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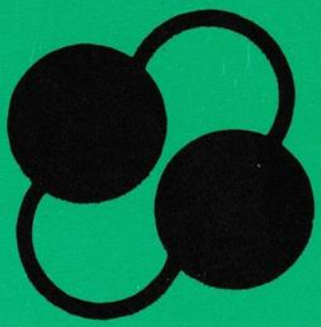

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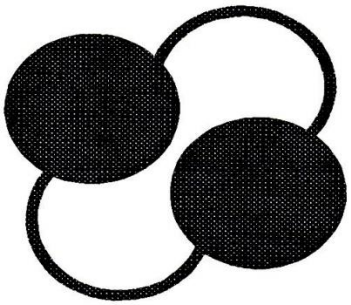

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NOTES ON THE NON-VASCULAR MACROPHYTE BIODIVERSITY OF THE IUA – WILDLIFE SANCTUARY, ITU, NIGERIA

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Abstract: The IUA-Wildlife Sanctuary is a secondary tropical forest in Itu Local Government Area of Akwa Ibom State, Nigeria. A minimum of 16 families and 18 genera of non-vascular macrophytes are present. Fifteen (15) families are monospecific while one (Polyporaceae) is polyspecific, comprising more than one species. There are five (5) families, five (5) genera and five (5) species of bryophytes and 11 families, 13 genera and 13 species of fungi. The results are based on preliminary collections made during the wet season (June – September, 2004). A dry season sampling will probably reveal the presence of other non-vascular plant species.

Keywords: Forest, non-vascular, diversity, wet season.

INTRODUCTION

Tropical forests account for over half of the world's species diversity and serve a wide range of environmental functions (Munasinghe, 1992). The major threat to the loss of species is caused by habitat alteration and destruction that result from the expansion of human population and human activities (Perrings, *et al.,* 1992). The IUA Wildlife Sanctuary is a conservation effort by the Center for Wetlands and Waste Management Studies of the University of Uyo, Nigeria. Its establishment was prompted by the discovery of the Sclater's guenon (*Cercopithecus sclateri*), a monkey species endemic to the Niger Delta of Nigeria. The Sanctuary is located at 5^0. 00'- 5^0.20'N and 7^0.50' - 8^0.10' E in Itu Local Government Area of Akwa Ibom State, Nigeria (Ibong, 2002). This secondary forest lying within the continuous rainforest zone of South Eastern Nigeria is surrounded by a highly degraded wetland area used for subsistence agriculture by the Ibibio speaking Itam people who inhabit the area (Egwali *et al.*, 2005).

Non-vascular plants studies in Nigeria have shown that some of them are adapted to the grassland region and others are commonly found in the rainforest region of the nation (Alofe, *et al.*, 1998). Edible mushrooms are prepared in diverse ways for human consumption in different localities. Decomposers are ecologically important in degrading the locked-up nutrients in dead organisms (Alofe, *et al.,* 1998).

On the other hand, some non-vascular macrophytes especially those from the family Amanitaceae are infectious to man and other living things. (Haas, 1969). Mosses are relevant to man in reducing soil erosion and in ecological succession. This is because of their water holding capacity and addition of organic materials to the barren area when they died and decay (Haynes, 1975).

The sanctuary has experienced alteration particularly due to farming practices. In order to have a record of non-vascular plant species and their diversity, this preliminary work was embarked upon during the wet season (June - September 2004).

MATERIALS AND METHODS

The sanctuary was broken up into three plots which were measured with a 30 – meters tape and then stratified into blocks, each block measuring 40 x 25 m. Four quadrats (each 20 x 20 m) were marked out with a rope and pegs in each of plot 1 and plot 2. Plot 3 had only one quadrat. A random sampling method was used in collecting and enumerating the non vascular plants within each quadrat that was randomly positioned in each block and the method of Jones *et al.* (2002) was used to reduce error due to edge effects.

