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ASSESSMENT OF HERBACEOUS PLANT SPECIES DIVERSITY AND DISTRIBUTION PATTERN OF ROAN ANTELOPE (*Hippotragus equinus*, Desmarst 1804) WILDLIFE HABITATS IN ZUGURMA SECTOR, KANIJI LAKE NATIONAL PARK, NIGERIA

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ABSTRACT

The study focused on the diversity and distribution pattern of herbaceous plants species in Roan antelope (*Hippotragus equinus*, Desmarst 1804) wildlife habitats of Zugurma sector, Kainji Lake National Park, Nigeria. Four (4) out of the five (5) existing wildlife habitats in Zugurma sector were randomly selected for the study. Two (2) line transects of 4 km each were randomly laid on each of the selected wildlife habitats. Along each transects, four (25m x 25m) temporary plots were laid in an alternate direction. Furthermore, five sub-transects of 5m were laid at 5m interval in each of the 25m × 25m plot. Five samples points were collected from each sub-transect using step point techniques for herbaceous plant species assessment. A total 65 herbaceous plant species were encountered belonging to 7 families with a mean density/ha of 902 individuals/ha in the study area. Out of which 27 herbaceous plant species were present in all the four wildlife habitats of Zugurma sector prominent species were: *Aspilia africana, Mimosa invisa, Mimosa pudica, Andropogon gayanus, Andropogon tectorum and Brachiaria deflexa*. However, *Cyperus iria* was only encountered in one habitat of the Zugurma sector. It was observed that the national park was suffering from loss of biodiversity as a result of human activities such as illegal hunting, cattle grazing, uncontrolled burning, illegal felling and mining. Therefore, there should be proper enforcement of strict laws and orders governing the biodiversity conservation and management of the National Park.

Key word: Distribution, Diversity, Roan Antelope, Herbaceous, wildlife, habitats, Pattern

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INTRODUCTION

Understanding the condition of the wildlife habitats used by roan antelopes depends in large part on quantitative data on the composition, diversity, and distribution pattern of herbaceous plant species (Alfeus, 2022). Additionally, it supports the National Parks' sustainable biodiversity conservation strategy's planning, implementation, and decision-making. Globally, tropical forests are disappearing at frightening rates; each year, they lose almost 4% of their present land. According to FAO (2015), tropical forests have currently shrunk to half of their former extent. According to Onyekwelu (2017), the Nigerian forest estate makes up just 12.2% of the nation's 983,213 km^ land mass, which is far

less than the FAO's suggested national minimum of 25% (Ladan, 2010).

In order to guide succession processes toward preserving species and habitat variety, vegetation components must be continuously observed, maintained, protected, and managed, (Attua and Pabi, 2013). An essential component of the foundation for wildlife biodiversity and ecosystem health is the diversity and distribution patterns of herbaceous species (Wang *et al*., 2003). The shape of wildlife habitats is crucial to comprehending wildlife ecosystems and is also a crucial component of biodiversity (Ozcelik *et al*, 2008). The baseline data needed to determine the condition of the roan antelope natural habitats in the research area would be knowledge of species diversity and distribution. The objective of this research is to evaluate the diversity and distribution pattern of herbaceous plant species in the habitats used by roan antelopes in the Zugurma sector of Kainji Lake National Park, Nigeria.

MATERIALS AND METHODS

Description of the Study Area

Kainji Lake National Park (KLNP) covers a total area of 5,340.83 km^2. It is made up of two non-contiguous sectors; Borgu sector covers about 3,970.83km^2(74.3%) while Zugurma sector cover 1,370km^2(25.7%) (Aremu *et al*.,2007). It lies approximately between latitudes 9^0 40'N and 10^0 30'N and longitudes 3^0 30'E and 5^0 50'E (Ezealor, 2002). The vegetation has been described as Northern Guinea Savanna formations which recognized five Savanna sub types/wildlife habitats in the Zugurma sector (Keay, 1989; Ayeni, 2007). The mean annual rainfall varies from 1,100 mm to 1,150 mm in the Park. The mean (minimum and maximum) annual temperature is between 12^{o}C and 37^{o}C while the average relative humidity is 53%. The study area is blessed with diverse flora and fauna resources.

