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DIVERSITY AND STATUS OF THE FLOWERING PLANTS IN THE HADEJIA-NGURU WETLANDS, NORTH-EAST NIGERIA

[1] SANUSI S.S., [2] DAURA M.M., [3]BDLIYA, H.H. AND [3] AKINSOLA O.A.
[1]Department of Biological Sciences, Univ. of Maiduguri, Nigeria.
[2]Department of Geography, Univ. of Maiduguri, Nigeria.
[3]Hadejia-Nguru Wetlands Conservation Project, Nguru, Nigeria.

ABSTRACT

The Hadejia-Nguru Wetlands Conservation Project (HNWCP) in NE Nigeria is committed to promoting the conservation and sustainable utilization of the rich resources of the flood-plain complex in the Hadeija-Nguru inland wetland areas. The upland vegetation is dry savanna whereas the lowlands suppport marshes and swamps of largely grasses and sedges. The lakes or open waters harbour the true aquatics including Najas pectinata, Pistia stratiotes and Nymphaea spp. The flowering plants constitute an indispensable component of the wetlands which are exploited at the expense of their ecological and hydrological values. Disturbance of the natural flooding cycle of the wetland complex, over-exploitation of the resources, habitat destruction and conflicting resource utilization are the major threats. A call for increased rational resource management is advocated.

INTRODUCTION

Wetlands are habitats where the water table, salty or fresh, is situated at or near the ground surface and supports vegetation which is adapted to more or less continuous water-logging (MAB-5, 1974). The Ramsar Convention defines wetlands very widely to encompass diverse habitats including areas of submerged or water-saturated land, natural or artificial, permanent or temporary and whether the water is static or flowing, fresh, brackish or salt (Dugan, 1990).

Nigeria has a wide variety of wetlands, many of which have acquired considerable economic values. They include the coastal mangroves, brackish swamps, floodplains and open water bodies (artificial and natural). The publications by Akpata and Okali (1990), Ayeni and Olatunde (1992) and Ita (1994) are the most recent on our wetlands, their plant resources and utilization.

THE STUDY AREA

The Hadejia-Nguru Wetlands is an extensive floodplain complex of the Hadejia and Jama'are river systems in NE Nigeria. It is a source of livelihood for millions of people and their animals; supplying fodder,

fuelwood and hidden harvests with the vegetation cover controlling desertification and other functions. Its importance as breeding and feeding ground for many palaearctic and migratory waterbirds led to the creation of the Hadejia-Nguru Wetlands Conservation Pro-ject (HNWCP) in 1987 with an initial focus on the protection of the wetlands as a habitat for migratory water birds. In 1989, the Dagona Waterfowl Sanctuary was declared a Site of Special Conservation Interest (SSCI) within the wetlands by HRH The Duke of Edinburgh, President WWF International. The focus was broadened in 1990 to include the general maintenance of the economic and ecological functions of the wetlands in particular and the promotion of sustainable development in the Komadugu-Yobe Basin in general. Since then, this non governmental organization (NGO) has become the field project of The World Conservation Union (IUCN) and many studies have been conducted on it including those reported in Kimmage and Adams (1992) and Hollis *et al.* (1993).

The IUCN/HNWCP has just completed a 18-month biodiversity study which was undertaken by six Working Groups on inter-related components. This paper reports on the flowering plants which were sampled from representative sites in the dry and rainy seasons by the Point-Centred Quarter (PCQ) and Quadrat methods respectively. Site species were identified, point-to-plant distances measured and the number of individuals within each species was counted. The frequencies and diversity indexes were determined and used to identify sites worth recommending for conservation.

RESULTS AND DISCUSSION

The number of tree species (S) varies from a low two on one site (4/13B in Fig.1) to 12 on three sites (4/05A, 4/05B and 4/14B). The number of individuals of species (N) on each site also varies from a low nine on site 1/08A to 40 on three sites (1/12A, 1/12B and 2/17A). The Shannon-Weiner index varies from a low 0.17 for site 4/13B to the high 0.93 for site 2/09B. It is least if all individuals belong to one species and greatest if each individual belongs to a different species. Twenty-four (24) tree species, out of the 38 sampled on all the 42 sites, have wide distributions (high frequenci-es) and also attained community dominance status. They include *Balanites aegyptiaca*, *Hyphaene thebaica*, *Ziziphus mauritiana* and six species of *Acacia*. The summary of the flowering plants, comprising over 250 species, encountered during the study is presented below:

a. Dicotyledons (171)
Trees/Shrubs 44
Herbaceous 127
b. Monocotyledons (87)
Trees/Shrubs 1
Herbaceous 86

They are distributed among about 160 genera in 60 families. The families of trees/shrubs with four or more genera and/or species include Anacardiaceae, Mimosaceae and Capparidaceae. Those with fewer genera and species but also widely distributed within the wetlands include Bombacaceae (*Adansonia digitata*, *Ceiba pentandra*),

Balanitaceae (*Balanites aegyptiaca*), Ebenaceae (*Diospyros mespiliformis*), Rhamnaceae (*Ziziphus* spp.) and Arecaceae or Palmae (*Hyphaene thebaica*). These are the common or widely distributed savanna trees on sandy plains where some economic trees, like *Acacia albida* and *Tamarindus indica*, are also left on farmlands. The families of herbaceous growth-forms include Amaranthaceae, Asteraceae (Compositae), Malvaceae, Poaceae (Gramineae) and Cyperaceae. The rare species, probably due to their localized distributions, are *Crateva adansonii* and *Khaya senegalensis*.