Diagnostic features of mosses were observed using a hand lens and a light microscope and spore print of the agarics were made (Jennings, 1975). The mosses and agarics were stored in envelops after drying and deposited in the University of Uyo Herbarium (UUH) in the Department of Botany and Ecological Studies. These collections were identified with the aid of Haas (1969), Jennings (1975), Mc Graw-Hills (1997), Alexopoulos and Mims (1979), Vallin (1974), Watson (1978), Novak (1976) and the private mosses Herbarium of Dr. M. Bassey. Photographs of the collections were taken with the aid of Minolta X – 370 camera. Morphological measurements of the collections were carried out with a 30 cm ruler. Fungi caps lengths were taken from the widest surface across their centre. Mosses gametophytic heights were measured from the bases to the tips of the gametophyte.

RESULTS

The IUA – Wildlife Sanctuary harbours a minimum of 16 families, 18 genera and 18 species of non-vascular macrophytes. Fifteen (15) families are monospecific while one (Polyporaceae) is polyspecific (i.e with more than 1 species). There are 5 families, 5 genera and 5 species of bryophytes (Fig. 1) and 11 families, 13 genera and 13 species of fungi (Fig. 2).

Ecological and Morphological Notes on the Bryophytes

Dicranum strictum (Dicranaceae) (Fig. 1a)

A terrestial moss, forming a greenish carpet and covering a large area of the soil; the leaf-like structures are inserted in many rows, linear in shape and are serrated at the tips; it grows to a height of about 3.8cm; gemma are present both on the tip of the stem-like structures and the leaf-like structures.

Fissidens bryoides (Fissidentaceae) (Fig. 1b)

It grows luxuriantly on termite mound; the leaf-like structures are arranged in two rows and are lanceolate in shape; costa are present; capsules are inclined and acrocarpous; tuft colour is deep green.

Octoblepharum albidum (Leucobryaceae) (Fig. 1c)

A moss which grows on soil and on decayed logs; tuft is light green; leaf-like structures are linear in shape,with no costa on them and are arranged in many rows; capsules are both pleurocarpous and acrocarpous.

Hypnum sp. (Hypnaceae) (Fig. 1d)

It grows on decayed twigs; the leaf-like structures are arranged irregularly in three rows along the prostate stem-like structure; tuft colour is light green; capsules are inclined and pleurocarpous.

Lejeunea controversa (Lejeuneaceae) (Fig. 1e)

This is a leafy – liverworth that grows on the leaves of some forest plants; the leaf-like structures are arranged in two rows and they bear two perianths; oil bodies are present.

