

Assessment of present status of plant species in Otuoke macro habitat of Ogbia in Bayelsa state, Nigeria: A checklist of plant species in the study area

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Abstract

This study was carried out to assess the qualitative parameters of native species in Otuoke terrestrial habitat in view of the need for monitoring of plant species and enhance sustainability of the important services provided by plants. Random sampling with line transect was used to collect plant specimen from the study area. Preservation and identification of plant species were carried out using standard taxonomic procedures. Vast number of plant species ranging from herbs, shrubs to trees were identified in the study area. Eighty six (86) plant species that cut across different families were identified and preserved in the herbarium unit of the Department of Biological Sciences, Federal University Otuoke, Bayelsa State, Nigeria. This study provides an excellent overview of the present status of plant species in the study area. This study suggests that Otuoke terrestrial habitat is endowed with great diversity of flora, hence, appropriate conservation strategies should be adopted for sustainable exploitation and management of plant species in the area.

Keywords: Assessment, present status, plant species, Otuoke, Bayelsa state, Nigeria.

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INTRODUCTION

Sustainability of plant diversity remains a subject of major interest to conservationist and scientist due to the ecosystem services derivable from plants^{7,17}. Increasing anthropogenic pressures have evoked the need for a broad based research of the current status of terrestrial plant species⁴. The role of biodiversity as a driver of ecosystem functions and the basis for human life has enhanced research interest in this field. Biodiversity is thus one of the foundation stones on which human life and culture is built¹⁷. However, plant species are declining dramatically at local, regional and global levels due to large scale

modification, fragmentation, destruction of habitats and to increased rates of invasions by non-natives species¹³. Plant species potentials are faced with sources of strong disturbances such as destructive practices, pollution, invasive species, mass mortality outbreaks, bush fires, flooding, and poor development plans and programs leading to profound structural and functional changes^{5,11}. Plant species assessment and monitoring project is part of the management measures of plant species in the study area. The development of effective conservation strategies for plant species in Otuoke terrestrial ecosystem requires the acquisition of baseline information, which is the ultimate focus of this research. Obtaining this baseline information represents a key step in exploring future modifications of the ecosystems. Therefore, future shifts in the species composition of assemblages cannot be evaluated without knowledge and understanding of the present state of habitat biodiversity. The maintenance of ecological, aesthetic and economic values of plant species in Otuoke terrestrial ecosystem requires regular ecological sampling for their assessment, monitoring and protection. Although, a variety of approaches have been investigated for measuring components of biodiversity, the focus of assessment and monitoring of plant species in

Otuoke terrestrial ecosystem is on approaches associated with estimating the qualitative parameters of native species in the sample plots.

MATERIAL AND METHODS

Study Area

This research was conducted in Otuoke terrestrial habitat in Ogbia Local Government Area of Bayelsa State, Nigeria. Otuoke is a suburb in Ogbia Local Government Area of Bayelsa State in the Niger Delta region in Nigeria. The majority of inhabitants are mainly fishermen and farmers. Otuoke is located at coordinates of 4°42'N and 6°19'E. Bayelsa State has a riverine and estuarine setting with many of its communities completely surrounded by water, and lies in the heaviest rainfall area of Nigeria, with heavy rain forest and short dry season. The temperature is humid averaging about 300 Celsius with a mean minimum monthly temperature ranging from 25°C to 31°C^{3,14}.

Site Evaluation And Sample Collection

The habitat was mapped out, and weather condition (air temperature), information on site location, date and time, site photograph, soil characteristics and other relevant environmental variables were recorded. Systematic technique was used to determine the locations of the sampling plots. The plot size (area), shape and plot layout were determined using measuring tape, stakes and

compass. In view of the marshy terrain of the study area, random sampling with line transects were used. Samples of plant species were collected based on the sampling units.

Determination of Qualitative Data

Plant species found in the plots were identified to its lowest taxonomic division possible. All unknown plants were collected, pressed, and dried for identification in the laboratory. Preservation and identification of plant species were carried out using standard taxonomic procedures.

