

## 23. Palm wooded grassland physiognomically easily recognized type, P)

### 23.1. Description

White (1983) did not describe palm wooded grasslands as a separate vegetation type in his main treatment of floristic regions. However, he describes *Hyphaene coriacea* palm stands that occur on sites with permanent ground water at the edge of the Chalbi desert and at the base of Mt. Kulal (White 1983 p. 123). *Borassus aethiopum* and *Hyphaene petersiana* (synonym: *Hyphaene ventricosa*) are among the characteristic species of the riparian woodland subtype of Undifferentiated woodland and wooded grassland (Wn, White 1983 p. 95). *Borassus aethiopum* is listed to occur in seasonally inundated flood plains in the Sudanian floristic region (White 1983 p. 107). *Borassus aethiopum* and *Hyphaene thebaica* occur on transition zones between swamp grassland and better drained areas with *Acacia seyal* in the flood region of the Nile (White 1983 p. 108). *Hyphaene compressa* occurs in Zanzibar-Inhambane edaphic wooded grassland (White 1983 p. 189). *Phoenix reclinata* and *Raphia farifera* are palm species that are listed among the more important species of swamp forests that are widespread in the Lake Victoria region and elsewhere (White 1983 p. 181). *Phoenix reclinata* occurs in swamp forests in the Zanzibar-Inhambane region (White 1983 p. 188).

Lind and Morrison (1974 p. 94) mention that palm wooded grassland is limited in area, but so noticeable that it needed to be included in descriptions of East African vegetation types. The main species is *Borassus aethiopum*. In Uganda, it is found on sands and sandy loams with mobile ground water. In Kenya, it is scattered through the coastal belt and is noticeable on the Shimba Hills. In Tanzania, extensive stands occur in the flood plains of the Igombe and Ugala rivers and other riverine communities where it is sometimes accompanied by *Hyphaene* doum palm species. *Hyphaene coriacea* is the dominant palm species on the Ruaha - Usangu plain complex and in the Warimi and Mkata flood plains. *Borassus* stands are more common than *Hyphaene* in parts of the coastal plain, but small trees (up to 3 m) of *Hyphaene* form extensive stands in grassland on poorly drained sands.

From the descriptions above it is clear that the palm stands that were described often occur in areas with drainage impediments or riverine locations. It would therefore be perfectly acceptable to classify and map these vegetation types as “edaphic wooded grassland” (wd) or “riverine wooded grassland” (wr), which we have done in several situations. We think that discrimination between these types is more a question of the scale of mapping since palm trees can easily be identified in the field.



Figure 22.1. *Borassus - Hyperthelia dissoluta* [a grass species, synonym: *Hyparrhenia dissoluta*,] palm wooded grassland (original mapping unit M2) from Uganda. Photograph by J. Kalema.



Figure 23.2. Stand of *Phoenix reclinata* in waterlogged area within Afromontane rain forest (Fa). Photograph by I. Friis and Sebsebe Demissew. Reproduced from Biologiske Skrifter of the Royal Danish Academy of Sciences and letters, Vol. 58, Fig. 25G. 2010.



Figure 23.3. *Hyphaene petersiana* wooded grassland next to the Shire River marsh and lagoons (Liwonde National Park, Malawi). An alternative classification method for this vegetation type would have been as "edaphic wooded grassland on drainage-impaired or seasonally flooded soils". Photograph by C. Dudley.

## 23.2. 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 23. Species composition for Palm wooded grassland physiognomically easily recognized type, P)

