

## 7. Afromontane undifferentiated forest (Fbu) and Afromontane single-dominant *Juniperus procera* forest (Fbj)

### 7.1. Description

Afromontane undifferentiated forest is usually shorter than Afromontane rain forest (Fa). Although there is some floristic overlap in species composition between these two forest types (for example, *Podocarpus latifolius*, *Prunus africana* and *Xymalos monospora* were listed as characteristic species both for Afromontane rain forest and Afromontane undifferentiated forest), species composition is distinctive (White 1983 p. 165). White (1983) reserved the term of “undifferentiated forests” to forests that undergo rapid and kaleidoscopic changes in structure and species composition over short distances (White 1983 p. 47).

Afromontane undifferentiated forest usually replaces Afromontane rain forest at comparable altitudes (usually between 1250 and 2500 m) on the drier slopes of mountains and at higher altitudes on the wetter slopes, and sometimes at lower altitudes. Afromontane undifferentiated forest usually receives lower rainfall (possibly as low as 850 mm, which is the upper rainfall limit of East African evergreen bushland [Be]) than Afromontane rain forest (White 1983 p. 165).

After fire, Afromontane undifferentiated forests are sometimes replaced by almost pure stands of Afromontane single-dominant *Juniperus procera* forest (Fbj), Afromontane single-dominant *Widdringtonia whytei* forest (Fc) or Afromontane single-dominant *Hagenia abyssinica* forest (Fd). Within the VE-CEA map, we mapped the latter two types of forests (Fc and Fd) separately but mapped Afromontane undifferentiated forest together with Afromontane single-dominant *Juniperus procera* forest (Fbj). We made this decision especially since most of the national maps only listed one of these two forests types, whereas our floristic and environmental analysis suggested that both these forests belonged to the same potential natural vegetation type.

Afromontane single-dominant *Juniperus procera* forest (Fbj) mostly occurs on the drier slopes of mountains between 1800 and 2900 m, although it sometimes descends to 1000 m. Annual rainfall is usually between 1000 and 1150 mm, but sometimes more than 1250 mm. *Juniperus procera* also occurs outside forests as in evergreen bushland (Be, see volume 5) where rainfall can be as low as 650 mm - this could be the original habitat of this species (for example, the species occurs in evergreen bushland [Be] at lower elevations on Mt. Kulal [Kenya] where it is 4 to 6 m tall [White 1983 p. 121]). *Juniperus procera* is a strong light-demander that does not regenerate in its own shade, so its presence as forest tree depends on fire. This species also seems to be intolerant of deep humus layers (White 1983 p. 165 - 166).

Besides the **potentially** dominant *Juniperus procera*, regional indicator species (characteristic species listed by White (1983) [1983] that were only provided for Afromontane undifferentiated forest and no other Afromontane forest types) that were listed as characteristic species for one or several national maps include *Halleria lucida*, *Ilex mitis*, *Kiggelaria africana* (this species does not extend as far north as Ethiopia), *Nuxia congesta*, *Nuxia floribunda* (this species does not extend as far north as Ethiopia), *Ocotea kenyensis*, *Podocarpus falcatus* (synonym: *Podocarpus gracilior*).



Figure 7.1. Afromontane undifferentiated forest with canopy of *Juniperus procera* and *Podocarpus falcatus* in Chilimo forest (Ethiopia). Altitude approximately 2550 m. Photograph by I. Friis and Sebsebe Demissew (September 2005). Reproduced from Biologiske Skrifter of the Royal Danish Academy of Sciences and letters, Vol. 58, Fig. 20A. 2010.



Figure 7.2. Afromontane single-dominant *Juniperus procera* forest with a tree of *Hagenia abyssinica* in the foreground near the upper edge of Chilimo forest (Ethiopia). Altitude approximately 3000 m. Photograph by I. Friis and Sebsebe Demissew (September 2005). Reproduced from Biologiske Skrifter of the Royal Danish Academy of Sciences and letters, Vol. 58, Fig. 21B. 2010.



Figure 7.3. Climax stand of *Juniperus procera* (30 - 37 m) in Afromontane single-dominant *Juniperus procera* forest. Photographed in 1960 by unknown photographer at unknown location (presumably in Kenya). Photograph given to F. Gachachi by C.G. Trapnell (before his decease).



Figure 7.4. Afromontane single-dominant *Juniperus procera* forest in Maralal District (Kenya, top image, photograph taken in 2009) and Mt. Kenya (bottom image, photograph taken in 2011). Photographs by F. Gachathi.



Figure 7.5. A glade in Afromontane undifferentiated forest (synonym: montane sclerophyll forest) with *Juniperus procera* on the right and an unidentified *Podocarpus* species on the left. Afromontane bamboo (*Sinarundinaria alpina*, synonym: *Arundinaria alpina*) is portrayed behind the unidentified *Podocarpus* species. Western slopes of Mt. Kenya along the Sirimon track. Shell guide to East African birds (reproduced with permission from URL <http://ufdc.ufl.edu/UF00077050>).

