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Life-form and Density of Valuable Non-timber Plants in Ukpom Community Forest, Akwa Ibom State, Nigeria

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Abstract
Ukpom Community Forest in Ikono Local Government Area of Akwa Ibom State, Nigeria was assessed for the abundance of plant species producing economically valuable non-timber forest products. Forty-six plant species comprising 16 tree species, 17 shrub species, 8 herb species and 5 climber species were encountered. Apart from Baphia nitida, Pentatethra macrophylla and Brachystegia eurycoma with densities of 6,4 and 3/ha respectively, all the other tree species had a density of 1/ha each. In the shrub category, Lasianthera africana had the highest density of 255/ha and Alchornea cordifolia, the least of 1/ha. Palisota hirsuta had the highest density of 136/ha in the herb life-form, and Urena lobata the least of one/ha. Among the climbers, Ancistrophyllum secundiflorum had the highest density of 51/ha and Plukentia conophora, the least of 1/ha. The implications of the results for sustainable management of the forest are discussed.

Key words: Rainforest, Plants, Density, Non-Timber Products, Exploitation.

Introduction

A forest is a natural resource of multiple values, but oftentimes, the value of a tract of forest is estimated from the population density or standing volume of timber tree species present, while much more valuable non-timber resources are ignored. This is absolutely improper. The predominant forest type in Nigeria is rainforest. Other forest formations are swamp forest and mangrove forest. The Nigerian rainforest is an integral part of the world tropical rainforest, which has been identified as the most biologically diverse terrestrial ecosystem on earth (Richard, 1996; Turner, 2001 and Gillespie *et al* 2004). The rainforest occupies only 9.7% (95,372km^2) of the country's landmass of 983,213km^2 (Onyekwelu *et al*, 2005). Furthermore, only 19986km^2 of the tropical rainforest (21.0% of the rainforest ecosystem and 2.0% of the country's landmass) has been constituted into forest reserves (Onyekwelu *et al*, 2005).

Not until recently, the Nigerian rainforest has been managed exclusively over the years for timber production. Consequently, a considerable area of the rainforest poor in timber tree species, but heavily socked with diversity of valuable non-timber resources, has been replaced with monoculture forests of mostly fast-growing exotic species like *Gmelina arborea* and *Tectona grandis*, farmland and pasture. Among the numerous valuable non-timber resources of the rainforest are edible and medicinal fruits, seeds, leafy vegetables, twigs, nuts and industrial products like rafter, gum, tannin, latex and dyes (Appendix I). Evaluating from a long-term standpoint, non-timber forest resources or products provide a far greater income than timber resources as the former can be harvested for many years without degrading the forest. The non-timber forest products are a particularly important part of multiple-use strategies, because they increase the range of income generating options of forest-dependent communities while avoiding some of the ecological costs of timber cutting (Ford Foundation, 1998; Olajide, 2003 and Olajide *et al* 2008).

This paper is a report of the study carried out in a tract of rainforest (a community forest)) to assess the density and distribution of plant life-form that produce economically valuable non-timber products so as to provide a basis for formulating strategies for multiple use of the forest and other similar forest tracts.

Methodology

Study Area: The study was carried out in Ukpom Community Forest, Ikono Local Government Area of Akwa Ibom State, Nigeria. The forest covers an area of about 9.4 hectares. It is a typical lowland rainforest, though it has suffered human disturbance, particularly through timber exploitation. The area lies between latitudes 5° 45' and 61° 05'N of the Equator, and longitudes 7° 35' and 8° 15' of Greenwich Meridian. The average annual rainfall of the area is 2,500mm. The mean minimum and maximum temperatures are 25°C and 30°C respectively. The average relative humidity is about 85% at 7.00 hr. The soil in the area is sandy-loam.

Data Collection: Ten metres away from the access route into the forest, three 200m line transects, each separated by a distance of 100m, were laid in the forest. Along each transect, five 20m x 20m sample plots were laid at randomly selected points. In all, fifteen, 20m x 20m sample plots, which totalled 6000m^3 (0.6ha), were laid. All the sample plots were enumerated for the plant species producing valuable non-timber products. The data collection was undertaken between October, 2005, and February, 2006.

Data Processing and Analysis: The enumerated plant species were classified into four life-forms, namely: trees, shrubs, herbs and climbers. The number of each plant life-form was extrapolated to per hectare basis.

