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Research Article

Assessing biodiversity and floristic composition of tree species in Okomu forest reserve, Edo State, Nigeria

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Abstract

The loss of tree species due to human activities has been on the rise in recent times. This study employed a systematic sampling technique to assess tree species diversity and floral composition in the Okomu Forest Reserve, Edo State, Nigeria. Four-line strips, each 2 km long and 2 m wide, were established at 1 km intervals for this study. A skilled tree taxonomist carefully measured and identified trees with a DBH of 10 cm or greater. Subsequently, the gathered data were utilised to calculate the diversity of tree species and tree composition. The study identified 60 tree species, distributed across 31 families and 56 genera in the study area. *Cleistopholis patens, Ceiba petandra, Terminalia ivorensis*, and *Diospyros insculpta* were found to have the highest individual populations of not less than 15 trees per hectare. However, some trees were represented by only one tree per hectare, which is a concern as they are threatened. The three most dominant families were Leguminosae, Annonaceae, and Apocynaceae, comprising six tree species. The Important Value Index (IVI) of 11.15 and 10.05 for *Terminalia ivorensis* and *Ceiba petandra*, respectively, show that these two species are more prominent in the reserve.

Keywords: Diversity index, floristic composition, Okomu Forest Reserve, Importance Value Index.

Introduction

Forests are considered one of the fundamental renewable natural resources for humanity. They play a crucial role in maintaining environmental stability, providing raw resources for wood-dependent

industries, providing sustenance and livelihoods, and job opportunities, mostly in remote areas (FAO, 2001). Notably, recent conservation efforts have been directed towards tropical rainforests due to their exceptional biological diversity (Aigbe *et al*., 2014). Tropical rainforests stand out as the most biodiverse terrestrial ecosystems, hosting two-thirds of all land-based plant and animal species (Turner, 2001; Onyekwelu *et al*., 2008; Schmitt *et al*., 2009; IUCN, 2010; FAO, 2010). Though covering merely 7 per cent of the planet's land mass, tropical forests are home to roughly 70 per cent of the world's plants and animals in a variety of habitats.

Nigeria's dwindling biodiversity is mostly caused by overexploitation, pollution, the introduction of new species, and habitat degradation (UNEP, 2001). The modern industrial period has resulted in an ever-increasing loss of biodiversity. Human activity has caused the extinction of species to occur at rates that are up to 1,000 times faster than they have historically been (Millennium Ecosystem Assessment, 2005). The specific conditions of the Okomu Forest Reserve, however, are not yet documented. The entire biodiversity, productivity, and sustainability of tropical forests depend on management intervention because of the substantial anthropogenic stressors that these forests face. There is a lack of documentation regarding the degree of damage and the impact of the related activities on structural diversity and tree species. Recently, a portion of the reserve was cleared out to allow oil palm plants established. The extent of the devastation of the Okomu Forest Reserve is unknown.

Analyzing the current state of biodiversity is crucial for sustainable management, which will prevent the reserve from declining. Since tree species offer resources for many other species, quantifying tree species diversity is crucial (Shuaibu, 2014). Assessing the circumstances surrounding threatened and endangered species requires a diverse inventory of tree species. The conservation measures needed to preserve the forest, repopulate critically endangered species, and manage tree species diversity sustainably by using inventories of the diversity of trees in the research region. Consequently, an assessment was conducted on the floristic composition and species diversity of trees in the Okomu Forest Reserve located in Edo State, Nigeria.

Material and Methods

The Study Location

The Okomu Forest Reserve is situated in southern Nigeria, approximately 45km west of the Edo State capital, Benin City. The Reserve encompasses 1,238 square kilometres, located within the coordinates of 5° 0' - 5° 30' E longitude and 5° 23' - 6° 15' N latitude. (as shown in Fig. 1).