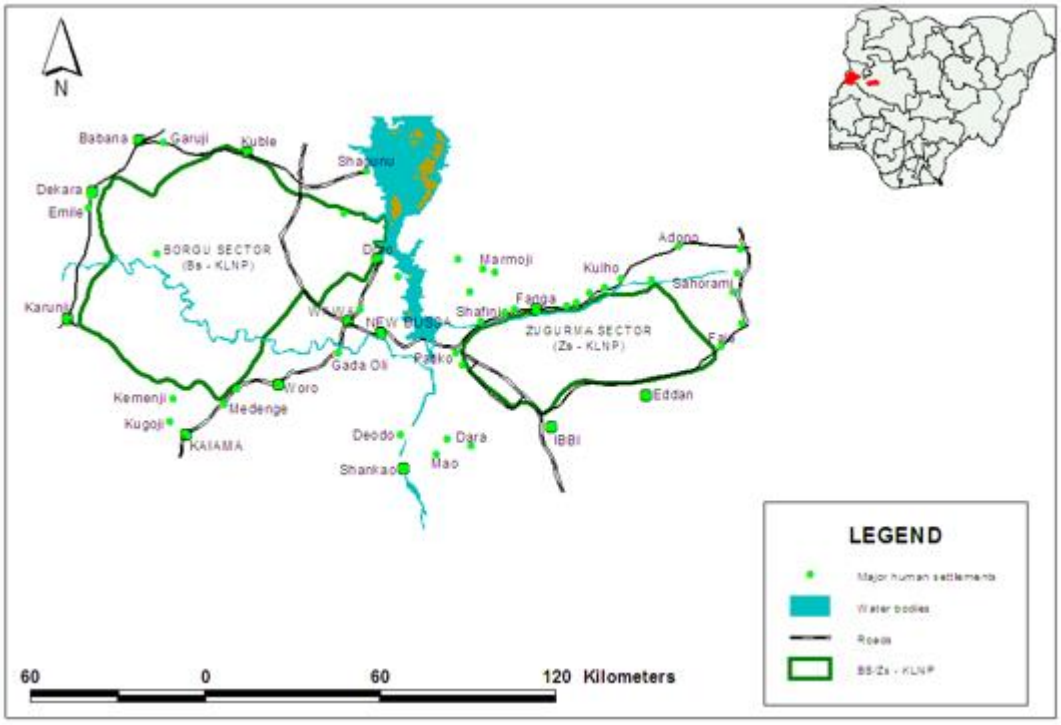

Figure 1: Map of Kainji Lake National Park indicating the two sectors (Borgu and Zugurma) (Source: Tuna, 1992).

Data Collection

Herbaceous Plant Species Sampling

A reconnaissance survey was carried out to be familiarized with the roan antelope wildlife habitats in the study area. Studies conducted by

(Ayeni, 2007) observed that roan antelope are entirely distributed in the five (5) sub savanna or wildlife habitats in the study area. Out of the five (5) existing wildlife habitats, four (4) were randomly selected from Zugurma sector. In each of the selected wildlife habitat, two (2) transects of 4km each were randomly laid. Along each transect, four (4) 25m x 25m plots were laid at 1km interval and in an alternate direction as was done by Ogunjemite *et al*. (2005). In addition, 5 sub-transects of 5m were laid at 5m interval in each of the 25m × 25m plots, five samples points was collected from each sub-transect using step point techniques (Riney, 1982). The herbaceous species within each sub-transect were identified by t taxonomist and their frequency of occurrence recorded. Nomenclature of herbaceous species followed after Lowe (1989).

Method of Data Analysis

Data was analyzed using the descriptive statistics (tables), diversity indices and one-way ANOVA

(a) *Species richness* was calculated using Margalef's index (Magurran, 1987)

$D = (S-1)/\ln N$ ….. (1)

Where: D = Margalef's index; S = Numbers of species; N = Total numbers of individual species; ln = natural logarithm

(b) *Shannon–Wiener diversity index (H'):* was used to calculate ecosystems' diversity index as adopted by (Price, 1997).