RESULTS

The lists of plant species collected and identified in the study area are presented in Table 1. Vast number of plant species ranging from herbs, shrubs to trees were identified in the study area. A total of eighty six (86) plant species that cut across different families were identified and preserved in the herbarium unit of the Department of Biological Sciences, Federal University Otuoke, Bayelsa State, Nigeria. The dominant plant species were recorded from the Families, Euphorbiaceae, Apocyanaceae, Longaiaceae, Menispermaceae and Rubiaceae, while those from the Families, Moraceae, Cesalpinoideae, and Asteraceae (Compositae) were of moderate proportion. Other Families indicated in this study recorded low proportion (Table 1).

Table 1: Plant species from Otuoke terrestrial habitat, Bayelsa State, Nigeria

NAME	FAMILY	HABITAT	DESCRIPTION
Ceiba pentandra (Linn.) Gaertn.	Bombacaceae	Secondary forest	A growing tree up to 5m high. The trunk is armed with thorns and usually with large buttresses when big
Aframomum sceptrum (Oliv.and Hanb.) K. Schum	Zingiberaceae	Secondary forest	Forest herb with pale lilac flowers and edible fruits.
Culcasia scandens P. Beauv.	Araceae	Secondary forest	Epiphytic climbing herb with slender wiry stems producing numerous short adhering root. Spathe greenish.
Platostoma africanum P. Beauv.	Lamiaceae Syn. Labiaceae	Secondary forest	A branched slender herb up to 30- 39cm high, with slender racemes of very small flowers.
Uapaca heudelotii Baill.	Euphorbiaceae	Secondary forest	A forest tree up to 6-7m high with stilt roots, usually near a river.
Pergularia daemia (Forsk.) Chiov.	Asclepiadaceae	Secondary forest	A climbing plant; leaves, obovate, opposite with elongated petiole. When plucked produce white exudate.
Phyllanthus capillaris Schum and Thonn.	Euphorbiaceae	Secondary forest	A small shrub, up to 8-9cm high with slender stem and white flowers.
Rinorea oblongifolia (C. H. Wright) Marq. Ex Chipp	Violaceae	Secondary forest	A understorey plant/ tree upto 1.5m high. Leaves, large, long stalk, acuminate, cuneate at the base.
Rinorea brachypetala (Turcz.) O. Ktze	Violaceae	Secondary forest	A Shrub up to 2m high, grows in deep shade near water.
Macaranga occidentalis (Mull. Arg.) Mull. Arg.	Euphorbiaceae	Secondary forest	A tree up to 8-9m high, stem and branches often with spine, flower green
Mimosa pudica Linn.	Mimosoideae	Secondary	Creeping plant armed with thorns. Leaves,