The major wetland ecological units/communities are given in Table 1. They vary from seasonally flooded forests, marshes and swamps to open water communities. The zonation of some of the true aquatic species is given in Table 2. The most frequ-ent herbaceous members are *Echinochloa pyramidalis* and *E. sta-gnina* (50-70%), *Vetiveria nigritiana* (20-30%), *Oryza barthii* (10-15%), *Polygonum* spp.(30-40%) and *Cyperus* spp.(20-30%). In general, the plants occur in mixtures and thus, except *Typha latifolia* and *Echinochloa* spp., pure stands are rare.

RESOURCE UTILIZATION

Uncontrolled harvests of plants, grazing by the large herds of transhumant nomads and seasonal vegetation burning are the major threats to the Hadejia-Nguru Wetlands. Most of the plants have high regeneration capacity but the rate of their extraction is higher. Thus, *Hyphaene thebaica* (doum palm) and preferred forage and fuelwood species constitute the most threatened plant species within the wetlands.

SUGGESTIONS/ RECOMMENDATIONS

Many sites still have unique plant communities in terms of composition and structure. Fortunately, some of these are already included under the Chad Basin National Park. Sites in Zone 4 contain the true wetland plant communities worth considering for conservation. The Nguru-Punjumu waterway is suitable for boating and thus a potential tourist attraction. The Forest/ Game Reserves or the protected areas within the wetlands need re-assessing. Parts of the funds generated from to resource extraction could be returned as incentives to the local communities adjacent to the resources. Both conservation and water development agencies need approaches to equitable water sharing so as to keep the Hadejia-Nguru Wetlands wet. Thus, interrelated strategies involving ecological, socio-political, economic and technological considerations will all have to enter into the decision on how the resources, including the flowering plants, should be used. Nigeria needs to ratify the Ramsar Convention for the inclusion of the IUCN/HNWCP on the Ramsar List.

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Table 1: Wetland ecological units/ communities within the Hadejia-Nguru Wetlands [based on the schemes of Muthuri (1992), Ita (1994) and Roggeri (1995)].

1. Floodplains (seasonally flooded, along rivers and lakes).

1.1. Flooded grasslands (temporal).
Echinochloa spp., Vetiveria nigritiana, Cynodon spp., Neptunia oleracea, Ipomoea aquatica, Cyperus spp.

1.2. Flooded forest (zonal)
Acacia spp., Mitragyna inermis, Diospyros mespiliformis, Celtis integrifolia.

2. Marshlands (mixed herbaceous formations on deep muddy water-logged soils)

2.1. Grass/Reed/Sedge marshes (temporal)
Eragrostis spp., Crinum natans, Leersia hexandra, Cyperus spp., Scirpus spp.

3. Swamps (on shallow stagnant water or inundated soils)

3.1. Herbaceous (temporal)
Species similar to 2.1 but in different proportions.

3.2. Shrub/Tree (zonal)
Species similar to 1.2 but in different proportions.

4. Lakes and other shallow open water bodies

4.1. Seasonal ox-bow lakes, ponds and pools (temporal)
Nymphaea spp., Polygonum spp., Oryza spp., Nymphoides indica, Acroceras spp., Pistia stratiotes, Eichhornia natans, Jussiaea (= Ludwigia) spp.

4.2. Permanent lakes (zonal)
Species in 4.1., *Limnophyton obtusifolium, Najas pectinata, Ceratophyllum demersum, Aponogeton subconjugatus, Potamogeton octandrus,*

Table 2: Zonation of some aquatic macrophytes within the Hadejia-Nguru Wetlands

SPECIES	ZONES		
	Soak	Floating	Submerged
Acroceras SPP	+		
Vetivera nigritiana	+		
Cyperus spp	+		
Typha latifolia	+	+	
Neptunia oleracea	+	+	
Echinochloa stagnina		+	
Pistia stratiotes		+	
Nympheae spp		+	
Nymphoides indica		+	
Vossia cuspidata		+	
Limnophyton obtusifolium		+	+
Najas pectinata		+	+
Aponogeton subconjugatus		+	+
Ceratophyllum demersum		+	+
Potamogeton octandrus		+	+