$H' = -\sum_{i=1}^{S} Pi \ln(Pi)$ ……. (2)

Where:

H′ = Shannon-Wiener diversity index; S = the total number of species in the habitat;

Pi = proportion S (species in the family) made up of the i^{th} species; ln = natural logarithm.

(c) *Species evenness (E):* was calculated using Shannon's equitability index (E_H) as stated by Kent and Coker (1992)

$E_{H'} = \frac{\sum_{i=1}^{S} Pi \ln(Pi)}{\ln(S)}$ ….. (3)

Where E_H' = species evenness; S = Number of species; Pi and ln are as defined above.

(d) Species evenness was determined with Simpson's index as adopted by Magurran (1987)

$D = \left(\sum \frac{ni(ni-1)}{N}\right)(N-1)$….. (4)

Where D = Simpson's index; ni = the number of individuals in the i^{th} species; N= the total number of individual species

(e). *Shannon's maximum diversity index was calculated using equation (5):*

$H_{max} = ln(S)$ ..... (5)

(f). *Sorensen's species similarity index (SI) of Nath et al. (2005) was adopted in calculating the similarity of species between wildlife habitats using equation (9):*

$SI = \left(\frac{2C}{a+b}\right) \times 100$…. (6)

Where: C = number of species in sites a and b; a, b = number of species at sites a and b

RESULTS

Herbaceous Plant Species Composition and Distribution Pattern

Herbaceous plant species composition in the different roan antelope (*Hippotragus equinus*) wildlife habitats in Zugurma sector of Kainji Lake National Park, Nigeria is presented on Table 1. A pooled total of 65 herbaceous plant species was encountered in 7 families with a mean density/ha of 902 individuals/ha in Zugurma sector of Kainji Lake National Park (KLNP). Afzelia/Daniella Woodland wildlife habitat had the highest number of individual herbaceous plant species with 1098 individuals/ha, followed by Terminalia, Monotes/Isoberlinia woodland wildlife habitat with 892 individuals/ha, then Pterocarpus/Detarium woodland wildlife habitat with 818 individuals/ha, while the Riparian forest wildlife habitat had the lowest frequency of herbaceous plant species occurrence (798 individuals/ha). However, *Andropogon gayanus* had the highest frequency of occurrence of 308 individuals/ha, followed by *Hyparrhenia rufa* (286 individuals/ha) then *Aspilia africana* with 258 individuals/ha and *Andropogon tectorum* with 174 individuals/ha (Table 1).

Biological Diversity Indices of Herbaceous Plant Species

The result of the biological diversity indices of herbaceous plant species in the different wildlife habitats in Kainji Lake National Park, Nigeria are summarized on Table 2. The result reveals that in the different wildlife habitats of Zugurma sector,

herbaceous plant species richness values were similar ranged 52 - 54 while density ranged from 798 to 1098/ha. Simpson diversity index (0.91-0.97) was almost the same in all four wildlife habitats of Zugurma sector. Shannon –Wiener diversity index ranged from 3.07 - 3.74 while Species evenness varied 0.42 - 0.78; Margalef index was between (8.48 - 8.85); Shannon equitability index varied (0.78 - 0.93) while Shannon maximum diversity index was (6.01-6.31) among the different wildlife habitats.

The results of ANOVA (Table 3) revealed that there were significant differences in most of the diversity indices (Simpson diversity index, Shannon-Wiener diversity index, Margalef index, Shannon equitability index and Shannon maximum diversity index) of herbaceous plant species within wildlife habitats in Zugurma sector of the National Park but only species evenness was not significantly different.

Sorensen's Species Similarity Index for Herbaceous Plant Species

Table 4 presents the Sorensen species similarity index for herbaceous plant species between pairs of wildlife habitats in Zugurma sector of KLNP. The similarity index between pairs of wildlife habitats was found to be high (range: 65.63% – 72.88%). The highest Sorensen species similarity index in wildlife habitats was obtained between Pterocarpus/Detarium woodland and Afzelia/Daniella woodland wildlife habitats (72.88%), which was closely followed by similarity index between Pterocarpus/Detarium woodland and Terminalia, Monotes/Isoberlinia woodland wildlife habitats (72.41%) (Table 4). The lowest sorensen species similarity index for herbaceous species (65.63%) was observed between Pterocarpus/Detarium woodland and Riparian forest wildlife habitats.