SPECIES	Regional Status	Ethiopia	Kenya	Malawi	Rwanda	Tanzania	P1U (Uganda subtype)	P2U (Uganda subtype)	Zambia	Coast
<i>Borassus aethiopicum</i>	Palm species (occurs in the riparian woodland subtype of north Zambezan undifferentiated woodland, in Sudanian edaphic grassland on Pleistocene clays, and in Zanzibar-Inhambane secondary grassland and wooded grassland)	C	C	f		f	D	D	f	C
<i>Cocos nucifera</i>	Palm species (occurs in Zanzibar-Inhambane edaphic grassland and secondary grassland)		C			f				C
<i>Elaeis guineensis</i>	Palm species		C	f		f	f	f		C
<i>Hyphaene compressa</i>	Palm species (occurs in Zanzibar-Inhambane edaphic grassland and secondary grassland)	C	C			f				C
<i>Hyphaene coriacea</i>	Palm species (small stands with permanent ground water at the edge of the Chalbi desert and at the base of Mt. Kulal)		C			f				C
<i>Hyphaene petersiana</i>	Palm species (occurs in the riparian woodland subtype of north Zambezan undifferentiated woodland)			D		f				C
<i>Hyphaene thebaica</i>	Palm species (occurs in Sudanian undifferentiated woodland and in Sudanian edaphic grassland on Pleistocene clays)	C								
<i>Phoenix reclinata</i>	Palm species (small communities in areas with frequent landslides on Mt. Kulal, Lake Victoria swamp forest, Zanzibar-Inhambane swamp forest)	C	C	f	C	f	f	f	f	C
<i>Raphia farinifera</i>	Palm species (occurs in Lake Victoria swamp forest)		C	f		f	f	f	f	C
<i>Acacia erioloba</i>										C
<i>Acacia nigrescens</i>				C						f
<i>Acacia polyacantha</i>				f			x	x		f
<i>Acacia sieberiana</i>				C			x	x		f
<i>Acacia xanthophloea</i>				C						
<i>Adansonia digitata</i>				C						f
<i>Albizia versicolor</i>				C			f	f	f	
<i>Burkea africana</i>				f			f	f		C
<i>Combretum collinum</i>				f			x	x		f
<i>Diospyros mespiliformis</i>				C			f	f	f	
<i>Faidherbia albida</i>				C			f	f	f	
<i>Kigelia africana</i>				C					x	f
<i>Lannea schweinfurthii</i>				C			f	f	f	
<i>Lonchocarpus capassa</i>				C						f
<i>Piliostigma thonningii</i>				C			x	x		f
<i>Sterculia africana</i>				C						f
<i>Terminalia sericea</i>				f						C
<i>Trichilia emetica</i>				C			f	f	f	

## 24. Edaphic wooded grassland on drainage-impeded or seasonally flooded soils (edaphic vegetation type, wd)

### 24.1. Description

It is not always easy to discriminate between riverine wooded grasslands and edaphic wooded grasslands (there is a similar problem in differentiating riverine forest from swamp forests, see Volume 2). We were probably not consistent in allocating mapping units from national maps to riverine or edaphic wooded grasslands, but where proximity to a river was obvious, we preferred the classification of riverine wooded grasslands. The edaphic wooded grasslands that we classified as such typically contained *Acacia* species. Wooded grasslands dominated by palm species are sometimes riverine or indicative of conditions of impeded drainage, but we classified these vegetation types separately (VECEA mapping unit “P”, see section 15) since they are easy to be distinguished in the field, from aerial photographs or even some satellite imagery.

White (1983) did not strictly apply a differentiation between edaphic wooded grassland (with cover percentages of 10 - 40% woody species) and edaphic grassland (with cover percentages of <10% woody species) since both types intergrade and edaphic wooded grasslands are often difficult to delimit from the more open grasslands with which they are associated (White 1983 pp. 50 - 52). **Within the VECEA map, we loosely defined “edaphic wooded grassland” as “edaphic grassland with scattered woody species” and “edaphic grassland” as “edaphic grassland without scattered woody species”. This means that some vegetation types that would have been classified as “edaphic grasslands” in a strict physiognomic classification system (i.e. woody cover < 10%) may have been allocated to “edaphic wooded grasslands”.**<sup>(15)</sup>

Although White (1983) described edaphic grasslands and wooded grasslands separately for the various floristic regions, we did not apply a floristic classification system to edaphic grasslands and edaphic wooded grasslands (although we directly relied on the information that was provided by White in descriptions of a particular floristic region).

