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Diversity and Utilization of Tree Species with Eco-tourism Potentials within Ethiope River Source, Umuaja, Delta State, Nigeria

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ABSTRACT: Trees are of great economic value and contribute greatly to life and environmental sustainability. The study evaluates **s**urvey of the ethnobotanical and trees diversity at the Ethiope River source Umuaja in Ukwuani Local Government Area of Delta state, Nigeria. It was done to document the ethnobotanical uses of the diversed tree species by the people of this community which has ecotorism potential. Photographs of trees were also taken to aid identification. A total of 17 trees species of economic values belonging to fourteen (14) different families were documented. The trees were employed in diversed uses such as medicine, foods, Religious and other general utilities. It is believed that the information gathered on the ethnobotanical uses of these trees will help to enhance public awareness as well as the need for conservation and maintenance of the eco-tourist site. We therefore, call the attention of both State and Federal Government as well as Environmental Agencies for proper recognition of this wonderful resource Centre at Umuaja

Keywords: Conservation, Ecotourism, Ethnobotanical, Identification, Utilization

Introduction

The role of plant diversity in the maintenance and stability of the ecosystem is very vital (Aati *et al.,* 2019). Human survival on earth depends on plant species (wild or cultivated) for provision of food, shelter, clothing as well as atmospheric oxygen for respiration (Panskus *et al*., 2013). Ethnobotany therefore, is defined as study of relationship between people and plants. It usually emphasizes on the interaction between indigenous plants and the local community inhabitants (McClatchey *et al*., 2009; Sonawane, 2019). As described by Chandravanshi (2019), ethnobotany involves the practical uses of plants through traditional knowledge of a local culture and their people. Trees are of great important to life and environment. They act as; air purifiers by absorbing carbon dioxide in the atmosphere and releasing oxygen during photosynthesis, some serve as windbreakers while others add an aesthetic value to the environment. Similarly, trees provide habitat or nesting sites for tree loving animals such as squirrels, bats and birds, and provide shade during the high temperature period (Ozumba *et al*., 2018).
Ethno-medicinal studies offer immense scope and opportunities for biodiversity conservation and sustainable development of local communities around the world. About 80% of the world's population rely on traditional medicine for primary healthcare needs (Singh, 2013). Therefore, the use of plant species for healthcare and overall wellbeing of local communities remains essential (Lawal *et al.,* 2020). The environment of Ethiope River source at Umuaja is endowed with plant biodiversity and ecotourism potentials. Similarly, many tree species found at Ethiope River Source, Umuaja are rich in ethnobotanical heritage and are of economic value, but there is paucity of documentation on the ethnobotanical data of the tree species therein. This study is

therefore undertaken to highlight the indigenous knowledge in respect to tree species diversity, utilization and ecotourism potentials of the Ethiope Rivers source in Umuaja, Delta State.

Materials and methods

Study area: The study was conducted in Umuaja (River Ethiope source) in Umutu axis in Ukwuani Local Government Area of Delta State which lie within latitude 5° 40N and 6° 14E (Okocha and Atakpo, 2013) (Figure 1). The river flows through a number of towns including Abraka, Warri, Sapele and Aghalokpe. The river is a river of outstanding beauty and a home of great biodiversity of plants. The River is used as source of drinking water and other domestic uses by people settling close to it. It is a tourist center. The river also provides ecosystem services such as flood control, climate change regulation, recreation, religious activities, water supply, food, medicine, and building materials to many communities through which it passed. River Ethiope originated from the tap root of a giant silk cotton tree at Umuaja in Ukwani L.G.A of Delta state. The area falls within the equatorial climate belt of the world and tropical rain forest belt of Nigerian with mean temperature of 30^0c. Annual rainfall amounts to 3,098mm, with mean monthly rainfall ranging from 25.8mm in December to 628.9mm in September. Double rain maxima and August break is witnessed in the area (Okumagba and Ozabor, 2014).