Table 1: Herbaceous plant species composition and diversity of different wildlife habitats of Zugurma sector, Kainji Lake National Park, Nigeria.

S/ No	Family	Herbaceous Species	Zugurma Sector Wildlife Habitats			
			A1(n/ha)	A2(n/ha)	A3(n/ha)	A4(n/ha)
1	Asteraceae	*Aspilia africana* (Pers.) C.D. Adams	112	72	28	46
2	Cyperaceae	*Cyperus difformis* Linn.	0	46	24	16
3	Cyperaceae	*Cyperus esculentus* Linn.	0	32	8	0
4	Cyperaceae	*Cyperus iria* Linn.	0	0	0	8
5	Fabaceae	*Desmodium salicifolium* (Poir.) DC	0	8	0	8
6	Fabaceae	*Desmodium scorpiurus* (SW.) Desv.	0	20	18	12
7	Fabaceae	*Mimosa invisa* Martius ex Colla	24	6	4	8
8	Fabaceae	*Mimosa pudica* Linn.	8	4	14	10
9	Papilionoideae	*Tephrosia bracteolata* Guill. and Perr.	12	14	0	6
10	Papilionoideae	*Tephrosia linearis* (Willd) Pers.	0	10	12	8
11	Poaceae	*Acroceras zizaniodes* Kunth Dandy	4	8	0	12
12	Poaceae	*Andropogon gayanus* Kunth var. gayanus	132	70	48	58
13	Poaceae	*Andropogon tectorum* Schumach and Thonn.	36	50	62	26
14	Poaceae	*Brachiaria deflexa* (Schumach.) C.E Hubbaed ex Robyns	2	20	8	30
15	Poaceae	*Brachiaria falcifera* (Trin.) Stapf	18	22	20	10
16	Poaceae	*Brachiaria lata* (Schumach.) C.E. Hubbard	2	6	20	0
17	Poaceae	*Cenchrus biflorus* (Roxb)	2	0	22	0
18	Poaceae	*Chloris robusta* (Stapf)	2	42	8	10
19	Poaceae	*Chrysopogon aciculatus* (Retz.) Trin.	20	38	8	4
20	Poaceae	*Cymbopogon giganteus* (Chiov)	2	48	12	8
21	Poaceae	*Cynodon dactylon* (Linn.) Pers.	4	0	0	36
22	Poaceae	*Dactyloctenium aegyptium* (Linn.) P. Beauv	4	10	8	16
23	Poaceae	*Digitaria gayana* (Kunth.) A. Chev. Ex Stapf	2	16	18	0
24	Poaceae	*Digitaria horizontalis* (Willd.)	10	20	8	4
25	Poaceae	*Echinochloa obtusiflora* (Stapf)	6	12	6	0
26	Poaceae	*Echinochloa pyramidalis* (Lam.) Hitchc. and Chase	0	12	4	12
27	Poaceae	*Echinochloea colona* (Linn.) Link	8	0	4	6
28	Poaceae	*Eleusine indica* (Linn.) Gaertn.	2	4	12	0
29	Poaceae	*Eragrostis atrovirens* (Desf.) Trin. Ex. Steud.	16	0	4	8
30	Poaceae	*Eragrostis ciliaris* (Linn.) R. Br.	2	14	6	2

