

35. Fresh-water swamp (X)

35.1. Description

Permanent swamps occur in depressions where water permanently floods the surface to a shallow depth (seasonal swamps are usually covered with edaphic grassland [see g]). Most of the shallower lakes outside the Guineo-Congolian floristic region (especially those that are not strongly saline, see halophytic vegetation [Z]) have a wide belt of reed-swamp where the dominant species are usually rooted in the soil and have stems that rise out of the water (inside the Guineo-Congolian region, most swampy areas are covered with swamp forest [fs]). The most abundant reed-swamp species is ***Cyperus papyrus*** (a giant sedge species) but other species can also be dominant such as ***Miscanthus violaceus***, *Phragmites australis* and *Phragmites mauritianus* grasses (White 1983 pp. 55 and 265).

True aquatic species occur in deeper water beyond the reed swamp and are either completely submerged or have floating leaves. A belt of floating grasses (principally *Vossia cuspidata*, *Paspalidium germinatum* and *Panicum repens*, but often invaded by *Cyperus papyrus*) frequently separates the reed-swamp from the aquatic vegetation (White 1983 p. 55).

Towards the landward margin of reed-swamp, often a narrow zone occurs of small trees and shrubs that are adapted to swamp conditions. The principal species are *Aeschynomene elaphroxylon*, *Aeschynomene pfundii*, *Ficus trichopoda* (scattered juveniles of swamp-forest trees), *Ficus verruculosa* (scattered juveniles of swamp-forest trees), *Kotschya africana*, *Mimosa pigra*, *Sesbania sesban* and *Syzygium cordatum* (scattered juveniles of swamp-forest trees; White 1983 p. 266).



Figure 35.1. Freshwater swamp in Morogoro District (Tanzania). Photograph by H. N. Moshi (2010).



Figure 35.2. Freshwater swamp dominated by *Cyperus papyrus* west of Mbale Town (Uganda). Photograph by J. Kalema (November 2010).



Figure 35.3. Freshwater swamp in Rwanda occurring at medium altitudes in that country in Akanyaru. Photograph by C. K. Ruffo (October 2009).



Figure 35.4. Typical East African birds of freshwater swamps and lakes within their natural habitat. Shell guide to East African birds (1960; reproduced with permission from URL <http://ufdc.ufl.edu/UF00077050>).

35.2. 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 35. Species composition for Fresh-water swamp (X)