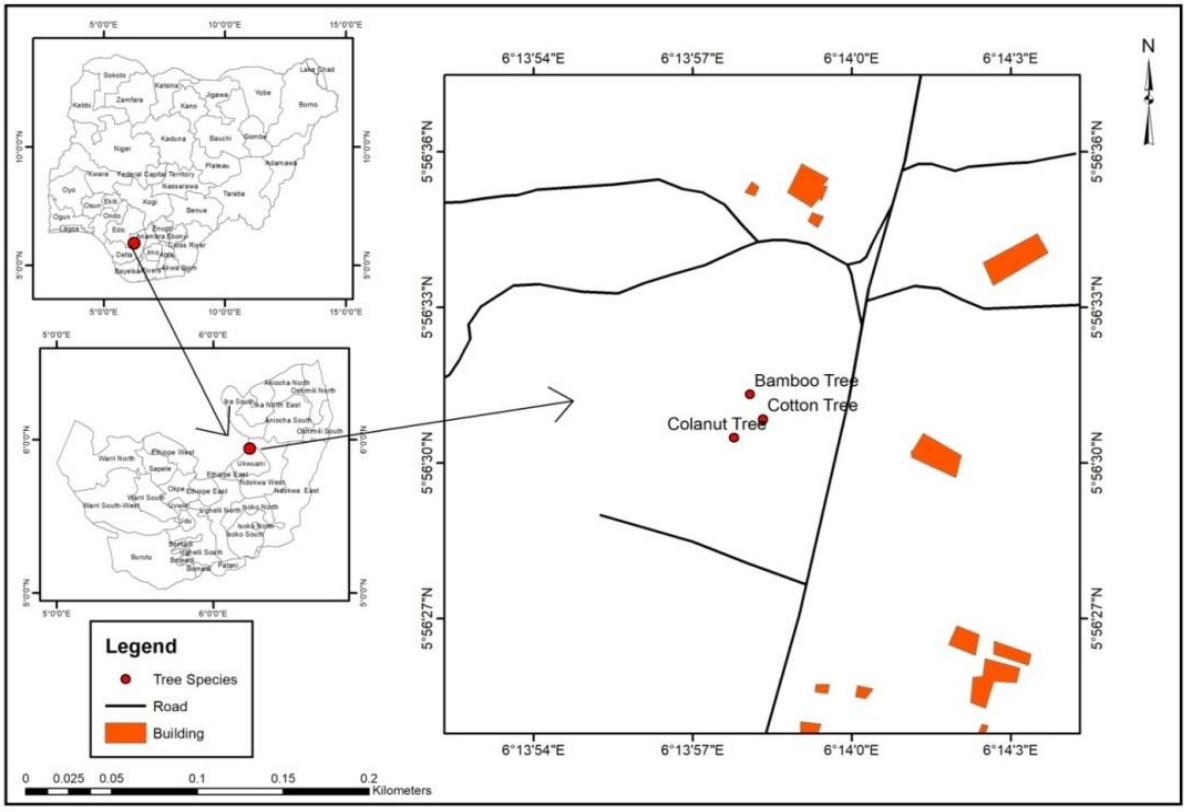

Figure 1: Map of River Ethiope at Umuaja showing the study area

Field survey and data collection: The survey was conducted between the month of December, 2018 and April, 2019. Observation and transect walk around the River Ethiope source, Umuaja was done with the assistance of the guard who works there by name Herbal Doctor Uche Ossai. Photograph of the tree species were taken with digital camera (Ozumba *et al.*, 2018) to aid identification. Plant parts were collected and identified using Odugbemi and Akinsulire (2006) and were authenticated by Dr. Henry A. Akinnibosun of the Department of Plant Biology and Biotechnology, University of Benin, Nigeria. The Voucher specimens were deposited at the University of Benin Herbarium. During the field visits, the information about ethnobotanical uses of various plant parts were obtained by oral interview with the Herbal Doctor Uche Ossai and other relevant literature

including Usman and Osuji (2007), Okoli and Okere (2010), Sahrawat *et al.* (2013), Jahurul *et al.* (2015) and Lawal *et al.* (2020). The relative abundance of tree species were recorded using a scale of 1-5 as adopted from Agbogidi *et al.* (2017) being represented as Rare, Occasional, Frequent, Abundance and Dominant respectively.

Results and Discussion

In this study, 17 diverse tree species within 14 families were recorded from the study area (Table 1). *Bambusa vulgaris* family (Poaceae) is the most abundant species in the study area followed by *Gmelina arborea* family (Lamiaceae).