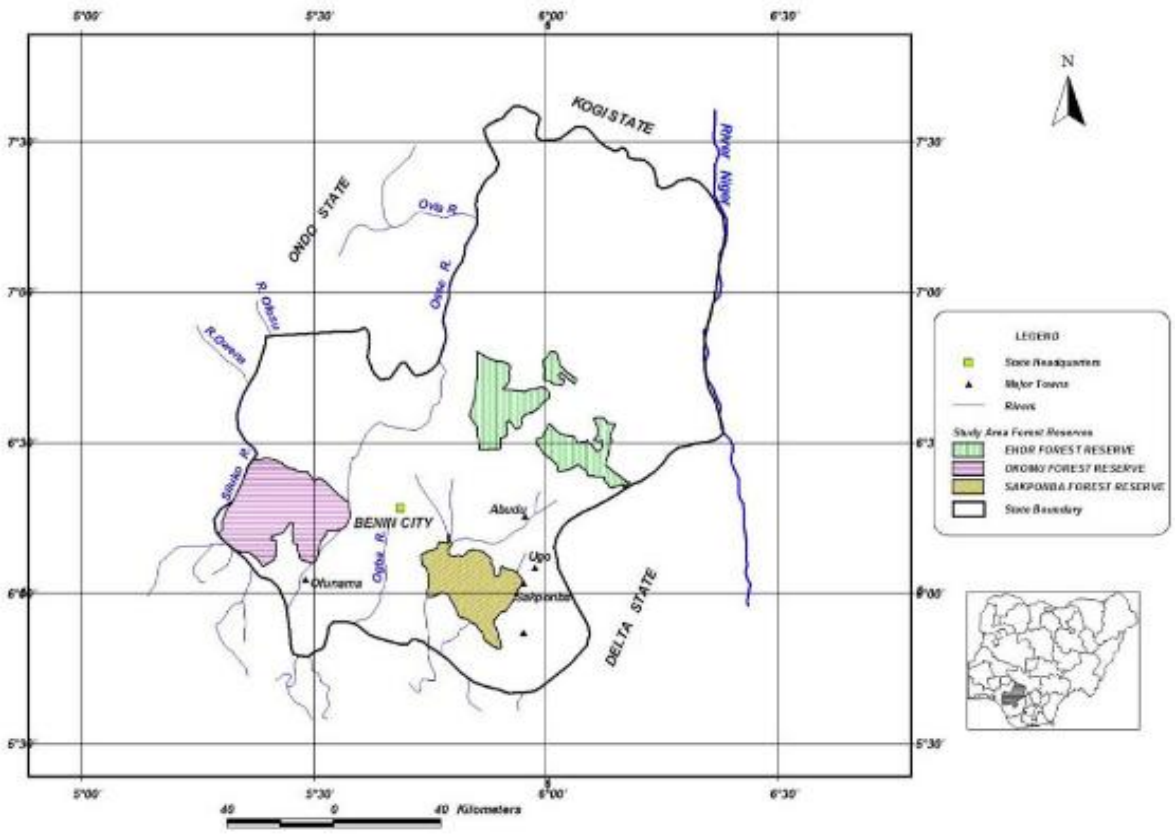

Figure 1. Location of Okomu Forest Reserve within Edo State, Nigeria
(Source: Azeez *et al*, 2010)

The Okomu Forest Reserve, situated in Nigeria, has a 25 m mean elevation above sea level, indicating a relatively low-lying terrain. River Osse drains the reserve to the east, while the River Siluko drains it to the west. The soils in the geological formations of the study area are a result of the coastal plain sand and lignite groups that date back to the late Tertiary period. The group originally referred to as the "Benin Sands" is now known as the coastal plains sand subformation (FRIN, 2000). These sands are made of red soil, interstratify, and conform to clays and lignites, forming a thick succession of deposits (FRIN, 2000). As described by Ikhuoria (1993), the soil in this region is ferritic, comprising kaolin and quartzite from tertiary secondary sedimentary rock formations.

The soil varies in texture, ranging from loamy sand to sandy loam. It's made up of heavily weathered sandstones and has a low nutrient reserve. The soil's average pH is 5.0, making it mildly acidic at the top layer. However, it becomes less acidic as you go down the profile. FRIN (2000) describes Okomu's climate as tropical, with distinct seasonal variations. Annual precipitation totals 2,100 mm, concentrated between March and October, peaking in July and September. The dry season runs from

November to February. Relative humidity stays above 65% throughout the year, and the average temperature reaches 30.2°C. The reserve's vegetation is mainly lowland humid semi-deciduous rainforest, supplemented by freshwater swamp forests along rivers.