31	Poaceae	*Eragrostis tenella* (Linn.) P. Beauv.ex. Roem and Schult	0	0	20	16
32	Poaceae	*Eragrostis tremula* (Hochst.ex Steud)	26	10	0	6
33	Poaceae	*Hackelochloa granularis* (Linn.) O. Ktze	2	4	12	18
34	Poaceae	*Heteropogon contortus* (Linn.) Beauv.ex Roem. and Schult	2	6	0	0
35	Poaceae	*Hyparrhenia dissoluta* Staof(Nees ex Steud.)	6	20	22	36
36	Poaceae	*Hyparrhenia involucrata* (Stapf.)	8	10	16	12
37	Poaceae	*Hyparrhenia rufa* (Nees) Stapf.	144	30	68	44
38	Poaceae	*Imperata cylindrica* (Linn.) Raeuschel var. Africana	0	66	30	18
39	Poaceae	*Leptochlora filiformis* (Pers.) P.Beauv.	2	14	0	8
40	Poaceae	*Loudetia annua* (Stapf)C.E.Hubbard	0	10	12	4
41	Poaceae	*Loudetia arundinacea* (Hochst.ex. A.rich)Steud.	16	18	8	20
42	Poaceae	*Panicum maximum* (Jacq.)	0	20	46	10
43	Poaceae	*Panicum repens* Linn.	8	16	34	6
44	Poaceae	*Paspalum conjugatum* Berg.	4	16	16	42
45	Poaceae	*Paspalum scrobiculatum* (Linn.)	4	26	4	0
46	Poaceae	*Pennisetum pedicellatum* Trin.	4	34	26	14
47	Poaceae	*Pennisetum polystachion* (Linn.) Schult.	6	0	10	8
48	Poaceae	*Perotis inidca* (Linn.) O.Ktze	6	6	14	0
49	Poaceae	*Rhynchelytrum repens* (Willd.) C.E.Hubbard	32	8	12	12
50	Poaceae	*Schizachyrium exile* (Hochst)	8	20	8	0
51	Poaceae	*Setaria barbata* (Lam.) Kunth.	20	46	18	8
52	Poaceae	*Setaria longiseta* (P.Beauv)	18	10	10	16
53	Poaceae	*Setaria megaphylla* (Steud)Dur. and Schinz.	0	0	8	10
54	Poaceae	*Setaria pumila* (Poir.) Roem. and Schlit	16	14	28	16
55	Poaceae	*Sorghastrum bipennatum* (Hack.) Pilger	6	6	0	4
56	Poaceae	*Sorghum arundinaceum* (Desu.)Stapf	6	10	14	0
57	Poaceae	*Sporobolus indicus* (Linn.)A. Chase	6	12	8	10
58	Poaceae	*Sporobolus pyramidalis* P. Beauv.	10	0	4	12
59	Rubiaceae	*Mitrocarpus villosus* (SW.)DC	6	0	18	10
60	Rubiaceae	*Oldenlandia corymbosa* Linn.	6	8	0	18
61	Rubiaceae	*Oldenlandia herbacea* (Linn.) Roxb.	4	16	10	8
62	Rubiaceae	*Pentodon pentandrus* (Schum.and Thonn.)	0	20	18	6
63	Rubiaceae	*Spermacoce ocymoides* (Burm. F)	4	0	12	8
64	Rubiaceae	*Spermacoce verticillata* Linn.	4	8	0	20
65	Smilacaceae	*Smilax anceps* Willd.	4	10	0	14
Total density (ha^{-1}) for wildlife habitats			**818**	**1098**	**892**	**798**
Mean density (ha^{-1}) for the sector					**902**	

Key: n/ha = Number of individual species/ha; A1=Pterocarpus/Detarium woodland; A2= Afzelia /Daniella woodland: A4= Riparian forest

Table 2: Biodiversity indices for herbaceous plant species in different wildlife habitats of Zugurma sector, Kainji Lake National Park, Nigeria.

Parameters	Zugurma Sector Wildlife Habitats			
	A1	**A2**	**A3**	**A4**
No of Species	52	54	53	54
No of Individuals/ha	818	1098	892	798
Simpson diversity index	0.91	0.97	0.97	0.97
Shannon-Wiener diversity index	3.07	3.70	3.71	3.74
Species Evenness	0.42	0.75	0.77	0.78
Margalef index	8.48	8.40	8.52	8.85
Shannon Equitability index	0.78	0.93	0.93	0.94
Shannon maximum diversity index	6.01	6.31	6.10	5.99

Key: A1=Pterocarpus/Detarium woodland; A2= Afzelia /Daniella woodland; A3=Terminalia, Monotes/ Isoberlinia woodland, A4= Riparian forest.

