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A Survey of the Mangrove Vegetation in the Niger Delta Region of Nigeria

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ABSTRACT

A survey of the mangrove vegetation in the Niger Delta region of Nigeria was carried out. The study was carried out in Rivers State of Nigeria and covered two Local Government Areas namely, Khana and Akuku Toru Local Government Areas. Field trips were embarked upon to Asarama Kingdom in Khana LGA and Abonnema in Akuku Toru LGA, all in Rivers State. The true mangrove is made up of trees belonging to three genera Rhizophora, Avicennia and Laguncularia. Two species of Rhizophora (R. mangle and R. racemosa) were seen in this study. There are two types of mangrove, the red and the white mangroves and both of them were seen in the areas surveyed. All the three different mangrove species were identified in this study. In all the locations, it was observed that there is a silent but serious competition between Nypa palms (Nypa fruticans) and the mangrove species. The mangrove ecosystem is essentially a swamp vegetation having a number of characteristics some of which include the presence of mudskippers (Periophthalmus modestus), crabs (Uca pugilator) and crab holes and a salty soil outlook. All these characteristics were observed in the mangrove sites covered in this study.

Keywords:

Mangrove Vegetation, Niger Delta, Region of Nigeria

INTRODUCTION

Mangroves can be variously defined but when defined from point of view of plants

refer to the various types of trees and shrubs that are adapted to saline conditions. When defined from the point of view of the ecosystem, it includes the interactions between all the components of the ecosystem. When mangroves are narrowly defined, they refer to the mangrove family of plants, the Rhizophoraceae or even more specifically just to mangrove trees of the genus *Rhizophora*. The mangroves are found in saline and fertile rivermouths and lagoons and contain trees of medium height. The habitats are in the tropics and subtropics mainly between latitudes 25° N and 25° S (UNEP, 2007, Fatoyinbo, and Simard, 2013). Mangroves are known to occur across the intertidal zones of the tropics and subtropics in the estuaries and creeks. In Africa, the mangrove ecosystem is found on the Atlantic Coast between Mauritania and Angola. The term "mangrove" is likely to have originated from the Portuguese word "mangue" or Spanish "mangle" (Hogarth, 1999, Giri, *et al.*, 2011). The saline conditions tolerated by various mangrove species range from brackish water through pure seawater to ocean seawater. The mangrove ecosystem is essentially a swamp vegetation having a number of characteristics some of which include the presence of mudskippers, crabs and crab holes and a salty soil outlook. Skov and Hartnoll (2002) have reported crabs in the mangroves and that they feed on plant leaves.

The mangrove flora of the world is represented by several species and it is difficult to give the exact considered in mangrove classification. He considered that there would be about 55 species in the world. Most of the species are strongly represented in South East Asia and the Eastern number of mangrove species in the world because of the confusion between the true mangroves and the mangrove associates. Mangrove ecosystems in Nigeria are sometimes described as coastal woodland, tidal forest or mangrove forest and attain a height of about 40 metres. Some known species of true mangroves in Nigeria are, *Rhizophora harrisonii, R. Mangle, R. racemosa, Avicennia germinans (= A. africana)* and *Laguncularia racemosa*. There are also a number of mangrove trees that are classified as mangrove associates. One of the most popular mangrove associates is the Nypa palm (*Nypa fruticans*) which is often referred to as mangrove palm (Gee, 2001). Report has it that it was introduced to Nigeria in 1901 but it now constitutes a major competitor with mangroves in the Niger Delta (Moffat and Linden, 1995; BDCP, 2010). Generally, mangroves are reliable as agents of sustainable

development because they possess environmental, social and economic relevance. Mangrove wetlands provide humans directly and indirectly with a range of goods and services including medicine, support for coast and inland fisheries, flood control, breeding ground for foraging birds and as a source of fuel. The usefulness of mangrove ecosystem underscores the need for their conservation.

The aim of this study was to survey the mangrove vegetation in the Niger Delta with a view to determining the extent and diversity of the species given the role mangroves play in the livelihood of the people.

MATERIALS AND METHODS

Field Survey

Field surveys of the mangrove vegetation in the Niger Delta were carried out in the process of this study. Two locations noted for their extent and richness in mangrove vegetation were surveyed namely Asarama in Khana LGA and Abonnema in Akuku-Toru LGA both in Rivers State, Nigeria. While the Asarama survey was via land transportation, the Abonnema survey involved both land and water transportation. At the field, records were taken for the spread and abundance of the mangrove species. The different species available in each location were recorded. Photographs were also taken to record some of the field observations.