Edaphic grassland areas of the Zambezian region were mapped and described as grasslands, including suffrutex grassland areas that are considered as wooded grasslands (mapping unit g, see Volume 5) by some authors.

In the Somalia-Masai region, water-receiving depressions covered with black and cracking clays are extensively developed in Central Tanzania; these depressions do not have sufficient run-off to carve stream beds and quickly evaporate in the dry season. The principal grasses that cover these

15: The definition of "grasslands" of Pratt et al. (1966) of "land dominated by grasses and occasionally other herbs; sometimes with widely scattered or grouped trees and shrubs, the canopy cover of which does not exceed 2%" may therefore provide a more accurate physiognomic definition of vegetation types that were classified as "edaphic grassland" by the VECEA project.

16: The definition given (White 1983 p. 269) is of “water-receiving depressions in East Africa covered with grassland and *Acacia*-wooded grassland on seasonally saturated, black, cracking clays. Mostly occurring at low altitudes and under a drier and hotter climate than dambos”.

depressions (“mbugas”<sup>(16)</sup>) are *Setaria incrassata* and *Themeda triandra*. The *mbugas* are treeless but are usually separated by an ecotone of wooded grassland that is dominated by various gall *Acacia* species, including *Acacia drepanolobium*, *Acacia malacocephala*, *Acacia pseudofistula* and *Acacia seyal*. Seasonally waterlogged (wooded) grassland also occurs as ill-defined glades on non-cracking calcimorphic “hard pan” soils within deciduous bushland (Bd). The dominant grass species in these glades are dwarf grasses, including *Microchloa indica*. The glades do not have trees or have scattered individuals of *Acacia drepanolobium*, *Acacia mellifera*, *Acacia tanganyikensis*, *Acacia tortilis*, *Albizia amara*, *Albizia harveyi*, *Commiphora schimperi*, *Dalbergia melanoxylon*, *Lannea humilis*, *Sclerocarya birrea* and *Terminalia stuhlmannii*. Ill-defined areas of inland drainage in Somalia are covered with *Cynodon dactylon* and *Chloris roxburghiana* and have scattered *Acacia tortilis* (White 1983 p. 116).

Various types of edaphic wooded grassland are described for the Sudanian floristic region, including those occurring on the Pleistocene clays of the Nile Valley. Within the flood region, areas of slightly higher grounds that are only flooded to a shallow depth and where annual rainfall is in between 570 and 1000 mm are covered with *Acacia seyal*. The transition zones in between swamp grasslands (containing *Setaria incrassata*) and the better drained areas are sometimes dominated by the palm species *Borassus aethiopum* and *Hyphaene thebaica*, either single or together (White 1983 p. 108).

Zanzibar-Inhambane edaphic (wooded) grassland cover large areas of grey-black cracking clay soils near the mouth of the Tana river. These grasslands are studded with thicket-covered termite mounds (described separately as Termitary vegetation [T, see Volume 4]). There are widely spaced individuals of *Acacia zanzibarica*, *Hyphaene compressa*, *Terminalia spinosa* and *Thespesia danis* (White 1983 p. 189).

Figure 24.1. Profile diagram of seasonally waterlogged wooded grassland with *Acacia drepanolobium*. Height of vegetation in meter. The grass species is *Pennisetum mezipanicum*. Pratt et al. (1966, Fig. 5b). Image obtained from URL: <http://www.jstor.org/stable/2401259>.

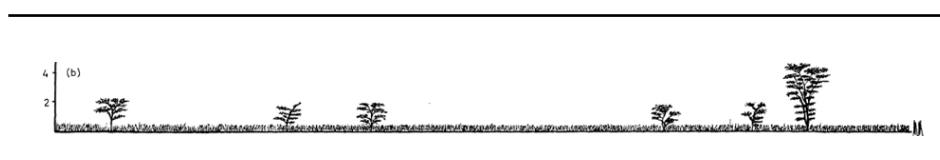




Figure 24.2. Edaphic wooded grassland with *Acacia drepanolobium* in Nairobi National Park (Kenya). Photograph by F. Gachathi (2009).