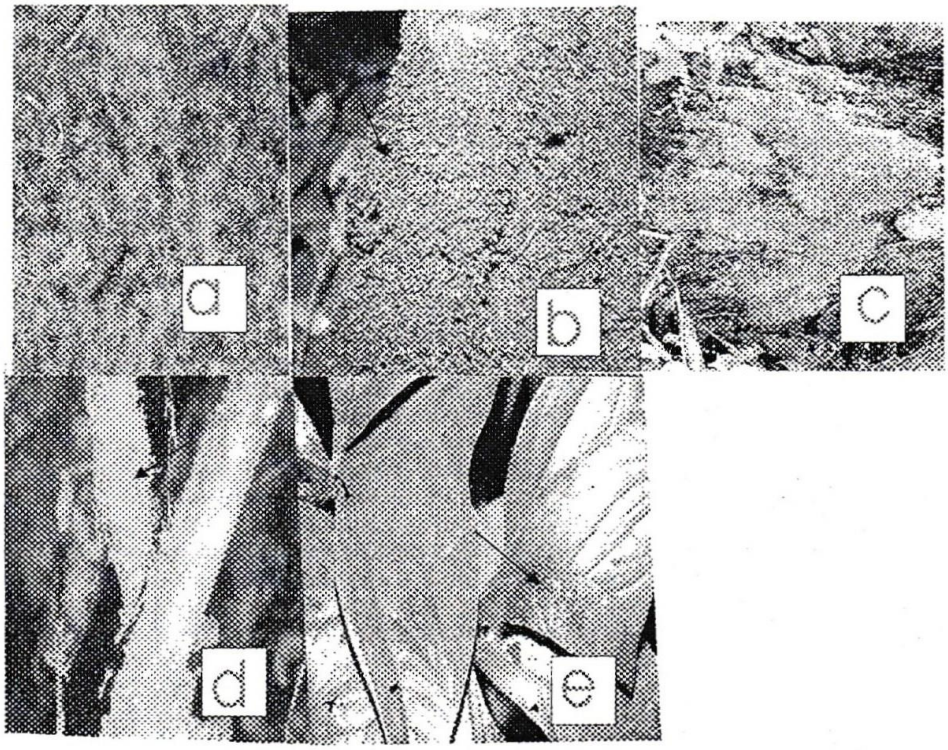

Fig. 1. Bryophytes of the IUA – Wildlife sanctuary, Nigeria.
(a) *Dicranum strictum*; (b) *Fissidens bryoides*; (c) *Hypnum sp.*;
(d) *Octoblepharum albidum*; (e) *Lejenuea controversa.*

Ecological and Morphological Notes on the Fungi

Auricularia meripulus (Auriculariaceae) (Fig. 2a)

This edible fungus grows on dead twigs; it is disc-shaped and reddish in colour; it grows in tiers; the upper surface of the fruiting body is smooth and glossy; it measures about 4 cm in diameter and is cartilaginous when dried.

Calycella citrina (Helotiaceae) (Fig. 2b)

A disc-shaped fungus, measuring about 0.6cm in diameter; colour is brownish; grows on decayed twigs; a short stalk is present; when dried, it becomes leathery and folded.

Clavariodelphus sp. (Clavariaceae) (Fig. 2c)

A fungus, which grows on decayed logs; it is club-shaped with blackish outer surface and a whitish inner surface; tiny round are present all over the outer surface; it looks tube- like when fresh but hardens when dried.

Corticum sp. (Corticiaceae) (Fig. 2d)

This is a fungus, which grows on damp decayed twigs forming a crust- like layer which lies flat on the substratum; it is brownish in colour and has round pores that are irregularly arranged; fruiting body bears a smooth hymenium.

Craterellus sp. (Cantharellaceae) (Fig. 2e)

This is a saprophytic fungus, which grows on decayed logs; it is stalked and funnel – shaped; very small round pores are found on the hymenium; the basidiocarp is brownish and measures about 1.2cm in diameter across the funnel.

Crepidotus variabilis (Crepidotaceae) (Fig. 2f)

This is a fungus, which grows on decayed twigs. It is whitish with short stalk on it. The fruiting body measures 0.4 – 1.2cm in diameter.

Daedalea sp (Polyporaceae) (Fig. 2g)

This is a saprophyte on decayed twigs; the basidiocarp is brownish with pores that approach a gill- like structure found beneath the basidiocarp; there is no stalk and the upper surface of the fungi is striated.

Fomes sp. (Polyporaceae) (Fig. 2h)

This fungus is whitish in colour and hoof-shaped; it measures about 0.6cm across the undersurface; there is no stalk; small round pores occur on the undersurface. It grows on dead twigs.

Inocybe sp. (Cortinariaceae) (Fig. 2i)

A fungus whose cap is small in size, convex and brownish in colour; it measures about 0.7cm in diameter; grows on decayed logs; gills beneath are sinuated; stipe is smooth and there is no annulus.

Marasmius epiphyllus (Tricholomataceae) (Fig. 2j)

It is a fungus which grows on dead shed leaves on forest floor; fruiting body is whitish with no volva and annulus, and the stipe is fibrous; gills are present and free.

Panellus stipticus (Panellaceae) (Fig. 2k)

A fungus which grows on dead trees; fruiting body is whitish in colour both on the surface and beneath, and is fan-shaped; it measures about 1.4cm in diameter across the surface and a short stalk is present; widely spaced gill-like structures occur under the surface.

Physarum sp. (Physaraceae) (Fig. 2l)

A fungus which forms phaneroplasmodium during growth; it streams over damp decayed logs: plasmodium is vein-like and whitish in colour.