RESULTS

Results of this field survey revealed that true mangroves really exist in both Asarama and Abonnema communities. The observed species were *Rhizophora mangle, R. racemosa, R. Avicennia* sp. and *Nypa fruticans*. Swamp environment characteristic of the mangrove ecosystem as well as periwinkle shells, crabs and crab holes were all identified in these locations (Plate 1). The mangrove vegetation seen in both locations were very rich in species diversity. Vast areas of land were observed covered entirely by mangrove species. A few non mangrove species were also found among the true mangrove species. In the course of this survey, it was observed

that some portions of the mangrove ecosystem have been distorted by different anthropological activities (Plate 2). Some of these distortions were in the process of road construction by government or oil exploration by some oil prospecting companies.


A


B

Plate 1: Some Mangrove Characteristics Observed During Field Survey (A) Mudskipper and periwinkle shells encrusted in the swamp (B) Crab holes

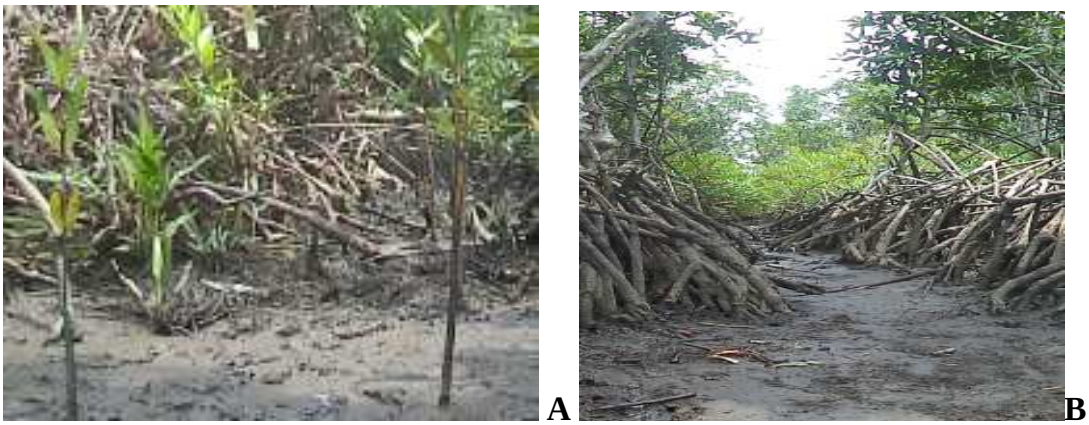

A


B

Plate 2: Pure mangrove vegetation (A) Cleared mangrove vegetation (B)

While some of the distorted portions have been re-vegetated, some are yet to be re-vegetated. At Abonnema, it was observed that some portions of the mangrove vegetation were cut down during seismic acquisition by Shell Petroleum Development Company (SPDC), the largest oil and gas Exploration Company operating in Nigeria. The seismic lines are 1 meter-diameter lines that ease the movement of the oil company workers. It was also

observed during this survey that the seismic lines were properly re-vegetated with mangrove seedlings (Plate 3).



A **B**

Plate 3:Re-vegetated seismic line showing mangrove seedlings (A) A narrow seismic line showing re-growth (B)

In all the locations visited both at Asarama and Abonnema, it was observed that Nypa palms (*Nypa fruticans*) competed with *Rhizophora* species and in some places out-competed the mangrove species (Plate 4). Observations in this study also confirmed the swamp ecology of mangrove species and the breathing root system of mangroves. *Rhizophora* species were seen growing into the creek at Abonnema (Plate 5).

Plate 4: Competition between *Nypa fruticans* and *Rhizophora* species in Asarama Kingdom

A **B**

Plate 5: Canopy of *Rhizophora* sp. hanging over the Soku creek (A) mangrove roots growing into the creek (B)

Results of this study showed that a number of known mangrove species in Nigeria were also found in Asarama and Abonnema, Rivers State. But it was observed that *Rhizophora* species dominated the species distribution of mangrove species in the present study (Table 1).