Table 3: Comparison of diversity indices of herbaceous plant species in the different wildlife habitats of Zugurma sector, Kainji Lake National Park

Parameters	Zugurma Sector Wildlife Habitats			
	A1	A2	A3	A4
No of Species	52	54	53	54
No of Individuals/ha	818	1098	892	789
Simpson diversity index	0.88^{b}	0.94^{a}	0.94^{a}	0.93^{a}
Shannon-Wiener diversity index	2.41^{c}	3.03^{a}	2.90^{ab}	2.80^{b}
Species evenness	0.98^{a}	0.86^{a}	0.90^{a}	0.88^{a}
Margalef index	3.68^{c}	5.52^{a}	4.79^{b}	4.54^{b}
Shannon Equitability index	0.88^{b}	0.95^{a}	0.97^{a}	0.95^{a}
Shannon maximum diversity index	3.93^{b}	4.21^{a}	4.01^{b}	3.88^{b}

Means in the same row with same superscript are not significantly different (P≥ 0.05)
Key: A1=Pterocarpus/Detarium woodland; A2= Afzelia /Daniella woodland; A3=Terminalia, Monotes/ Isoberlinia woodland; A4= Riparian forest

Table 4: Sorensen species similarity index for herbaceous plant species among between different wildlife habitats in Zugurma sector, Kainji Lake National Park, Nigeria.

	Zugurma Sector			
Wildlife Habitats	**A1(%)**	**A2(%)**	**A3(%)**	**A4(%)**
A1 (%)	1			
A2 (%)	72.88	1		
A3 (%)	72.41	72.13	1	
A4 (%)	65.63	69.84	71.19	1

Key: A1=Pterocarpus/Detarium woodland; A2= Afzelia /Daniella woodland; A3=Terminalia, Monotes/ Isoberlinia woodland; A4= Riparian forest. % = Percentage

DISCUSSION

Composition and Distribution Pattern of Herbaceous Plant Species.

In order to evaluate the sustainability of animal habitats, species protection, and ecosystem management in the face of biodiversity loss, it is crucial to comprehend the diversity and distribution of herbaceous plant species (Kacholi, 2014). The density, abundance, and distribution of specific species are quantifiable markers of biodiversity loss, according to Wattenberg and Breckle (1995). Understanding the diversity of species and their distribution patterns is crucial for estimating the ecosystem's density and future state (Saikia, 2017). In this study herbaceous plant species composition and diversity were greatly rich and is typical of Northern Guinean savanna having the same features like that of Guinean Savanna of West Africa. This finding corroborates with Keay (1989) and (Ayeni, 2007).

The composition and distribution of herbaceous plant species) recorded in the different wildlife habitats ranged between 798 and 1098 individuals/ha; with species richness ranging from 52-54 herbaceous plant species, which is higher compared to report of Tyowua *et al*. (2012), who encountered 32 herbaceous plant species in Borgu sector, KLNP, Nigeria ; Mohammed and Timothy (2021) recorded 20 herbaceous plant species in Lede and Galumji, Wawa-Zange Forest Reserve, Gombe State, Nigeria .However, this study is in consistent with Kensa *et al*., (2018) with 54 herbaceous plant species in South India; Oni and Ndiribe (2019) with 47 herbaceous plant species in University of Lagos , Nigeria. The herbaceous plant species composition of Kainji Lake National Park varied from one wildlife habitat to another. It is also characterized by tall, perennial grasses quite similar to those found in the Southern Guinea Savanna which included: *Hyparrhenia rufa, Brachiaria deflexa, Cymbopogon giganteus*, etc. Herbaceous plant species commonly abundant in

Zugurma sector includes *Aspilia africana, Andropogon gayanus, Andropogon tectorum, Brachiaria deflexa, Chloris robusta, Cymbbopogon giganteus, Hyparrhenia rufa, Imperata cylindrica* and *Panicum maximum*.