Parquetina nigrescens (Afzel.) Bullock.	Periplocaceae	forest Secondary forest	sensitive to touch. A twiner often herbaceous but becomes woody with leathery glossy leaves.
Oldenlandia corymbosa Linn.	Loganiaceae	Secondary forest	An erect and diffusely branched herb up to 30cm high. Leaves, opposite.
Paullinia pinnata Linn.	Sapindaceae	Secondary forest	A woody or subwoody climber with tendrils fruit-red.
Leea guinneensis G. Don	Leeaceae	Secondary forest	An erect / suberect soft wooded shrub up to 1.5 to 2m high. Flowers bright yellow, orange or red. Fruit brilliant red.
Irvingia gabonensis (O' Rorke) Baill.	Irvingiaceae	Secondary forest	A growing tree up to 3m high. Bark greyish, smooth. Leaves, simple, broad, elliptic. Fruit, edible.
Icacina trichantha Oliv.	Icacinaceae	Secondary forest	A scandent shrub. Fruit reddish when ripe, velvety, and edible.
Rauvolfia vomitoria Afzel.	Apocyanaceae	Secondary forest	A small shrub or tree up to 6-7m high with whorled leaves. Fruits are reddish in colour. When slashed produce white exudates
Trichilia heudelotii Planch Ex Oliv.	Meliaceae	Secondary forest	A tree up to 6- 7m high. Slash dark pink with slight exudates of whitish latex.
Glyphaea brevis (Spreng) Monachino	Tiliaceae	Secondary forest	A tree up to 4.5m. Leaves, spindle shaped. Flowers, yellow.
Antiaris toxicaria Var. Africana A. Chev.	Moraceae	Secondary forest	The tree resembles Millicia excelsa. A tree up to 4-5m high. Leaves scabrid. Trunk produce exudate when slashed.
Costus afer Ker-Gawl.	Zingiberaceae	Secondary forest	A succulent herb. Leaves-pilose, allover.
Salacia pallenscens Oliv.	Celastraceae	Secondary forest	A shrub with opposite serrate, accumulated at the apex. Fruit red or orange.
Senna alata (Linn.) Roxb. Syn Cassia alata Linn	Caesalpinoideae	Forest perimeter	A small growing shrub up to 1m. Leaves, elliptic, small or no petiole and obtuse.
Urera rigida (Benth.) Keay	Urticaceae	Secondary forest	A small tree or shrub up to 2 to 3m high. Leaves pilosely simple when touched. Venation bondly showing. Margin minutely serrated.
Anthocleista djalonensis A. Chev.	Loganiaceae	Secondary forest	A tree, 4 to 5m high with blunt spines on the unbranched pale grey trunk and widespreading crown, Bronder white or cream.
Anthocleista liebrechtsiana De Wild. and Th. Dur.	Loganiaceae	Secondary forest	A tree, 8 to 10m high with blunt spines on the unbranched pale grey trunk and widespreading crown.
Sterculia tragacantha L.	Sterculiaceae	Secondary forest	A tree up to 11m high. Grey corky bark yielding a coloured gum.
Spondianthus preussii Engl. Var preussii	Euphorbiaceae	Secondary forest	A tree, 3 to 4m high and grows in swampy areas within the rain forest
Spigelia anthelmia Linn.	Loganiaceae	Secondary forest perimeter	A common weed up to 35cm high with pink flowers.
Sphenocentrum jollyanum Pierre.	Menispermaceae	Secondary forest	Sparingly branched evergreen shrub. Fruits bright orange, edible.
Solenostemon monostac-hyus (P. Beauv.) Briq.	Lamiaceae = Labiaceae	Secondary forest	An erect, branched, pubescent, annual weedy herb with long rather dense inflorescences of small, pale violet flowers.
Zanthoxylum rubescens Panch. Ex Hook. F. Syn. Fagara rubescens (Planch. Ex Hook. Engl)	Rutaceae	Secondary forest	An understorey forest tree up to 6m high, armed with black thorns.
Vernonia cinerea (Linn.) Less	Asteraceae = Compositae	Secondary forest	An erect branched herb up to 15 to 20cm high. Flower, reddish-purple florets.
Vitex grandifolia Gurke.	Verbenaceae	Secondary	A growing tree up to 4 to 5m high with glabrous