Table 1: Distribution of Mangrove species in Asarama and Abonnema Communities of Rivers State, Nigeria

Species	Common Name	Location	
Common		Asarama	Abonnema
Rhizophora mangle	Red Mangrove (dwarf)	+	+
Rhizophora harrisonii	Red Mangrove (dwarf)	+	-
Rhizophora racemosa	Red Mangrove (Tall)	+	+
Acrostichum aureum	Leather fern	+	-
Avicennia sp.	White Mangrove	+	-
Nypa fruticans	Mangrove palm	+	+
Conocarpus erectus	Button wood tree	+	+
Pandanus candelabum	Screw pine	+	+
Laguncularia racemosa	Black Mangrove	+	+

Legend: + = Present; - = Absent

DISCUSSION

It was observed in the present study that nine mangrove species were identified during a field survey of Asarama and Abonnema areas of Rivers State. These included both true and associate mangrove species. Most of the species reported in the present study have been reported in earlier mangrove studies in other areas of the Niger Delta (Adegbehin and Nwaigbo, 1990). About seventy (70%) percent of the mangroves species in Africa are found in the sub-saharan Africa where Nigeria belongs. Nigeria has been reported to have the largest mangrove in Africa stretching from Calabar in the east to Badagry in the west (IUCN, 1993; Corcoran *et al.* 2007; BDCP, 2010; Spalding, 2010). The size of the mangroves in Nigeria continues to change due to anthropogenic activities (Spalding *et al.*, 1997). In Nigeria, Bayelsa State has the largest mangrove. Cross River has a considerable area of mangroves extending in a belt of 7-8 km on both sides of the estuary and up to 26 km in the deltaic zone at the head of the estuary. More mangrove species were seen at Asarama than at Abonnema in the present study. This observation may be related to the mode of movement employed during the survey. While survey at Asarama was on land and done on foot, observations at Abonnema were done from inside the boat because of tidal limitations which prevented pedestal access into the swamp.

Clearing of large mangrove areas for different purposes ranging from road construction to agriculture was observed during this study. This practice has a lot of implications for the environment. It has been reported that clear felling of mangroves for charcoal production puts villages at risk of increased impacts from waves, wind and flooding. Villages along the Western (windward) side of the Barnabe Island, Brazil (Riley and Kent, 1999) were reported to have experienced increased flooding due to clear felling of coastal mangroves for charcoal production and pond development. The loss of the vegetation cover severely altered the sediment dynamics. Mangrove restoration project at the Barnabe Island was reported to have failed completely. The project was based strictly on planting of *Rhizophora mangle* propagules using the Riley Encased Methodology (REM). In Nigeria, SPDC

through her contractors have carried out some mangrove re-vegetation projects and many of them were successful. Monitoring was found to be an important aspect of mangrove restoration. Given that mangrove restoration projects can become unsuccessful, it becomes necessary to conserve existing mangroves to forestall restoration failure as well as conserve resources.

The most abundant mangrove species in this study was *R. harrisonii* while *Avicennia* was seen at Asarama but not in Abonnema. Nypa palms were seen both at Asarama and Abonnema competing fiercely with the mangrove species. This report is in accordance with the findings of an earlier Forest Resources Assessment which reported *R. harrisonii* as dominating in the middle zone and *Rhizophora mangle* on the inner edge. *Avicennia germinans* was reported to be sparsely represented. According to that report, *Nypa fruticans*, an introduced species, was very abundant. Mangroves in Nigeria rarely exceed 10-12 m in height but may occasionally reach more than 40 m. *Conocarpus erectus* and other woody species that grow at the edge of the swamps may be associated with the main species, mainly near the sea (Corcoran *et al.*, 2007)

Mangroves are of importance in different ways depending on how they are put to use. For instance, mangroves of the Niger Delta region support some endangered species and so can be seen as reservoirs. Also, mangroves are known to serve as carbon sink by way of carbon sequestration. It has been reported that mangrove forests are among the most carbon-rich habitats on the planet though they occupy just a fraction of the world's surface. On the average, mangroves have double the living biomass of all the tropical forests. This means that if one wants to slow carbon emissions, one of the first places one could look would be in the mangroves. According to Hutchison *et al*. (2014), an acre of mangrove preserved will achieve a big reduction in carbon emission. Beyond carbon storage, mangroves deliver a host of other ecosystem services (ES), including coastal protection, fisheries, timber, water purification and biodiversity (Sathirathai and Barbier, 2001; Gunawardena and Rowan, 2005). Investments to secure individual ecosystem services are, therefore, likely to yield multiple economic and social benefits.

Threats to mangroves in the Niger Delta can be seen in the activities of the oil industries (Ohimain *et al.*, 2004), clearance for salt pans, and overcutting by an increasing human population. According to Siikamäki *et al*. (2012), policy and market-based approaches are likely to be critical in increasing efforts to reduce mangrove loss and to stimulate restoration.

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