Results

A total of 46 plant species were encountered. The distributions were 16 species of trees, 17 shrub species and 5 climber species (Table 1).

Apart from *Baphia nitida*, *Pentaclethra macrophylla* and *Brachystegia eurycoma* with density of 6/ha, 4/ha and 3/ha respectively, all other tree species had one individual each/ha (Table 1). In the shrub category, *Alchornea cordifolia* had the least density of 1/ha while *Lasianthera africana* had the highest of 255/ha. In the herb life-form, *Palisota hirsuta* had the highest density of 136/ha, while *Urena lobata* had the least of 1/ha. *Ancistrophyllum secundiflorum* had the highest density of 51/ha in the climber category, while *Plukenetia conophora* had the least of 1/ha.

Discussion and Conclusion

The existence and degree of abundance of a plant species in a rainforest ecosystem is a function of the availability of its seeds or propagules and favourable microclimate for germination and growth. Furthermore, the abundance or rarity of plant species, especially if it has an economic value, is a function of the intensity and pattern of exploitation which the forest is generally subject to. Therefore, the high population of most individual shrub, herb and climber species in the study forest can be ascribed to the favourable microclimate which included adequate sunlight, created by the canopy-gaps occasioned by timber exploitation. Nath *et al* (2005) reported higher population of undergrowth species as compared with tree species in a disturbed tropical rainforest in Northeast India.

The fewer or population of individual tree species producing valuable non-timber products observed in this study indicated their over-exploitation for poles, timber and fuelwood. This might have caused gross inadequacy of their seeds for regeneration, as a lot of the mother trees must have been felled. Parthasarathy and Karthikeyan (1997) reported poor population density of timber trees producing economically valuable non-timber products in a tropical evergreen forest subject to timber exploitation in Western Ghats, India.

In order to ensure conservation and sustainable management of the forest for multiple use, the community should reduce timber exploitation in the forest. Moreover, with the assistance of the Akwa Ibom State Government Forestry Directorate, the forest should be subjected to enrichment planting using native rainforest tree species, particularly those that have multiple value so that the natural ecological integrity of the forest can be sustained.

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Table 1: Plant Species Producing Valuable Non-Timber Forest Products in Ukpom Community Forest, Ikono Local Government Area, Nigeria.

S/N	Plant Species	Population
	TREES	
1.	Anthocleista djalonensis	1
2.	*Baphia nitida*	6
3.	*Brachystegia ecurycoma*	3
4.	*Canarium schweinfurthii*	1
5.	*Ceiba pentandra*	1
6.	*Cola argentea*	1
7	*Coula edulis*	1
8	*Distemonanthus benthamianus*	1
9.	*Elaeis guineenis*	1
10.	*Garcinia mannii*	1
11.	*Macaranga barteri*	1
12.	*Musanga cecropioides*	1
13.	*Pachypodanthium standtii*	1
14.	*Pentaclethra macrophylla*	4
15.	*Pterocarpus midbraedii*	1
16.	*Spondias mombin*	1
	SHRUBS	
1.	Alchornea cordifolia	1
2.	*Bambusa vulgaris*	29
3.	*Bandeiraea simplicifolia*	6
4.	*Carpolobia lutea*	8
5.	*Cola milieni*	11
6.	*Dactyladenia barteri*	4
7.	*Glyphaea brevis*	15
8.	*Harungana madagascariensis*	8
9.	*Hippocratea africana*	2
10.	*Lasianthera africana*	255
11.	*Lonchocarpus griffonianus*	2
12.	*Maesobotrya barteri*	4
13.	*Mallotus oppositifolius*	2
14.	*Microdesmis puberula*	33
15.	*Perperomia pellucida*	2
16.	*Randia acuminata*	330
17.	*Sphenocentrum jollyanum*	5
	HERBS	
1.	*Acanthus montanus*	25
2.	*Afromonnum acceptrum*	31
3.	Culcasia scandens	7
4.	*Gongronema latifolium*	3
5.	*Laportea aestuans*	16
6.	*Monantochloa cuspidate*	4
7.	*Palisota hirsuta*	136
8.	*Urena lobata*	1

	CLIMBERS	
1.	*Ancistrophyllum secundiflorum*	51
2.	*Calamus deerratus*	47
3.	*Gnetum africanum*	10
4.	*Piper guineense*	2
5.	*Plukenetia concophora*	1
	TOTAL	**1077**

APPENDIX I: Uses of Non-Timber Products in Ukpom Community Forest Local Government Area, Akwa Ibom State, Nigeria.