Polyporus sp. (Polyporaceae) (Fig. 2m)

This fungus is whitish in colour and measures about 3.3cm in diameter; grows on dead tree trunk in tiers with no stalk for attachment to the substratum. Pores that approach spine-like structures are present underneath its fruiting body.

Of the 18 species of non –vascular plants recorded 14 species were found to grow on dead twigs, tree trunks and logs. One species grows on each of the following substrates-soils termite mound, fresh leaves and dead leaves.

DISCUSSION

Putman (1994) noted tropical rainforest for having the largest species biodiversity. This accounts for the diversity of non-vascular plants in IUA. Algae not being recognized in the area during this study may be due to the absence of water course in the sample site. Doyle (1973) working on algae observed that most algae are commonly found in moist habitats.

Vallin (1974) working on bryophytes noted them as bio-indicators in an environment. Greenish colouration especially the gametophyte of bryophytes and their immature sporophytes indicate the seasonal wetness of the study area.

Mosses are generally noted to be water absorbers (Doyle, 1973) and they bind soil particles together thus preventing water erosion in some area. *Dicranum strictum,* a terrestrial moss which grows on soil forms a carpet in the study area and is probably of importance in preventing water erosion and in soil conservation in the study area. *Auricularia meripulus,* is the only edible fungus in the study area. The host community should be encouraged to harvest it sustainably.

As over 70% of the non-vascular macropytes were found to grow on dead tree twigs, trunks and logs, the collection of these substrates for use as biofuel is likely to be instrumental to the loss of some taxa from the area. Consequently, the collection of

fuelwoods should be curtailed as a plant diversity management strategy. It is believed that a dry season collection of non-vascular plants will give a complete picture of the non-vascular plants in the IUA sanctuary. In conclusion, it is expected that more species of non-vascular macrophytes can be discovered in the dry season and when sampling is done around the water course.