Table 1. The relative abundance of trees encountered at the study site

S/N	Botanical Name	Common Name	Family	Abundance (%)	Ecological Status	Voucher Number
1	*Ceiba pentandra*	Silk cotton	Malvaceae	2(3.57)	Rare	UBH-C170
2	*Mangifera indica*	Mango tree	Anarcadiaceae	1(1.78)	Rare	UBH-M257
3	*Anarcadium occidentale*	Cashew tree	Anarcadiaceae	1(1.78)	Rare	UBH-A389
4	*Bambusa vulgaris*	Bamboo tree	Poaceae	27(48.21)	Abundant	UBH-B120
5	*Irvingia gabonensis*	Bush mango	Irvingiaceae	3(5.35)	Rare	UBH-P153
6	*Cola nitida*	Kolanut tree	Sterculiaceae	1(1.78)	Rare	UBH-C323
7	*Gmelina arborea*	Gmelina tree	Lamiaceae	6(10.71)	Abundant	UBH-G134
8	*Hevea Brasiliensis*	Rubber tree	Euphorbiaceae	1(1.78)	Rare	UBH-H178
9	*Cocos nucifera*	Coconut tree	Arecaceae	2(3.57)	Rare	UBH-C419
10	*Elaeis guineensis*	Oil palm	Arecaceae	2(3.57)	Rare	UBH-E444
11	*Newbouldia leavis*	Boundry tree	Bignoniaceae	1(1.78)	Rare	UBH-N481
12	*Citrus sinensis*	Orange tree	Rutaceae	1(1.78)	Rare	UBH-C152
13	*Dalium gunnensis*	Velvet Tamarind	Fabaceae	1(1.78)	Rare	UBH-D331
14	*Chrysophyllum albidum*	African star apple	Sapotaceae	1(1.78)	Rare	UBH-C440
15	*Terminalia mantaly*	Umbrella tree	Combretaceae	2(3.57)	Rare	UBH-T258
16	*Persia americana*	Avacado pear	Laureaceae	2(3.57)	Rare	UBH-P408
17	*Tectona grandis*	Teak	Lamiaceae	2(3.57)	Rare	UBH-T128
	Total (%)			**56(100)**		

The ethnobotanical uses of various parts of the diverse tree species at the Ethiope River source, Umuaja is presented in Table 2. These trees create a peaceful and aesthetically pleasing environment. They provide shade and shelter during outdoor activities. Hence the environment is like a botanical garden and a spot for ecotourism in addition to its numerous benefits.

Table 2. Ethnobotanical uses of trees and parts used

S/N	Botanical Name	Family	Parts Used	Uses
1	*Ceiba pentandra*	Malvaceae	Fiber and wood	The source of Ethiope River, it serves as an altar and religious purposes. Cotton from the tree is used to make upholsteries.
2	*Mangifera indica*	Anarcadiaceae	Leaves and stem bark	The fruits are eaten, used to treat fever
3	*Anarcadium occidentale*	Anarcadiaceae	Fruits and stem	Used to relief tooth ache and gums while the fruits are eaten, to treat fever
4	*Bambusa vulgaris*	Poaceae	Stem, leaves	Used in building and construction works, for staking yams in farms, leaves are boiled with other herbs and taken for treatment of Malaria.

S/N	Botanical Name	Family	Parts Used	Uses

5	*Irvingia gabonensis*	Irvingiaceae	Stems and fruits	The fruits are eaten, stems used as chewing stick.
6	*Cola nitida*	Sterculiaceae	Fruits and stems	Used in treating whooping cough and in welcoming visitors
7	*Gmelina arborea*	Lamiaceae	Leaves	Used to wrap market commodities
8	*Hevea Brasiliensis*	Euphorbiaceae	Stem	Used in the production of rubber
9	*Cocos nucifera*	Arecaceae	Fruits, Leaves and water	To treat diabetes, fruits are eaten, the leaves are used for thatch roofs.
10	*Elaeis guineensis*	Arecaceae	Seeds, leaves	Palm oil is for cooking, Kernel oil used for cream and soap and to stop convulsion in children
11	*Newbouldia leavis*	Bignoniaceae	Barks and leaves	To treat dysentery
12	*Citrus sinensis*	Rutaceae	Fruits and leaves	The fruits are eaten and the leaves are used in treating fever
13	*Dalium gunnensis*	Fabaceae	Leaves and fruits	Leaves and fruits are edible, fruits are used to prepare local jam
14	*Chrysophyllum albidum*	Sapotaceae	Leaves extract, fruits	To stop bleeding in fresh wounds, fruits are also edible
15	*Terminalia mantaly*	Combretaceae	Whole tree	Provides shade, ornamental tree
16	*Persia americana*	Laureaceae	Fruits and leaves	Fruits are edible, used for skin treatment. Leave infusion used to lower blood pressure
17	*Tectona grandis*	Lamiaceae	Leaves	Used as shade tree, leaves are used to wrap market commodities

These trees and their parts such as stems, barks, leaves and fruits play a vital role in the sustainability of people of Umuaja community from food to medicine. Their use in healthcare delivery cannot be over-emphasized. Duke *et al.* (2012) and Asafo-Agyel (2019) reported that the use of tree species was dominant in the management of malaria ailments.