Rothmannia longiflora Salisb.	Rubiaceae	forest Secondary forest	branches, 5 foliate leaves. A Small tree up to 7 to 8m high. Leaves, opposite with shiny foliage and often much branched.
Rytigyna umbellulata (Hiern) Robyns.	Rubiaceae	Secondary forest	A small tree up to 1m high. Leaves, opposite, short petiole and accumulated apex. Fruits reddish.
Melanthera scandens (Schum and Thonn.)	Asteraceae= Compositae	Secondary forest	A branched herb usually scrambling or scandent with rather broad leaves.
Mondia whitei Hook	Periplocaceae	Secondary forest	A woody climber of drier forest, leaves, entire and edible.
Pauridiantha hirtella (Benth) Bremek.	Rubiaceae	Secondary forest	A medium shrub up to 2m high. Leaves, lanceolate, entire, acuminate, opposite.
Podococcus barteri Mann and Wendl.	Arecaceae/ Palmea	Secondary forest	A palm with slender stem, covered by rusty scurf. Fruits edible when ripe.
Tetrorchidium didymostemon (Baill) Pax and K.	Euphorbiaceae	Secondary forest	A growing tree up to 2m high. Leaves simple, acuminate, cuneate at the base, entire, lanceolate.
Tetracera potatoria Afzel. Ex Don.	Delleniaceae	Secondary forest	A climber rough twig leaves, cuneate at the base, upper surface and lower surface scabrid.
Hoslundia opposita Vahl.	Lamiaceae	Secondary forest	An erect or half climbing shrub, up to 1m high with small greenish-cream flowers.
Ageratum conyzoides Linn.	Compositae= Asteraceae	Secondary forest	A small herb. Leaves, serrated, cuneate at the base and pilose.
Glyphaea brevis (Spreng) Monachino.	Tiliaceae	Secondary forest	A growing tree up to 3m high. Leaves, serrated, cuneate at the base, acuminate.
Piper guineense Schum and Thonn.	Piperaceae	Secondary forest	A climber on trees. Leaves, cuneate at the base with fruits red. Both the leaves and fruits are edible.
Holarrhena floribunda (G. Don) Dur.	Apocyanaceae	Secondary forest	Shrub to medium sized tree, up to 16m high. Flower white. Fruit, paired narrowly cylindrical fruiting.
Harungana madagascariensis Lam. Ex. Poir	Guttiferae	Secondary forest	A medium tree of about 11m high. Flowers whitish, fragrant, dotted with black glands when slashed red colour.
Marantochloa purpurea (Ridl) Milne-Redh.	Marantaceae	Secondary forest	A Swamp forest herb. Leaves with lower surface deep purple.
Ficus exasperata Vahl.	Moraceae	Secondary forest	A deciduous tree up to 6 to 7m high with smooth grey bark and very rough leaves. Sap viscid, not milky, coppice shorts with lobed leaves.
Euclinia longiflora Salisb.	Rubiaceae	Secondary forest	A small tree up to 7m high. Leaves, opposite, cuneate at the base, apex -acuminate. Fruits, round with calyx.
Elaeis guineensis Jacq.	Arecaceae	Secondary forest	A tree up to 0.50cm high. Fruit- red when ripe and used for red oil for cooking soup.
Lophira alata Banks, Ex Geartn. F	Ochnaceae	Secondary forest	A large rainforest tree up to 10-11m high, leaves lanceolate and elongated.
Barteria fistulosa Mast.	Passifloraceae	Secondary forest	A tree up to 6-7m high, branches becoming hollow inhabiting stinging ants.
Ludwigia abyssinica A. Rich	Onagraceae	Secondary forest	A small herb up to 30- 39cm high, struggling or erect with much branches.
Albizia zygia (DC.) J. F. Macbr.	Mimosoideae	Secondary forest	A tree up to 9m high. Leaves compound, bi-pinnate. Flowers white.
Anchomanes difformis Var. difformis Hepper	Araceae	Secondary forest	Forest herb with horizontal tuber. Leaves, divided with a prickly petiole.
Alstonia boonei De Wild	Apocyanaceae	Secondary forest	Tree up to 20- 30m high. Leaves, whorled and white latex when slashed. Stem bark used in treating malaria.
Anthonotha obanensis (Bak. F.) J. Leonard	Papilionoideae= Caesalpinoideae	Secondary forest	Forest tree up to 7- 9m high. Leaves compound.