Sampling Procedure and Data Collection

This research utilised a systematic sample design, using four 2 km transects with a 2 m width, positioned 1 km apart. Within each transect, four 50 x 50 m plots were arranged alternately. The trees in sample plots with a DBH of 10 cm or greater were identified and measured. A forest taxonomist was engaged in the services of accurately enumerating the tree species present in the Okomu Forest Reserve.

Data Analysis

Diversity Analysis

The analysis of diversity was conducted using Magurran's (2004) well-established Shannon-Wiener diversity index, which has been widely adopted in the field.

$$HI = -\sum_{i=1}^{S} \frac{n_i}{N} \text{Ln}\left(\frac{n_i}{N}\right) \quad \text{Eqn. 1}$$

Where:

HI = Shannon-Wiener diversity index

S = Number of species (species richness)

ni = Number of individuals in species i

N = Total number of individuals across all species

Ln = Natural logarithm

$$Eveness = \frac{HI}{LogS} \quad \text{Eqn. 2}$$

Where:

S = Species richness, and Eveness ranges from 0 to 1.0.

Margalef' Index (d) =

$$\frac{S-1}{Ln(N)} \quad \text{Eqn. 3}$$

Density estimate

(i) *Basal Area*

Trees basal area (BA/ m^2) in layout plots were computed using equation (4):

$$BA = \frac{\pi D^2}{4} \quad \text{Eqn. 4}$$

π = 3.142

D = DBH (Diameter at Breast Height (m)

(ii) ***Relative Density of Species (%)***

The computation of the Relative Density of Species (RD) was done using the equation of Brashears *et al.* (2004), $RD = \frac{n_i}{N} \times 100$ Eqn. 5

According to Edet *et al.* (2012), different species were rated in relation to RD in the following ways:

1. Abundant (RD ≥ 5.00),
2. Frequent (RD = 4.0 - 4.99),
3. Occasional (RD = 3.00 - 3.99),
4. Rare (RD = 1.00 - 2.99)
5. Threatened/endangered (RD < 1.00)

(iii) ***Species Relative Dominance (%)***

Equation (6) was used to assess each species' relative dominance (RD_0)

$$RD_0 = \frac{\left(\sum B_{a_i} \times 100\right)}{\sum B_{a_n}} \quad \text{Eqn. 6}$$

Where, RD_0 refers to the species' relative dominance; B_{a_i} represents every individual tree basal area within a certain species; B_{a_n} refers to stand's basal area.

(iv) ***Importance Value Index (IVI)***

The important value index for each species was calculated by adding RD and RDo and dividing by 2 (Brashears et al. 2004; Yang et al. 2008). Rajkumar and Parthasarathy (2008), employed this technique to calculate the percentage of the various species within the forest community.

Results

Biodiversity Index

Table 1 displays the findings of several diversity indices for the research region. It shows the values for three ecological diversity indexes. The Shannon-Wiener Index (HI) assesses overall diversity, with higher values implying greater species diversity. The Evenness Index (E) measures how evenly individuals are distributed throughout species, and a score of 0.91 indicates a high level of uniformity. Finally, the Species Richness (d) represents the total number of species, with a value of 9.15 indicating significant species diversity.

Table 1. Computed Biodiversity Indices of the Study Area

Indices	Value
Shannon Wiener Index (HI)	3.71

Evenness Index(E)	0.91
Species Richness(d)	9.15

Source: Field survey (2023)

Tree Species Composition and Abundance

There were 60 species of trees in the research area, categorized into 31 families and 56 genera (Table 2). The table presents a comprehensive enumeration of 633 individual trees belonging to multiple families, categorising species based on their relative abundance and conservation status, which spans from abundant to threatened. This analysis underscores the biodiversity present within the forest reserve and highlights the varying conservation priorities that inform preservation efforts. *Diospyros insculpta* is the most abundant individual species with a relative density (RD) of 7.43%, while Leguminosae is the most represented family with the highest tree species. *Elaeis guineensis* is both the least abundant (RD of 0.16%) and the most threatened.