S/N	Plant Species	Uses
1.	**Anthocleista djalonensis**	Leaves used as fodder; bark and roots as medicine.
2.	*Baphia nitida*	Chewing sticks: leaves as fodder; root for medicine.
3.	*Brachystegia eurycoma*	Edible seeds; leaves as fodder.
4.	*Canarium schweinfurthii*	Edible fruits; nuts for rattles, bark and root for medicine.
5.	*Ceiba pentandra*	Leaves as fodder; silk cotton for pillows and mattresses, bark and root for medicine.
6.	*Cola argentia*	Edible fruits; leaves for fodder.
7.	*Coula edulis*	Edible seeds; leaves for fodder.
8.	*Distemonanthus benthamianus*	Root and bark for medicine.
9.	*Elaeis guineensis*	Edible fruits and seeds; fodder, oil; brooms and baskets; palm wine; fronds for tradition/cultural purposes; palm kernel cake.
10	*Garcinia mannii*	Chewing sticks; seeds as snacks and for medicinal purposes.
11.	*Macaranga barteri*	Fodder; poles for building, decking and staking.
12.	*Musanga cecropioides*	Root, barks and leaves for medicinal purposes; wood for making local xylophone, canoes, boxes, battens, crates, drums.
13.	*Achypondium standii*	Medicinal.
14.	*Pentaclethra macrophylla*	Edible seeds, oil, medicinal, cultural and religious purposes; wood for production of charcoal and mortars.
15.	*Pterocarpus milbraedii*	Edible leafy vegetable; ornamental and traditional purposes.
16.	**Spondias mombin**	Edible fruits and seeds; fodder; fence sticks; medical.
17.	*Alchornea cordifolia*	Fodder; medicinal.
18.	*Bambusa vulgaris*	Medicinal; fodder; yam stakes; poles for building; erosion control; baskets and chairs.
19.	*Bandeiraea simplicifolia*	Leafy vegetable, fodder; children's whistle.

20.	*Carpolobia lutea*	Edible fruits, medicinal, sweeping materials, canes.
21.	*Cola milieni*	Edible fruits; medicinal.
22.	*Dactyladenia barteri*	Fodder; yam stakes; poles for building and decking.
23	*Glyhaea brevis*	Ornamental; chewing stick; medicinal.
24	*Harungana madagascariensis*	Leaves as fodder; bark medicinal.
25	*Hippocratea africana*	Edible fruits; leaves as fodder.
26	*Lasianthera africana*	Edible leafy vegetable; chewing sticks; fence sticks; medicinal leaves.
27	*Lonchocarpus griffonianus*	Boundary plant; amenity plant; medicinal.
28	*Maesobotrya barteri*	Edible fruits; chewing sticks; medicinal.
29	*Mallotus oppositifolius*	Ritual and cultural displays; chewing sticks; medicinal.
30	*Mirodesmis puberula*	Edible fruits; fodder.
31	*Pereromia pellicuda*	Edible leafy vegetable; chewing sticks; fodder; medicinal.
32	*Randia acuminata*	Chewing sticks, fodder; medicinal.
33	*Sphenocentrum jollyanum*	Medicinal.
34	*Acantus montanus*	Ornamental; medicinal
35	*Afromomum acceptrum*	Edible fruits; fodder; medicinal
36	*Culcasia sacandens*	Medicinal
37	*Gongronema latifolium*	Edible leafy vegetable; medicinal
38	*Lapota aestuans*	Edible leaves and shoots; medicinal
39	*Monatochloa cuspidate*	Wrapping leaves
40	*Palisota hirsuta*	Fodder; medicinal
41	*Urena lobata*	Making of ropes; medicinal
42	*Ancistrophyllum secundiflorum*	Medicinal; basket making, cane tables, chairs and shelves
43	*Calamus deerratus*	For making cane baskets, tables, chairs and shelves
44	*Gnetum africana*	Edible leafy vegetable; medicinal
45	*Piper guineense*	Edible leafy vegetable and fruits (spices)
46	*Plukenetia conophera*	Edible seeds; medicinal.