SPECIES	Regional status	Ethiopia	Kenya	Malawi	Rwanda	Tanzania	Uganda	Zambia
<i>Acacia xanthophloea</i>			x	x		f		
<i>Aeschynomene abyssinica</i>		x	x	f		f	f	f
<i>Aeschynomene cristata</i>		C	x	f		f	f	f
<i>Aeschynomene elaphroxylon</i>	trees on the landward margin of reed-swamp	C	x	x	f	f	f	f
<i>Aeschynomene pfundii</i>	trees on the landward margin of reed-swamp	C	x	x		f	f	f
<i>Aeschynomene schimperi</i>		C	x	f	f	f	f	f
<i>Ceratophyllum demersum</i>	submerged community in deeper water beyond the reed swamp		f	x		f	f	
<i>Cissampelos mucronata</i>		f	f		f	f	C	
<i>Cyperus latifolius</i>		f			C			
<i>Cyperus papyrus</i>	the main constituent of most of the shallower lakes (except those that are strongly saline) outside the Guineo-Congolian region (where swamp forests are more prominent); also in floating mats		C	x	C	C	C	C
<i>Dissotis rotundifolia</i>	principal associate of papyrus		f			f	C	
<i>Echinochloa pyramidalis</i>	species rooted in <i>Vossia cuspidata</i> mats (grass)		f	x		f	f	
<i>Echinochloa stagnina</i>	species rooted in <i>Vossia cuspidata</i> mats (grass)		f			f	f	C
<i>Eichhornia crassipes</i>	free-floating species, pest introduced from tropical America (the water hyacinth)	f	f	x		f		
<i>Ficus verruculosa</i>	juveniles of swamp-forest trees on the landward margin of reed-swamp		f	f	f	f	x	f
<i>Heterotis canescens</i>	associate of <i>Miscanthus violaceus</i> in shallower lakes in which papyrus is absent						C	
<i>Hibiscus diversifolius</i>	principal associate of papyrus	f	f	x	f	f	f	f
<i>Ipomoea rubens</i>			x	x		f	f	
<i>Kotschyia africana</i>	trees on the landward margin of reed-swamp	f	x	x	f	f	f	f
<i>Leersia hexandra</i>	associate of <i>Miscanthus violaceus</i> in shallower lakes in which papyrus is absent (grass)	f	f	x		f	C	C
<i>Lemna perpusilla</i>	free-floating species		f	x		f	f	
<i>Loudetia phragmitoides</i>	in shallow water on the landward side of papyrus swamp (grass)		f			f	f	
<i>Ludwigia leptocarpa</i>	principal associate of papyrus			x				f
<i>Ludwigia octovalvis</i>	principal associate of papyrus		x	x				f
<i>Ludwigia stolonifera</i>	principal associate of papyrus			x				
<i>Melanthera scandens</i>	principal associate of papyrus		f			f	x	
<i>Mikania capensis</i>	principal associate of papyrus		f		f	f	x	
<i>Miscanthus violaceus</i>	in shallow water on the landward side of papyrus swamp; also forms a distinct zone in shallower water from which papyrus is absent (grass)						C	
<i>Nymphaea lotus</i>	community with floating leaves in deeper water beyond the reed swamp	f	f	x		f	f	
<i>Nymphaea nouchali</i>	community with floating leaves in deeper water beyond the reed swamp		f	x	C	f	f	
<i>Oryza longistaminata</i>	(grass)		f			f	f	C
<i>Pennisetum macrourum</i>	(grass)							C
<i>Persicaria decipiens</i>		f	f			f	C	
<i>Phoenix reclinata</i>	(palm species)	f	f	x	C	f	f	f
<i>Phragmites mauritianus</i>	common in silted areas and lakes of volcanic origin in East Africa (grass)		x	C		f	f	C
<i>Pistia stratiotes</i>	free-floating species	f		x				
<i>Pycreus mundtii</i>			f	x	C	f	f	
<i>Sesbania bispinosa</i>			x			f		
<i>Sesbania sesban</i>	trees on the landward margin of reed-swamp	C	x	x	f	f	f	f
<i>Syzygium cordatum</i>	juveniles of swamp-forest trees on the landward margin of reed-swamp		f	x	C	f	x	f
<i>Typha domingensis</i>			x	C		f	f	
<i>Typha latifolia</i>	locally replaces papyrus at higher altitudes		x				f	
<i>Utricularia gibba</i>	associate of <i>Miscanthus violaceus</i> in shallower lakes in which papyrus is absent		f	x		f	f	
<i>Vallisneria spiralis</i>	submerged community in deeper water beyond the reed swamp			x				
<i>Vigna luteola</i>	principal associate of papyrus		f	x		f	f	
<i>Voacanga thouarsii</i>			x	x			f	f
<i>Vossia cuspidata</i>	floating mat at the edge of reed-swamps, also pioneer of reed-swamp		f	x		f	f	

36. Halophytic vegetation (Z)

36.1. Description

Halophytes are a relatively small group of plant species that can grow on saline soils. The most typical halophytes absorb soluble salts (especially Sodium chloride) and tolerate high concentrations in the cell sap of their leaves. The vegetation on saline soils is dominated by halophytes and is physiognomically varied, including halophytic grassland, wooded grassland, shrubland and bushland (White 1983 pp. 55 and 266).

Saline soils are frequently found in arid and semi-arid regions where rainfall is insufficient to transport salts. The distribution of saline soils is also partially determined by geology as they can occur in wetter regions around springs that bring soluble salts to the surface (White 1983 p. 266). The halophytic grass *Drake-brockmania somalensis* occurs near outlets of the major tributary streams to the Chalbi desert (Kenya, this edaphic desert is seasonally flooded, White 1983 p. 120).

In parts of East Africa, salts that are derived from volcanic deposits rich in Sodium are deposited in lake basins and river valleys. As a consequence, halophytic vegetation occurs in most of the lake basins of the Eastern Rift (especially Lakes Bogoria [Kenya], Elementeita [Kenya], Eyasi [Tanzania], Nakuru [Kenya], Magadi, Manyara [Tanzania], Natron [Tanzania], Rukwa [Tanzania] and Turkana [Kenya]). Halophytic vegetation also occurs around Lake Mweru Wantipa (Zambia), a lake that also lies in a down-faulted depression with internal drainage (White 1983 pp. 266 - 267).