Biodiversity Indices of Herbaceous Plant Species

In order to facilitate comparison, floristic diversities and abundance of various habitats are assessed using biodiversity indices (Onyekwelu et al., 2022). Species diversity of an ecosystem is considered high if the Simpson diversity index value is close to one (1) while species diversity is low if Simpson diversity index value is close to zero (0). Consequently, considering the high Simpson diversity index values obtained in this study, it is obvious that species diversity is high at Zurguma sector, which is in conformity with the results of Dash (2003) and Chima and Omokhua, (2011). Results from the study areas indicates very high Simpson diversity index in all wildlife habitats (0.91-0.97) which is inline as reported by Chima and Omokhua, (2011).

Also, Shannon-Wiener's diversity index of Herbaceous plant species lies between 3.07 -3.74 which was higher compared with the standard value. The result supports the findings of Kent and Coker, (1992) and Akindele, (2013).) which stated that the typical values of the standard value of Shannon-Wiener's diversity index in most ecological site lies between 1.5 to 3.5 and hardly greater than 4.0. Furthermore, studies carried out by Onyekwelu *et. al*., (2008); Akindele, (2013) and Oke *et. al.*, (2017) in some part of rainforest areas in Nigeria recorded Shannon-Weiner diversity index of 3.12 - 3.74 which is closely related to the value obtained in this study. The higher the Species evenness index, the more species are proportionally distributed and vice versa. The value of Specie evenness obtained within the study area lies between 0.64 - 0.70, the value competes closely with findings of 0.82 and 0.89 reported by Akindele, (2013); Aigbe and Omokhua (2015) respectively in tropical rainforest of Nigeria.

Margalef index was high for herbaceous plant species (3.68- 5.52 in Zugurma sector. The value extends beyond one (1) which is in line with the findings of (Kent and Coker, 1992). The Margalef index for this study was very high compared to 1.84 for Kogo forest reserve recorded by Bishir (2012), it was similar to the range of 5.64 - 10.02 reported for some tropical rainforest ecosystems (sacred groves) in Nigeria by Onyekwelu *et al*. (2022)

The Shannon maximum diversity (Hmax) values for the study area ,3.93- 4.21 for herbaceous plants were higher than those of some previous studies (1.80–3.46) by (Onyekwelu and Olusola, 2014; Agbelade and Ojo, 2020). The Hmax values implied that most of the species encountered in KLNP do not have equal area abundance. Typically, Shannon equitability diversity index value obtained in Zugurma sector (0.89-0.91) were high which indicates complete evenness, is in agreement with Beals *et al*., (2000). Based on the very high Shannon equitability index for herbaceous plant species in the study area (0.89 - 0.92), it can be said that species similarity was high in the herbaceous layer of the study. The Sorensen's similarity index assesses how similar the species composition of two wildlife habitats or samples is, whereas the dissimilarity coefficient assesses how different the composition of two wildlife habitats or samples is. According to Arponen (2012), the pattern of plant species diversity has frequently been noted for prioritizing conservation activities because it reflects the underlying ecological processes that are important for management and conservation. The results revealed that Sorensen's similarity index between pairs of wildlife habitats in the Zugurma sector generally followed the following order: resemblance of herbaceous plant species Furthermore, Sorensen's species similarity index ranges between 65.63% and 72.88% among the four wildlife habitats, indicating that one wildlife habitat is better protected and differs from the other, which is highly exposed to human activities, resulting in community variation, as observed by Denu (2007).As a result, herbaceous species in the Zugurma sector's various wildlife habitats are very similar. Denu (2007) confirmed that, in addition to the attitudinal gradient, other environmental factors such as aspect, slope, and soil physical and chemical properties have a

significant impact on vegetation patterns in communities or wildlife habitat.

CONCLUSION AND RECOMMENDATION

The study was able to assess the biodiversity and distribution patterns of herbaceous plant species of roan antelope wildlife habitats in Zugurma sector of Kainji Lake National Park, Nigeria. There was close or great similarity in herbaceous plant species composition in the study area. However, anthropogenic factors (cattle grazing, uncontrolled bush burning, illegal hunting, mining, habitat utilization, extraction of non-timber forest products and others) has contributed negatively to the composition and diversity of herbaceous plant species in the study area. Therefore, it is imperative to eliminate all these anthropogenic activities from the National park for subsequent restoration and improvement of Roan antelope wildlife habitats. Public enlightenment education and awareness should be carried out regularly on needs to conserve and manage biodiversity.

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