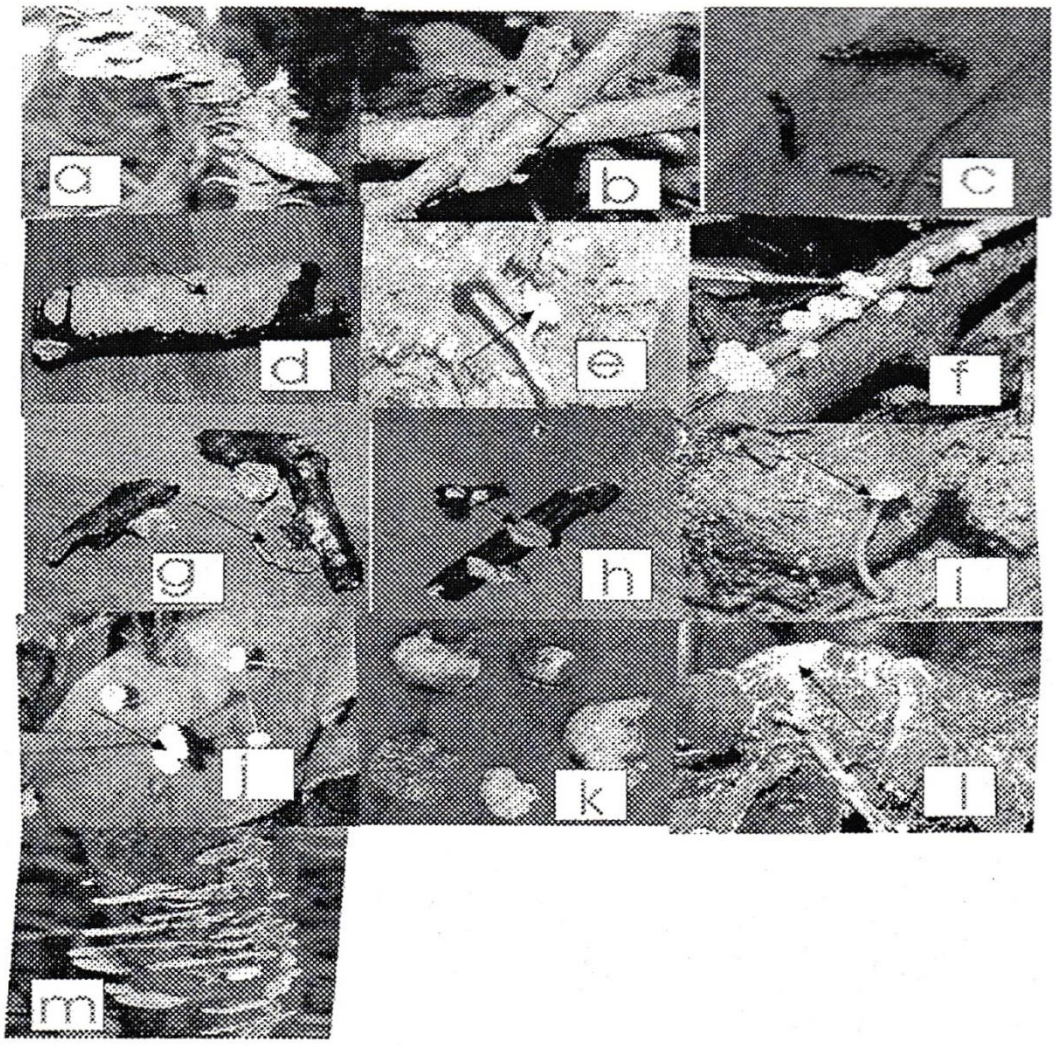

Fig. 2. Fungi of the IUA-Wildlife sanctuary, Nigeria.
(a) *Auricularia meripulus*; (b) *Crepidotus variabilis*; (c) *Calvariodelphus sp.*; (d) *Corticum sp.*; (e) *Cratereluus sp.*; (f) *Crepidotus variabilis*; (g) *Daedalea sp.*; (h) *Fomes sp.*; (i) *Inocybe sp.*; (j) *Marasmius epidhylus*; (k) *Stipticus stipticus*; (l) *Physarum sp.*; (m) *Polyporus sp.*

REFERENCES

Alexopoulos CJ and Mims CW 1979. Introduction to mycology . (3rd Edn.). John Wiley and Sons, New York. 632 pp.

Alofe FV, Odu EA and Illoh HC 1998. Mushroom, man and nature. *Nigerian Field,* 63:3-17.

Doyle WT 1973. Non – seed plants: forms and function. (2nd Edn.) Macmillan, London. pp. 1 – 62.

Egwali EC, King RP, Eniang EA and Obot EA 2005. Discovery of a new population of the Sclater's guenon, *Cercopithecus sclater,* in the Niger Delta wetlands, Nigeria. *Liv. Sys. Sus. Dev.* 2 (4) : 1 – 7.

Haas H 1969. The young specialist looks at fungi. Burke London. 240 pp.

Haynes JD 1975. Botany; An introductory survey of the plant kingdom. John Wiley and Sons, New York. p 310

Ibong BU 2002. Ecology and conservation of the primate Sclater's guenon (*Cercopithecus sclateri)* in Itu Local Government Area of Akwa Ibom State. Thesis, Department of Zoology. Univerity of Uyo, Uyo. p. 13.

Jennings TJ 1975. Collections from nature. Weatons, Exerter. pp. 276 – 278.

Jones A, Reed R and Weyers J 2002. Practical skills in biology. 2nd Edition. Longman, United Kingdom p. 19 – 52.

McGraw- Hills. 1997. Encyclopedia of science and technology (7th Edn.) New York 7:135 – 136.

Munasinghe M 1992. Biodiversity protection policy: environmental valuation and distribution issues. *Ambio*. 21 : 227 – 236.

Nouak FA 1976. The pictorial encyclopedia of plants and flowers. Paul Hamlyn. London. pp. 24 – 55.

Perrings C, Folke C and Maler K 1992. The ecology and economics of biodiversity loss: the research agenda. *Ambio* 21 : 201 – 211.

Putman RT 1994. Community ecology. Chapman and Hall, London. p. 115 – 116.

Vallin J 1974. The plant world: biology in colour series. Sterling, New York. pp 78-104.

Watson EV 1978. The structure and life of bryophytes. (3rd Edn.). Hutchinson, London. 310 pp.