Figure 24.3. *Acacia seyal* var. *seyal* in Moyale District (Kenya) in an area with impeded drainage. Photograph by F. Gachathi (2009).



Figure 24.4. Typical East African bird species of edaphic wooded grassland within their habitat. Shell guide to East African birds (1960, reproduced with permission from URL <http://ufdc.ufl.edu/UF00077050>).

Figure 24.5. Partly flooded "wooded grassland of the western Gambela region" with *Acacia nilotica*, *Acacia seyal* and *Balanites aegyptiaca*. West of Itang. Altitude approximately 450 m (September 1996). Photograph by I. Friis and Sebsebe Demissew. Reproduced from Biologiske Skrifter of the Royal Danish Academy of Sciences and letters, Vol. 58, Fig. 17B. 2010.



Figure 24.6. *Acacia paolii* is common in places with black cotton soil (vertisols) that occur within *Acacia-Commiphora* bushland (Bd). In the original vegetation map of Ethiopia (Friis *et al.* 2010), areas with edaphic wooded grassland on black cotton soils that occur within areas of *Acacia-Commiphora* deciduous bushland (Bd) were not mapped separately in their " *Acacia-Commiphora* woodland and bushland proper" mapping unit; these include areas of *Acacia drepanolobium* (Friis *et al.* 2010 Fig. 15E) and *Acacia paolii* (Friis *et al.* 2010 Fig. 15G). Photograph by I. Friis and Sebsebe Demissew. Reproduced from Biologiske Skrifter of the Royal Danish Academy of Sciences and letters, Vol. 58, Fig. 15G. 2010.



## 24.2. Species composition

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Table 24. Species composition for Edaphic wooded grassland on drainage-impeded or seasonally flooded soils (edaphic vegetation type, wd)

