae*

Plant Name	1	2	3	4	5	6
<i>Isobertinia angolensis</i> (Benth.) Hoyle & Brenan	mlembela	x	t			
<i>Julbernardia globiflora</i> (Benth.) Troupin	(Nishida 1989)		t			
<i>Julbernardia paniculata</i> (Benth.) Troupin	(Nishida 1989)		t			
<i>Piliostigma thonningii</i> (Schumach.) Milne-Redh.	mufumbe		t			
<i>Tamarindus indica</i> L.			t		N	
<b>Capparidaceae</b>						
<i>Maerua</i> sp.	93/61		s	s		
<b>Celastraceae</b>						
<i>Maytenus ?undata</i> (Thunb.) Blakelock	88/21		t	r		
<b>Combretaceae</b>						
<i>Combretum molle</i> G. Don	mlama		t			
<i>Combretum</i> sp. 1	88/6-7-47-35		t			
? <i>Combretum</i> or ? <i>Terminalia</i> sp. 1	88/131		t			
? <i>Combretum</i> or ? <i>Terminalia</i> sp. 2	88/150		t	s		
<i>Terminalia mollis</i> Laws.	(Nishida 1989)					
<i>Terminalia ?sericea</i> or ? <i>kaiserana</i>	88/94		t			
<i>Terminalia</i> sp. [?mollis?]	mliampene, 88/95		t			
<b>Compositae</b>						
<i>Aspilia</i> sp.	salawasala. 92/3		h			
<b>Dipterocarpaceae</b>						
<i>Monotes ?elegans</i> Gilg	mukokote, 92/FB117		t	p		
? <i>Monotes ?africanus</i>	88/45		t			
<b>Droseraceae</b>						
<i>Drosera</i> sp.	[sundew]		h			
<b>Euphorbiaceae</b>						
<i>Bridelia ?micrantha</i> (Hochst.) Baill.	kamembe	x	t	s	a	
? <i>Bridelia</i> sp.	88/145		t	r		
? <i>Drypetes</i> sp.1	88/41		t			
? <i>Drypetes</i> sp.2	88/40		t			
<i>Euphorbia candelabrum</i> Kotschy	(Nishida 1989)					
<i>Hymenocardia acida</i> Tul.	88/83		t			
<i>Maprounea africana</i> Muell.-Arg.	88/22-63		t			
<i>Pseudolachnostylis maprouneifolia</i> Pax	mutungulu	x	t		d	
<i>Uapaca kirkiana</i> Muell.-Arg.	(Nishida 1989)					
<i>Uapaca ?nitida</i> Muell.-Arg.	88/61		t			
<b>Flacourtiaceae</b>						
<i>Gerrardina eylesiana</i> Milne-Redh.	92/61		s	r		
<i>Oncoba ?spinosa</i> Forsk.	kaposo, 93/FB139	x	s	r		
<b>Guttiferae</b>						
<i>Garcinia ?huillensis</i> Oliv.	kasolio, 92/35	x	t	r		
<i>Garcinia livingstonei</i> T. Anders.	88/91		t/l			
<i>Harungana madagascariensis</i> Poir.	kalilolilo (mshaishai [S])	x	t			b
<b>Loganiaceae</b>						
<i>Strychnos cocculoides</i> Bak.	(Nishida 1989)				N	
<i>Strychnos</i> sp. 1	88/102-103		t	s		
<i>Strychnos</i> sp. 2	88/148		t			
? <i>Strychnos</i> sp. 3	88/85		t			
? <i>Strychnos</i> sp. 4	mutunga, 93/7		t		a	
<b>Malvaceae</b>						
<i>Azanza garckeana</i> (F. Hoffm.) Excell & Hillcoat	mutobo	x	t		a	y
<b>Meliaceae</b>						
<i>Carapa grandiflora</i> Sprague	(Nishida 1989)					
<i>Carapa</i> or <i>Khaya</i> sp. [could be <i>C. grandiflora</i> ]	mulangale, 92/43	x	t	r		
<b>Mimosaceae</b>						
<i>Acacia albida</i> Del.	(Nishida 1989)					
<i>Acacia drepanolobium</i> Harms ex Sjostedt	(Nishida 1989)					
<i>Acacia polyacantha</i> Willd.	(Nishida 1989)					
<i>Acacia xanthophloea</i> Benth.	(Nishida 1989)					
<i>Albizia adianthifolia</i> or <i>gummifera</i>	mitanga, 93/FB138	x	t	r		
<i>Albizia ?antunesiana</i> Harms	88/75		t			

Plant Name	1	2	3	4	5	6
<b>MONOCOTYLEDONEAE</b>						
<b>Commelinaceae</b>						
<i>Aneilema</i> sp.	88/20		h			
<b>Gramineae</b>						
<i>Hyparrhenia</i> sp.	(Nishida 1989)		h			
<i>Pennisetum purpureum</i> Schumach.	(Nishida 1989)		h			
<b>Orchidaceae</b>						
<i>Bulbophyllum</i> sp.	[bulb orchid]		h			
<i>Vanilla imperialis</i> Kraenzl. or <i>polylepis</i> Summerh.	muyokayoka		l	r		
<b>Palmae</b>						
<i>Borassus aethiopum</i> Mart.	[borassus]		t		N	
? <i>Eremospatha haullevilleana</i> De Wild.	lugage, 92/FB111	x	l	r		
<b>Zingiberaceae</b>						
? <i>Aframomum</i> sp.	matunguru, 92/FB64		h		a,e	y

close examination. These are indicated on the list. Some of the local names I was given are similar/identical to names appearing in Nishida & Uehara's list, but were clearly applied to different plants. Such discrepancies may be due to dialect differences, transcription errors on my part, or mistakes on Mr. Bilali's part.

Where I identified a plant only to genus and Nishida (1989) lists a species that resembles mine, I have assumed (without detailed examination) that mine is the species he named. This procedure could result in a slight under-reporting of species number. Species reported by Nishida that I did not observe are so indicated under "field name".

All specimens are currently held at the Biological Anthropology Lab, UCSD in the author's collection, and can be referenced by name or the collection codes listed in Table 1.

**Chimpanzee feeding:** I have found approximately 20 different varieties of seed in fecal samples from the site, but most of these have not been identified. Since humans and four species of monkey also forage in the area, I have been cautious about attributing feeding damage to chimpanzees. Taxa are listed as chimpanzee food sources if (1) I have unambiguous evidence of chimpanzee feeding, or (2) I confirmed the species, my guide said it was eaten, and it is recorded as a chimpanzee food at Gombe or Mahale. Information on feeding by other taxa (monkeys, duiker) is mostly hearsay.

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**Jim Moore**      タンザニア国トングウェ東森林保護区（ウガラ地域）の植物

霊長類研究者に「ウガラ」の名で知られるトングウェ東森林保護区は、チンパンジー (*Pan troglodytes schweinfurthii*) の生息が知られる地域の中で、もっとも乾燥したハビタートの一つである。そのような場所は、チンパンジーの分布を制限する気候・植生要素を理解する上で重要である。本論文では、ウガラ地域から報告された植物リストを予備的に示す。