Ceiba Pentandra (silk cotton tree) (Plate 1) Family Malvaceae is the source of River Ethiope at Umuaja (Okumagba and Ozabor, 2014). At this point, the river is worshipped and called "Oloku" (personal communication with Herbal Doctor Uche Ossai). It attracts traditional religious activity and a good source of portable water and other domestic uses for the community (Agbogidi, 2017). *Bambusa vulgaris* (Bambo) family Poaceae (Plate 2) is very abundant in the study area. The native use the stem for building houses and staking of yams in their farms. The leaves are boiled together with other herbs such as Avocado and pawpaw and decoction taken for the treatment of malaria (Asafo-Agyel *et al.*, 2019).

Plate 1: Silk cotton tree (*Ceiba pentandra* L)

Plate 2: *Bambusa vulgaris* (Schrad)

The coconut tree (Plate 3) have various medicinal value: the coconut water is known to have a number of health benefits, minerals and vitamins, used in cooking as a special ingredient, coir fibre is obtained from mesocarp of

the fruits, the shells can be used to make bowls as well as the manufacture of various handcrafts such as brushes and foot mats and they can also be used as source of fuel. Coconut oil is good for skin (Kochhar, 1986).
Elaies guinensis Jacq (Plate 4): The tree and the fruit have a wide range of traditional and medicinal uses. Red palm oil and palm kernel oil are obtained from the tree. Palm oil is extracted from the fleshly mesocarp of the fruit and used for cooking food, manufacture of soaps and candles, margarine and cooking fats (Sammbamurty and Subrahmanyam, 1998). Palm kernel oil is used in manufacture of soaps and detergent. Press cake, after oil extraction is used for livestock feed. The palm fronds are used for thatching, fencing and protecting the tops of ratid walls. Refuse after stripping the bunches used for mulching and manuring, the ash is used in making local soap (Kochhar, 1986).

Plate 3. *Cocos nucifera* (Linn)

Plate 4. *Elaies guinensis* (Jacq)

Plate 5. *Mangifera indica* L.

Plate 6. *Chrysophyllum albidum* G. Don

The stem bark of *Citrus sinensis* Linn (Table 1) can be mixed with other herbs for management of fever and headache. The phytochemicals present in edible fruits prevent chronic and degenerative diseases in man as opined by Tripoli *et al*. (2007). Jahurul *et al*. (2015) stated that Mango (Plate 5) fruits provide energy, dietary

fibers, carbohydrates, proteins, fats and phenolic compounds which are vital for healthy living. Studies by Sahrawat *et al*., (2013) show that antibacterial activities of aqueous and ethanol extracts of leaves and stems of mango has been found sufficient activity against bacterial *Staphylococcus aureus* and diarrhea.
The leaves extract of *Newbouldia laevis* (Table.1) is used for treatment of eye problem as well as remedy to roundworms as reported by Usman and Osuji, (2007). The *Newbouldia laevis* tree serves a multipurpose to the people of Umuaja as certain ceremonial activities are done under the tree. The *Cola nitida* plant serves as a symbol of culture in ceremonies and for welcoming visitors. In Nigeria particularly there is no discussion that is done without the use of cola nut. At the ecotourist site, trees like the *Chrysophyllum albidum* were encountered (Plate 6) which is used in arresting fresh blood in wounds (Okoli *et al*., 2010). *Terminalia mantaly* (Plate 7) provides shade at the eco-tourist site and the relaxation spots (Plates 8 and 9).

Plate 7. *Terminalia mantaly* H. Perrier

Plate 9. Relaxation spot at eco-tourist site

Conclusion and recommendation

The Ethiope River source at Umuaja harbor several tree species that are beneficial to the indigenous community. The environment is endowed with natural biodiversity, cultural and historical resources, hence and excellent site for ecotourism development. To mitigate decline and loss of these plant species, the Authors strongly recommend environmental protection from over exploitation, deforestation and bush burning therein. Similarly, we call the attention of both State and Federal Government as well as Environmental Agencies for proper recognition of this wonderful resource Centre at Umuaja.

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