SPECIES	Regional status	Ethiopia	Kenya	Malawi	wd eT (Tanzania subtype)	wd nT (Tanzania subtype)	wd U (Uganda)	Zambia	Coast
<i>Acacia drepanolobium</i>	Somalia-Masai edaphic grassland	C	C		C	C	C		
<i>Acacia gerrardii</i>		f	C	f	f	f	x	f	f
<i>Acacia malacocephala</i>	Somalia-Masai edaphic grassland		x		C	f			
<i>Acacia mellifera</i>	Somalia-Masai edaphic grassland; scattered bushes in edaphic grassland of the Serengeti plains; Pleistocene clays of the Nile valley	C	C		f	C	f	f	f
<i>Acacia nilotica</i>		C	x	f	f	f	f	C	f
<i>Acacia paalii</i>		C	x						
<i>Acacia polyacantha</i>		f	C	f	f	f	C	C	f
<i>Acacia pseudofistula</i>	Somalia-Masai edaphic grassland		x		C	f			
<i>Acacia senegal</i>		C	f		f	f	x	f	f
<i>Acacia seyal</i>	Somalia-Masai edaphic grassland; Pleistocene clays of the Nile Basin	C	C	f	C	f	C	C	
<i>Acacia sieberiana</i>		f	C	f	f	f	C	C	f
<i>Acacia tanganyikensis</i>	Somalia-Masai edaphic grassland		x		f	C			
<i>Acacia tortilis</i>	Somalia-Masai edaphic grassland	f	x		f	C	f	f	f
<i>Acacia xanthophloea</i>			x	C	f	f			f
<i>Acacia zanzibarica</i>	Zanzibar-Inhambane edaphic grassland	f	f		f	f			C
<i>Albizia amara</i>	Somalia-Masai edaphic grassland	f	x	f	f	C	x	f	
<i>Albizia harveyi</i>	Somalia-Masai edaphic grassland		x	f	f	C	f	f	f
<i>Andropogon kelleri</i>	seasonally waterlogged grassland in Somalia with scattered <i>Acacia tortilis</i>		x						
<i>Aristida adscensionis</i>	seasonally waterlogged grassland in Somalia		x						
<i>Balanites aegyptiaca</i>	Sudanian grassland on shallow soil over ironstone	x	x		f	f	C	f	
<i>Balanites rotundifolia</i>		f	x				x		f
<i>Bauhinia petersiana</i>				f	f	f		C	
<i>Blepharis acanthodioides</i>	Somalia-Masai edaphic grassland		x						
<i>Borassus aethiopicum</i>	Sudanian valley and floodplain edaphic grassland; Sudanian wooded edaphic grassland on pleistocene clays; palm species	C	f	f	f	f	f	f	f
<i>Bothriochloa bladhii</i>			f	x	f	f	x		
<i>Cenchrus ciliaris</i>	seasonally waterlogged grassland in Somalia		x		f	f	f		
<i>Chloris gayana</i>			x	x	f	f	f		
<i>Chloris roxburghiana</i>	seasonally waterlogged grassland in Somalia with scattered <i>Acacia tortilis</i>		x		f	f	f		
<i>Chrysopogon plumulosus</i>	seasonally waterlogged grassland in Somalia		x		f	f			
<i>Combretum adenogonium</i>		f	f	f	f	f	C	C	
<i>Commiphora schimperi</i>	Somalia-Masai edaphic grassland	f	x		f	C	f		
<i>Cynodon dactylon</i>	seasonally waterlogged grassland in Somalia		x		f	f	f		
<i>Dactyloctenium aegyptium</i>			x	x	f	f	f		
<i>Dalbergia melanoxylon</i>	Somalia-Masai edaphic grassland	f	x	f	f	C	f	f	f
<i>Diospyros kirkii</i>				f	f	f	f	C	
<i>Faidherbia albida</i>		f	f	f	f	f	f	C	f
<i>Gardenia ternifolia</i>	Sudanian grassland on shallow soil over ironstone	f	f		f	f	x		f
<i>Harrisonia abyssinica</i>		x	f	f	f	f	x	f	f
<i>Hyparrhenia rufa</i>			f	x	f	f	x		
<i>Hyphaene compressa</i>	Zanzibar-Inhambane edaphic grassland, palm species	f	f		f	f			C
<i>Hyphaene petersiana</i>	(palm species)			C	f	f		f	
<i>Hyphaene thebaica</i>	Sudanian edaphic wooded grassland on pleistocene clays; palm species	C							
<i>Kyllinga alba</i>	Somalia-Masai edaphic grassland		x						
<i>Lannea humilis</i>	Somalia-Masai edaphic grassland	f	x		f	C	x	f	
<i>Leersia hexandra</i>			f	x	f	f	x		
<i>Microchloa indica</i>	Somalia-Masai edaphic grassland		x		f	C			
<i>Oryza longistaminata</i>		C							
<i>Panicum coloratum</i>	seasonally waterlogged grassland in Somalia		x		f	f	f		
<i>Piliostigma thonningii</i>		x	f	f	f	f	C	C	f
<i>Pseudocedrela kotschyi</i>	Sudanian grassland on shallow soil over ironstone	f					x		
<i>Sclerocarya birrea</i>	Somalia-Masai edaphic grassland	f	x	f	f	C	f	f	f
<i>Setaria incrassata</i>	Somalia-Masai edaphic grassland; Pleistocene clays of the Nile Basin		x	x	x	f	x		
<i>Setaria sphacelata</i>			f	f	f	f	x		x
<i>Sorghum purpureo-sericeum</i>	grass species that occurs in Pleistocene clays of the Nile basin		f		f	f	x		
<i>Sporobolus pyramidalis</i>			f	x	f	f	x		
<i>Terminalia spinosa</i>	Zanzibar-Inhambane edaphic grassland	f	f		f	f	f		C
<i>Terminalia stenostachya</i>				f	f	f		C	
<i>Terminalia stuhlmannii</i>	Somalia-Masai edaphic grassland		x		f	C		f	
<i>Thalia geniculata</i>		C							
<i>Themeda triandra</i>	Somalia-Masai edaphic grassland; edaphic grasslands of the Serengeti plains; Zambezi edaphic grassland		x		x	f	x		
<i>Thespesia danis</i>	Zanzibar-Inhambane edaphic grassland	f	f		f	f			C