## 7.2. Species composition

(Please check the methodology and information from Volumes 2 - 5 for more details on how the information on species composition for the different manifestations of this potential natural vegetation type was compiled. In composition tables, "x" indicates that the species is expected to be present, "C" indicates that the species was identified as characteristic species and "f" indicates a species that was not listed in the documentation that we consulted although it is known to occur in the specific country).

Table 7. Species composition of Afromontane undifferentiated forest (Fbu) and Afromontane single-dominant *Juniperus procera* forest (Fb)

SPECIES	Regional status	Ethiopia (FbuE subtype)		Kenya	Malawi	Tanzania	Uganda	Zambia
		C	D	C	D	C	C	
<i>Juniperus procera</i>	dominant in single-dominant <i>Juniperus procera</i> forest	C	D	C	D	C	C	
<i>Halleria lucida</i>	indicator species	x	x	x	x	C	f	f
<i>Ilex mitis</i>	indicator species	x	f	C	C	x	C	f
<i>Kiggelaria africana</i>	indicator species (species does not extend as far north as Ethiopia)				x	f		
<i>Nuxia congesta</i>	indicator species	x	C	C	C	C	x	C
<i>Nuxia floribunda</i>	indicator species (species does not extend as far north as Ethiopia)			f	x	x	x	C
<i>Ocotea kenyensis</i>	indicator species	f	f	f	f	f	f	
<i>Podocarpus falcatus</i>	indicator species (conifer species that is absent from Guineo-Congolian rain forest and less characteristic of Afromontane rain forest)	C	f	C	f	f	C	
<i>Rapanea melanophloeos</i>	indicator species	x	C	C	C	C	x	C
<i>Apodytes dimidiata</i>	characteristic species	C	f	C	x	C	f	f
<i>Podocarpus latifolius</i>	characteristic species (conifer species that is absent from Guineo-Congolian rain forest and less characteristic of Afromontane rain forest; species does not extend as far north as Ethiopia)			C	C	f	x	f
<i>Prunus africana</i>	characteristic species	C	f	C	C	C	x	f
<i>Xymalos monospora</i>	characteristic species (species that does not extend as far north as Ethiopia)			x	C	f	f	f
<i>Acacia abyssinica</i>	invasive species	f	f	C	f	f	x	
<i>Acacia lahai</i>	invasive species	f	f	C		f	f	
<i>Acokanthera schimperi</i>		f	C	f		f	f	
<i>Agauria salicifolia</i>		x	f	x	x	C	f	f
<i>Albizia gummifera</i>	not characteristic	x	f	C	f	C	x	f
<i>Allophylus abyssinicus</i>		C	f	x	f	f	x	f
<i>Berberis holstii</i>		f	f	x	x	f	C	
<i>Bersama abyssinica</i>		C	x	C	x	C	x	f
<i>Blighia unijugata</i>		f	f	x	f	f	x	f
<i>Buddleja polystachya</i>		f	C	x		f	f	
<i>Carissa spinarum</i>		x	C	f	f	f	f	f
<i>Cassipourea malosana</i>	not characteristic	C	f	C	C	C	x	f
<i>Catha edulis</i>		f	f	f	f	C	C	f
<i>Celtis africana</i>		C	f	C	x	f	x	f
<i>Clausena anisata</i>		x	C	x	x	f	x	f
<i>Clerodendrum myricoides</i>		x	C	f		f	f	
<i>Cordia africana</i>		x	f	f	f	f	x	f
<i>Cornus volkensii</i>				C	f	f	f	
<i>Croton macrostachyus</i>		C	f	C	f	C	x	f
<i>Croton megalocarpus</i>	not characteristic			f	f	x	x	f
<i>Cussonia holstii</i>		x	f	C		x	x	
<i>Cussonia spicata</i>				C	C	C	x	f
<i>Diospyros abyssinica</i>	not characteristic	x	f	C	f	x	x	f
<i>Discopodium penninervium</i>		x	C	f	f	f	x	
<i>Dodonaea viscosa</i>		x	C	C	f	f	x	f
<i>Dombeya torrida</i>		x	f	C	x	x	x	
<i>Dovyalis abyssinica</i>		C	x	C	f	f	x	f
<i>Dovyalis macrocalyx</i>				x	x	f	x	f
<i>Dracaena steudneri</i>		C	f	C	f	f	x	f
<i>Ehretia cymosa</i>		x	C	C	f		f	
<i>Ekebergia capensis</i>		C	x	C	x	C	C	f
<i>Erica arborea</i>		x	C	f		f	x	
<i>Erythrina abyssinica</i>		f	f	f	f	C	x	f
<i>Erythrina brucei</i>		C	f					
<i>Euclea divinorum</i>	not characteristic	x	x	C	x	C	C	f
<i>Euclea racemosa</i>		f	C	f	f	f	x	f
<i>Euphorbia abyssinica</i>		f	C	C	f	f	f	f
<i>Euphorbia tirucalli</i>		f	C	f	f	f	f	f
<i>Fagaropsis angolensis</i>	not characteristic	x	f	f	f	x	x	f
<i>Faurea saligna</i>				C	f	x	x	f
<i>Ficus ovata</i>		C	f	f	f	f	f	f
<i>Ficus sur</i>		C	f	C	f	f	x	f
<i>Ficus thonningii</i>		C	f	C	x	f	x	f
<i>Galiniera saxifraga</i>		x	C	C	f	f	f	
<i>Grewia ferruginea</i>		x	C					
<i>Hagenia abyssinica</i>		x	x	C	x	C	f	f
<i>Hypericum revolutum</i>		x	f	C	f	f	x	f
<i>Hypericum roeperanum</i>		x	x	f		f	x	f
<i>Lannea fulva</i>				f		f	x	