Alchornea laxiflora (Benth) Pax and K. Hoffm	Euphorbiaceae	Secondary forest	A small tree up to 4- 5m high, with leaves 3-nerved at the base.
Cyclosorus afer (Christ) Ching	Thelypteridaceae	Secondary forest	Grows in marshy places in the forest
Cissampelos owariensis P. Beauv.	Menispermaceae	Secondary forest	A twiner, round to ovate shape.
Cnestis ferruginea DC	Connaraceae	Secondary forest	A shrub or sometimes a climber densely brown pubescent. Fruit red when ripe.
Sacciolepis africana C. E. Hubbard and Snowden	Poaceae= Graminea	Secondary forest	Perennial with thick spongy culms.
Centrosema pubescens Benth	Papilionoideae	Secondary forest	A creeper with short pubescent stems and leaves.
Carapa procera DC	Meliaceae	Secondary forest	A forest tree up to 6- 7m high, with large leaves clustered at the ends of the branches. Oblanceolate and acuminate at the apex
Calopogonium mucunoides Desv.	Caesalpinoideae	Secondary forest	A creeping to climbing plant, trifoliolate, putrescent or pitose. Description: A small tree up to 3-4m high, leaves, opposite, lanceolate and entire with no or little petiole. Fruits, small, round with calyx cluster like punch.
Bertiera racemosa (G. Don) K. Schum. Var. racemosa	Rubiaceae	Secondary forest	
Solanum tonum SW	Solanaceae	Secondary forest	A small shrub up to 1m high with spines.
Solanum erianthum D. Don Syn. Solanum verbascifolium Linn.	Solanaceae	Secondary forest	An unarmed shrub, mealy-stellate-pubescent, with white flowers turning blue purple.
Diospyros barberi Hiern	Ebenaceae	Secondary forest	A forest shrub or small 1.5- 2m high, young parts covered with hairs.
Diospyros monbuttensis Gurke	Ebenaceae	Secondary forest	Forest shrub up to 4m high, bole fluted, branches of young trees with large, spreading, sharp-pointed spines, bark, papary, peeling, usually purple brown.
Stephania abyssinica (Dill and Rich) Walp.	Menispermaceae	Secondary forest	A slender liana. Leaves dark green above glaucous beneath.
Triclisia gillettii (De Wild.), Staner	Menispermaceae	Secondary forest	A climber growing into woody climber when slashed, exude red exudates.
Baphia nitida Lodd	Papilionoideae	Secondary forest	A small tree or shrub up to 3m high, with branches, twig is use for chew stick
Spathandra blackeoides (G. Don) Jacq. Fel Syn. Memyclon blackeoides G. Don	Melastomataceae	Secondary forest	Tree of swamp forest by river, with shrubby habit.
Buchholzia coriacea Engl.	Capparaceae	Secondary forest	Evergreen understory tree of forest, 4 -5m high. Slash deep red. Flowers cream. Fruits yellowish when ripe.
Cleistopholis patens (Benth), Engl. and Diels.	Annonaceae	Secondary forest	A tree up to 4m high with horizontal branches. Young leaves often very long.
Cola heterophylla (P. Beauv.) Schott and Endl.	Sterculiaceae	Secondary forest	Shrub or small tree, 2m high. Leaves simple.
Carpolobia luteanestis G. Don	Polygalaceae	Secondary forest	A shrub or small tree, 1m high. Ripe fruits- orange.
Spermacoce ocymoides Burm. F. syn. Borreria ocymoides (Burm. F) DC	Rubiaceae	Secondary forest	A small growing herb, up to 35cm in height. Leaves, opposite, entire.
Alafia bateri Oliv.	Apocyanaceae	Secondary forest	High- climbing glabrous shrub with small fruit, long, slender, paired.
Rhigiocarya racemifera Miers	Menispermaceae	Secondary forest	A large herb. Lower part of stem leafy. Flowers greenish or yellowish- white.

Myrianthus arboreus P. Beauv

Moraceae

Secondary forest

A tree up to 3-4m high with spreading branches, bole short, often with stilt roots, bark grayish, fruit edible.

Cnestis ferruginea DC

Connaraceae

Secondary forest

A shrub or sometimes a climber densely brown pubescent. Fruit red when ripened.

DISCUSSION

Plants are more commonly found to be adapted to the environment where they occur, and are mostly associated together in groups. The groups may include various plant species, belonging to different families, differing in shape, size, form and relationship, but they live under the same conditions of the soil, moisture, heat and light^{6,8}. This clearly shows the reason for the presence and absence of certain species in the study area as indicated in this work. In addition, plant species have been reported to be inflicted by minor or severe damages which may lead to temporary or permanent loss of species depending on the intensity of attack and the agent involved^{10,12}. Some of the agents involved in destruction of biodiversity of plants include, fire, insects, fungi, viruses, bacteria, weather, industrial pollution, man and animals^{2,9}. The mass conversion of primary to secondary forest has widespread implications for the flora. This implies that the natural habitat for the valuable plant species has been converted to agricultural land with intense cultivation activities, and their products are often over-exploited^{10,15,16}. In this study, some Families of important plant species were not represented. This result indicates that the marshy habitat and eroded nature of the study area could not support the growth of some species. There exist variations both in the distribution, composition and structure of the constituent plants due to the predominant environmental condition of a given site^{15,16}. The soil in marshy areas is known to be poorly aerated, thus, supporting a specialized type of vegetation. In addition, the cultural practices and other anthropogenic activities may also influence the vegetation type as well as frequency of species^{1,12}. Although, some of the plant species are not yet greatly threatened, their habitats need to be protected to preserve the genetic variation in related species and to prevent the important flora from being endangered. Therefore, there is need to protect plant species through sustainable use of forest resources, education and legislation^{10,16}.

CONCLUSION

This study shows that Otuoke terrestrial habitat is characterized by great diversity of plant species. In addition, valuable quantifiable and intangible benefits are derivable from the secondary forest. Therefore, there is need for consistent monitoring and management measures

to be put in place in order to enhance sustainable exploitation of the vast potentials of these species.

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