Table 2. Tree species abundance in Okomu Forest Reserve

Family	Species	Freq	RD (%)	Abundance class
Annonaceae	*Cleistopholis patens*	17	2.6856	Rare
	Enantia chlorantha	10	1.5798	Rare
	Monodora myristica	6	0.9479	Threatened
	Polyalthia suaveolens	5	0.7899	Threatened
	Polyceratocarpus parviflorus	3	0.4739	Threatened
	Xylopia aethiopica	9	1.4218	Rare
Apocynaceae	*Alstonia boonei*	13	2.0537	Rare
	Funtumia elastic	2	0.316	Threatened
	Hunteria umbellate	6	0.9479	Threatened
	Pleioceras barteri	8	1.2638	Rare
	Rauwolfia vomitoria	10	1.5798	Rare
	Voacanga Africana	4	0.6319	Threatened
Arecaceae	*Elaesis guineesis*	1	0.158	Threatened
Asteraceae	*Vernonia amydalina*	3	0.4739	Threatened
	Voacanga amydalina	3	0.4739	Threatened
Bignoniaceae	*Daniella ogea*	4	0.6319	Threatened
Bombacaceae	*Ceiba pentandra*	26	4.1074	Frequent

Boraginaceae	*Cordia millenii*	5	0.7899	Threatened
Burseraceae	*Dacryodes edulis*	1	0.158	Threatened
Capparaceae	*Buchholzia coriacea*	8	1.2638	Rare
Cecropiaceae	*Musanga cecropiodes*	5	0.7899	Threatened
	Myriathus aborus	3	0.4739	Threatened
Combretaceae	*Terminalia ivorensis*	35	5.5292	Abundant
	Terminalia superba	9	1.4218	Rare
Ebenaceae	*Diospyros crassifora*	4	0.6319	Threatened
	Diospyros insculpta	47	7.425	Abundant
Euphorbiaceae	*Bredelia ferruginea*	1	0.158	Threatened
	Macaranga barteri	7	1.1058	Rare
	Ricinodendron heuelotii	18	2.8436	Rare
Fabaceae	*Albizia ferruginea*	2	0.316	Threatened
Guttiferae	*Allanblackia floribunda*	26	4.1074	Frequent
Irvingiaceae	*Irvingia gabonesis*	4	0.6319	Threatened
Leguminosae	*Albizia zygia*	10	1.5798	Rare
	Anthonotha macrophylla	29	4.5814	Frequent
	Desmodium adscendens	5	0.7899	Threatened
	Piptadeniastrum africana	10	1.5798	Rare
	Distemonanthus benthamianus	19	3.0016	Occasional
	Pentaclethra macrophylla	1	0.158	Threatened
Malvaceae	*Cola schott*	15	2.3697	Rare
	Sterculia rhynopetals	10	1.5798	Rare
	Triplochiton scleroxylon	5	0.7899	Threatened
Meliaceae	*Enthandrophragma angolense*	5	0.7899	Threatened
	Guarea cedrata	7	1.1058	Threatened
	Khaya ivorensis	12	1.8957	Rare
	Lovoa trichiliodes	4	0.6319	Threatened
Moraceae	*Ficus exasperata*	3	0.4739	Threatened
	Treculia Africana	12	1.8957	Rare
Myristicaceae	*Staudtia spipitata*	5	0.7899	Threatened
	Pycnanthus angolensis	9	1.4218	Rare
Ochnaceae	*Lophira alata*	12	1.8957	Rare
Olacaceae	*Strombosia pustulata*	26	4.1074	Frequent
Papilonaceae	*Baphia nitida*	9	1.4218	Rare

Passifloraceae	*Barteria nigeritiana*	6	0.9479	Threatened
Rhamnaceae	*Mesopsis eminii*	5	0.7899	Threatened
Rubiaceae	*Berteria fistulosa*	27	4.2654	Frequent
Rutaceae	*Fagara zanthoxyloides*	4	0.6319	Threatened
Simaroubaceae	*Hannoa klaineana*	4	0.6319	Threatened
Sterculiaceae	*Sterculia oblonga*	12	1.8957	Rare
Ulmaceae	*Celtis bonsai*	41	6.4771	Abundant
	Celtis zenkeri	21	3.3175	Occasional
Total		633	100	

Source: Field survey (2023)

Species Importance Value Index

Table 3 delineates the Species Importance Value Index (IVI) for tree species within the Okomu Forest Reserve, derived from multiple metrics: basal area (BA), relative dominance (RDo%), relative density (RD%), and the computed IVI. This comprehensive analysis facilitates a nuanced understanding of the ecological significance of each species in the reserve. The table illustrates the dominance of species such as *Terminalia ivorensis* (IVI of 11.06) and *Ceiba pentandra* (IVI of 10.00) within the forest's structure and ecosystem which emphasises their dominance in the reserve. In contrast, species with low Important Value Index (IVI) values, such as *Pentaclethra macrophylla* (IVI of 0.09), are at risk and may necessitate conservation efforts to ensure their long-term sustainability. This analysis underscores the paramount significance of biodiversity management within the context of the reserve.