The halophytic vegetation in the Lake Rukwa basin (Tanzania) is chiefly grassland and can be subdivided in three zones: (i) the beach zone that marks the maximum extent of the lake has pure stands of 1 to 2 m tall *Sporobolus robustus*; (ii) the alkaline swamp is colonized by *Diplachne fusca* (current name: *Leptochloa fusca*; this grass species also dominates alkaline swamps south of Lake Eyasi [Tanzania]); and (iii) the alkaline flats (areas of the lake bed that are successively flooded or drying up) are colonized first by *Sporobolus spicatus* (a species that is also a chief plant around other lake basins in the Eastern Rift) but are replaced by *Odyssea jaegeri* when the lake shallowly refills (White 1983 p. 267).

Many of the flat valleys in the drier parts of Tanzania have alkaline soils. This is especially the case for the flood plains of the Pangani River as large amounts of salt are released from the volcanic deposits of Mt. Kilimanjaro and Mt. Meru. Prominent halophytes include *Salvadora persica*, *Suaeda monoica*, *Sporobolus robustus* and *Triplocephalum holstii*. Other species occur on the flood plain such as *Acacia xanthophloea* (a species that may not persist if high levels of sodium reach their rooting horizon [White 1983 p. 30]) and *Sesbania sesban* (White 1983 p. 267).



Figure 36.1. Salt pan surrounded by scrub of *Suaeda monoica* (Chenopodiaceae). The surrounding vegetation is desert (D) and semi-desert (S). Between Dichioto (Ethiopia) and the border with Djibouti. Approximate altitude 200 m. Photograph by I. Friis and Sebsebe Demissew (October 2006). Reproduced from Biologiske Skrifter of the Royal Danish Academy of Sciences and letters, Vol. 58, Fig. 35B. 2010.



Figure 36.2. Salt pan surrounded by scrub of *Suaeda monoica* (Chenopodiaceae). In the background lava flows without vegetation (desert [D]). Between Dichioto (Ethiopia) and the border with Djibouti. Approximate altitude 200 m. Photograph by I. Friis and Sebsebe Demissew (October 2006). Reproduced from Biologiske Skrifter of the Royal Danish Academy of Sciences and letters, Vol. 58, Fig. 35D. 2010.

Figure 36.3. A section of the Pangani floodplain not far from Hedaru with halophytic vegetation characterized by *Suaeda monoica*. Altitude approximately 650m. The Pare Mountains can be seen in the background. Photograph taken during the rainy season. Photograph by H. N. Moshi (May 2009).



Figure 36.4. Detail of *Suaeda monoica*. Photograph in same location as previous photograph (Figure 11.3). Photograph by H. N. Moshi (May 2009).



Figure 36.5. The original caption for this photograph was: semi-arid vegetation in the Mkomazi gap between the southern Pare and the west Usambara mountains (Tanzania; photograph by P. J. Greenway). Although this area was mapped by Gillman (1949) as "desert and semi-desert", we mapped it in the VECEA map as halophytic vegetation since we expect that most of these areas typically contain *Suaeda monoica* (salt bush; see also photographs 11.3 and 11.4 from the same general area). Gillman (1949, Fig. 17). Image obtained from URL: <http://www.jstor.org/stable/211155>.



36.2. Species composition

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Table 36. Species composition for halophytic vegetation (Z)

SPECIES	Regional status	Ethiopia	Kenya	ZIT (Tanzania subtype)	ZaT (Tanzania subtype)	Zambia
<i>Cyperus laevigatus</i>	chief plants around saline lakes in Kenya and Uganda		f	C	f	
<i>Sporobolus spicatus</i>	chief plants around saline lakes in Kenya and Uganda; alkaline flats around Lake Rukwa (grass)		C	C	f	C
<i>Drake-brockmania somalensis</i>	halophytic grass that grows near the outlets at the edge of the Chalbi desert		C			
<i>Leptochloa fusca</i>	alkaline swamp in the Lake Rukwa basin; Wembere depression south of Lake Eyasi (grass)		f	C	f	C
<i>Psilolemma jaegeri</i>	alkaline flats around Lake Rukwa (grass)					C
<i>Salsola africana</i>			C			
<i>Salvadora persica</i>	prominent halophyte in flood plain of the Pangani river	f	f	f	C	f
<i>Sesbania sesban</i>	flood plain of the Pangani river	f	x	f	C	f
<i>Sporobolus robustus</i>	beach zone on fringe of Lake Rukwa; prominent halophyte in the flood plain of the Pangani river (grass)					C
<i>Suaeda monoica</i>	prominent halophyte in flood plain of the Pangani river; replaces <i>Acacia xanthophloea</i> when the water table rises; also in semi-desert dwarf shrubland	C	C	f	C	
<i>Triplocephalum holstii</i>	prominent halophyte in flood plain of the Pangani river		f	f	C	