SPECIES	Regional status	Ethiopia (FbuE subtype)	Ethiopia (FbjE subtype)	Kenya	Malawi	Tanzania	Uganda	Zambia
<i>Lepidotrichilia volkensii</i>		C	f	C	x	f	f	f
<i>Maesa lanceolata</i>		x	C	f	x	x	x	f
<i>Margaritaria discoidea</i>		x	f	f	f	C	x	f
<i>Maytenus acuminata</i>				f	x	x	f	f
<i>Maytenus undata</i>		C	x	C	f	f	C	f
<i>Mimusops kummel</i>		x	f	f	f	f	x	
<i>Morella salicifolia</i>		x	f					
<i>Myrsine africana</i>		x	f	x	x	f	x	f
<i>Olea capensis</i>	not characteristic	x	f	C	C	C	x	f
<i>Olea europaea</i>	not characteristic	C	C	C	x	f	C	f
<i>Olinia rochetiana</i>		C	f	C	C	C	C	C
<i>Osyris lanceolata</i>		x	f	f		f	x	
<i>Parinari excelsa</i>	not characteristic				f	C	f	f
<i>Phoenix reclinata</i>	palm species	f	f	x	f	x	f	f
<i>Phytolacca dodecandra</i>		x	f	x	f	f	x	f
<i>Pittosporum viridiflorum</i>		x	f	C	C	x	x	f
<i>Psyrax schimperiana</i>		f	f	x	f	f	x	f
<i>Pterolobium stellatum</i>		f	C	x	f	f	f	f
<i>Rhamnus prinoides</i>		x	C	x	x	f	x	f
<i>Rhoicissus tridentata</i>		f	C	f	x	f	f	f
<i>Rhus longipes</i>		f	f	f	x	f	x	f
<i>Rhus natalensis</i>		f	C	x	f	f	x	f
<i>Rhus vulgaris</i>		f	f	x	f	f	x	f
<i>Ritchiea albersii</i>		x	f	C		x	x	f
<i>Rosa abyssinica</i>		x	C					
<i>Rothmannia urcelliformis</i>		x	f	f	f	f	x	f
<i>Rubus apetalus</i>		x	f	x	f	f	x	f
<i>Rubus volkensii</i>		x	f	x		f	f	
<i>Schefflera abyssinica</i>		x	f	f	x	f	x	f
<i>Schefflera volkensii</i>		x	f	C		f	x	
<i>Schrebera alata</i>	not characteristic	x	C	x	f	C	x	f
<i>Scutia myrtina</i>		x	f	x	f	f	f	f
<i>Senna didymobotrya</i>		f	C	x	f	f	f	f
<i>Shirakiopsis elliptica</i>		f	f	x	f	x	f	f
<i>Sinarundinaria alpina</i>	(Afromontane bamboo)	x	C	f	x	f	f	
<i>Solanecio mannii</i>		f	f	x	f	f	x	f
<i>Syzygium cordatum</i>				f	x	x	f	f
<i>Syzygium guineense</i>	not characteristic	x	f	C	x	x	x	f
<i>Trema orientalis</i>		x	f	x	f	f	x	f
<i>Vangueria apiculata</i>		x	f	f	f	f	x	f
<i>Vangueria madagascariensis</i>		f	C	f	f	f	x	
<i>Vepris dainellii</i>		C	f					
<i>Vepris nobilis</i>		C	C	C	x	f	C	f
<i>Vernonia amygdalina</i>		x	C	f	f	f	x	f
<i>Vernonia myriantha</i>		f	f	f	x	f	x	f
<i>Zanthoxylum usambarensis</i>		f	C	C		x		