Table 3. Species Importance Value Index in Okomu Forest Reserve

Species	**Family**	**BA**	**RD_o %**	**RD %**	**IVI**
Albizia ferruginea	*Fabaceae*	0.26	0.05	0.32	0.183
Albizia zygia	*Leguminisae*	6.82	1.22	1.58	1.40
Allanblackia floribunda	*Guttiferae*	13.54	2.43	4.11	3.27
Alstonia boonei	*Apocynaceae*	1.74	0.31	2.05	1.18
Anthonotha macrophylla	*Leguminisae*	11.88	2.13	4.58	3.36
Baphia nitida	*Papilonaceae*	4.74	0.85	1.42	1.14
Barteria nigeritiana	*Passifloraceae*	0.91	0.16	0.95	0.55
Berteria fistulosa	*Rubiaceae*	7.03	1.26	4.27	2.76
Bredelia ferruginea	*Euphorbiaceae*	0.10	0.02	0.16	0.09
Buchholzia coriacea	*Capparaceae*	2.64	0.47	1.26	0.87
Ceiba pentandra	*Bombacaceae*	88.57	15.9	4.11	10.00

Celtis bonsai	*Ulmaceae*	14.89	2.67	6.48	4.57
Celtis zenkeri	*Ulmaceae*	6.00	1.08	3.32	2.20
Cleistopholis patens	*Annonaceae*	12.40	2.23	2.69	2.46
Cola schott	*Malvaceae*	3.35	0.60	2.37	1.49
Cordia millenii	*Boraginaceae*	0.62	0.11	0.79	0.45
Dacryodes edulis	*Burseraceae*	0.09	0.02	0.16	0.09
Daniella ogea	*Bignoniaceae*	8.50	1.53	0.63	1.08
esmodium adscendens	*Leguminisae*	0.39	0.07	0.79	0.43
Diospyros crassifora	*Ebenaceae*	0.24	0.04	0.63	0.34
Diospyros insculpta	*Ebenaceae*	36.02	6.47	7.43	6.95
Distemonanthus benthamianus	*Leguminosae*	8.79	1.58	3.00	2.29
Elaesis guineesis	*Arecaceae*	2.55	0.46	0.16	0.31
Enantia chlorantha	*Annonaceae*	5.14	0.92	1.58	1.25
Enthandrophragma angolense	*Meliaceae*	11.42	2.05	0.79	1.42
Fagara zanthoxyloides	*Rutaceae*	1.02	0.18	0.63	0.41
Ficus exasperata	*Moraceae*	0.34	0.06	0.47	0.27
Funtumia elastic	*Apocynaceae*	0.38	0.07	0.32	0.19
Guarea cedrata	*Meliaceae*	2.81	0.50	1.11	0.80
Hannoa klaineana	*Simaroubaceae*	0.73	0.13	0.63	0.38
Hunteria umbellate	*Apocynaceae*	0.83	0.15	0.95	0.55
Irvingia gabonesis	*Irvingiaceae*	1.18	0.21	0.63	0.42
Khaya ivorensis	*Meliaceae*	7.02	1.26	1.90	1.58
Lophira alata	*Ochnaceae*	10.92	1.96	1.90	1.93
Lovoa trichiliodes	*Meliaceae*	4.21	0.76	0.63	0.70
Macaranga barteri	*Euphorbiaceae*	2.85	0.51	1.11	0.81
Mesopsis eminii	*Rhamnaceae*	5.80	1.04	0.79	0.92
Monodora myristica	*Annonaceae*	2.02	0.36	0.95	0.65
Musanga cecropiodes	*Cecropiaceae*	5.00	0.90	0.79	0.85
Myriathus aborus	*Cecropiaceae*	0.57	0.10	0.47	0.29
Pentaclethra macrophylla	*Leguminosae*	0.16	0.03	0.16	0.09
Piptadeniastrum africana	*Leguminisae*	29.11	5.23	1.58	3.41
Pleioceras barteri	*Apocynaceae*	3.16	0.57	1.26	0.92
Polyalthia suaveolens	*Annonaceae*	3.96	0.71	0.79	0.75
Polyceratocarpus parviflorus	*Annonaceae*	2.76	0.50	0.47	0.49
Pycnanthus angolensis	*Myristiceae*	1.15	0.21	1.42	0.82

Rauwolfia vomitoria	*Apocynaceae*	2.30	0.41	1.58	1.00
Ricinodendron heuelotii	*Euphorbiaceae*	11.65	2.09	2.84	2.47
Staudtia spipitata	*Myristicaceae*	1.88	0.34	0.79	0.57
Sterculia oblonga	*Sterculiaceae*	23.55	4.23	1.90	3.06
Sterculia rhynopetals	*Malvaceae*	4.46	0.80	1.58	1.19
Strombosia pustulata	*Olacaceae*	12.94	2.32	4.11	3.21
Terminalia ivorensis	*Combretaceae*	92.49	16.6	5.53	11.06
Terminalia superba	*Combretaceae*	10.18	1.83	1.42	1.63
Treculia africana	*Moraceae*	36.55	6.56	1.9	4.23
Triplochiton scleroxylon	*Malvaceae*	4.53	0.81	0.79	0.80
Vernonia amydalina	*Asteraceae*	16.92	3.04	0.47	1.76
Voacanga africana	*Apocynaceae*	3.25	0.58	0.63	0.61
Voacanga amydalina	*Asteraceae*	0.68	0.12	0.47	0.30
Xylopia aethiopica	*Annonaceae*	1.01	0.18	1.42	0.80

Source: Field survey (2023)

Discussion

Biodiversity Index

The calculated species richness index was 9.15. The values of species richness were somewhat lower than those found in the Afi River Forest Reserve (10.444) and the Oban Forest Reserve (10.605) (Aigbe, 2014). When compared to the value (4.71 - 10.51) reported by Eilu *et al*., (2004), for the Budonga forest in the Albertine Rift, Uganda, the species richness in the Okomu Forest Reserve is rather high.). The diversity index (HI) of Shannon-Wiener was 3.71. The Shannon-Wiener index typically falls within the range of 1.5 to 4.5 for healthy forest ecosystems. This range suggests that the reserve exhibits a high degree of biodiversity, characterized by a predominance of tree species that play a crucial role in shaping its structural and functional dynamics. (Adekunle *et al*, 2013; Olajuyigbe *et al*, 2018). A comparable figure of 3.60 was reported by Parthasarathy *et al*. (1992) in Kalakad Reserved Forests located in Western Ghats. When compared to other tropical rainforests, Afimy Fnd *et al*, (2024) reported 2.66 HI in Gunung Inas Forest; Mahmud, (2014) reported HI as 4.05 in Tropical Watershed Forest, Peninsular Malaysia; Norafida, (2018) reported 4.82 HI in Gunung Belumut Recreational Forest; and Ruziman *et al*, (2022) revealed 3.43 as HI in Kota Damansara Forest Reserve, Selangor.

Tree Species Composition and Abundance

In the study area, the following tree species were more common: *Cleistopholis patens, Ceiba petandra, Terminalia ivorensis, Diospyros insculpta, Ricinodendron heuelotii, Allanblackia floribunda, Anthonotha macrophylla, Distemonanthus benthanianus, Cola schott, Strombosia fistulosa, Celtis bonsai, and Celtis zenkeri*. The mean number of trees was at least 15 per hectare. (Table 2). The most abundant individual species were *Diospyros insculpta* and *Celtis bonsai*, with 47 and 41 trees per hectare, representing 7.425% and 6.477% of overall population of trees/hectare. (Table 2). Several tree species were classified as rare because of their low frequencies and high relative dominance percentages. Examples include *Cleistopholis patens* (Annonaceae), *Terminalia superba* (Combretaceae), and *Macaranga barteri* (Euphorbiaceae). Some tree species are classified as threatened, indicating that their populations are at risk. Examples include *Monodora myristica* and *Polyalthia suaveolens* from the Annonaceae family, *Funtumia elastic* from the Apocynaceae family, and *Buchholzia coriacea* from the Capparaceae family. However, certain species (such as *Elaies guineensis, Pentaclethra microphylla, Bredelia ferruginea, and Dacryodes edulis*) exhibited remarkably low tree diversity, with only one species per hectare, potentially indicating vulnerable conservation status and threat, and may become extinct in the Okomu Forest Reserve unless steps are taken to ensure their regeneration. According to Alamu and Agbeja (2011) and Aigbe and Omokhua (2015), one tree species per hectare is endangered. Tropical tree species that are vulnerable and threatened by extinction are at the highest risk (FORMECU, 1999).

The family composition of tree species in the reserve revealed that Leguminosae, Annonaceae, and Apocynaceae had the most tree species (Table 2). Meliaceae had four species, Euphorbiaceae and Malvaceae had three, Combretaceae, Ebenaceae, Ulmaceae, Moraceae, Myristicaceae, Asteraceae, and Cecropiaceae had two, while 17 other families had only one species (Table 2). These findings contradicted those of Aigbe (2014), who reported that the Caesalpinioideae, Mimosoideae, Euphorbiaceae, and Meliaceae families dominated the Afi River and Oban Forest Reserves, respectively. According to Onyekwelu *et al*. (2008), the dominant tree families in three southwestern Nigerian rainforest habitats were Euphorbiaceae, Sterculiaceae, Meliaceae, Mimosoideae, and Apocynaceae.

Species Importance Value Index

An indicator of a species' prevalence in a specific forest area is the Importance Value Index (IVI) (Aigbe *et al*., 2017). Foresters frequently utilize it as a metric to evaluate the percentage of prominent species in a given forest ecosystem. Prioritizing species for conservation or management actions is frequently done using it. Occasionally, the dominant species in the forest community was not the most

obvious. The Importance Value Index (IVI) serves as a metric to assess the dominance of a family or species within a specified study area. As articulated by Curtis and Macintosh (1951), a family is deemed to possess absolute dominance over competing families if its IVI exceeds 40%. Likewise, a species is classified as dominant if its IVI surpasses 10%. These thresholds are critical for understanding the ecological hierarchy and community structure within the ecosystem under investigation. IVI of tree species in the Okomu Forest Reserve is shown in Table 3. *Terminalia ivorensis* and *Ceiba pentandra* had the highest IVI values of 11.06 and 10.00, respectively. These results show that *Terminalia ivorensis* and *Ceiba pentandra* are well-represented in the study area. This agrees with Aigbe *et al.* (2017) report that *Ceiba pentandra* had the highest IVI in the Ehor Forest Reserve, Edo, Nigeria. The presence of *Ceiba pentandra* indicates features of a secondary forest. This species is prominent in degraded reserve (Edet *et al.*, 1994; Edet *et al.*, 2011). Comparing IVI values across species can help prioritize conservation efforts. For example, *Terminalia ivorensis* and *Diospyros insculpta* from the Ebenaceae family both have high IVI values, suggesting their importance for conservation planning.

Conclusion

Despite the extent of forest degradation caused by loggers and farmers, the Okomu Forest Reserve maintains a high status of biodiversity resources, as evidenced by the high value of the species richness and diversity index. *Cleistopholis patens, Ceiba petandra, Terminalia ivorensis, Diospyros insculpta, Ricinodendron heuelotii, Allanblackia floribunda, Anthonotha macrophylla, Distemonanthus benthanianus, Cola schott, Strombosia fistulosa, Celtis bonsai,* and *Celtis zenkeri* were the most common tree species. The Leguminosae, Annonaceae, and Apocynaceae families were the most abundant. In terms of the Importance Value Index (IVI), *Terminalia ivorensis* and *Ceiba pentandra* ranked as the top two tree species in the reserve, indicating their significant ecological presence. This research revealed numerous species with lower IVI values, implying that rare or endangered species constitute a significant number of the species found in the Okomu Forest Reserve. This study helps to identify many tree species as rare, threatened, or endangered, establishing the foundations for their conservation. Continuous Forest Inventory (CFI) and restocking are critical to keeping some indigenous species from becoming extinct. This is vital to the preservation of Okomu Forest Reserve's unique native tropical tree species.

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