Research Article

Abundance and distribution of mona monkey (*Cercopithecus mona* Schreber, 1775) in Osun Osogbo World Heritage Site, Nigeria

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Abstract

The objective of the present study was to evaluate the abundance and distribution of mona monkey (*Cercopithecus mona* Schreber, 1775) in Osun Osogbo World Heritage Site, Nigeria. This study used the line transect method to estimate population densities and map the spatial distribution of Mona monkeys (*Cercopithecus mona*) in Osun Osogbo World Heritage Site (OOWHS). Transects were marked at intervals of 0.05 km to facilitate data collection. Data were analyzed using Microsoft Excel 2016 and SPSS version 2023 to generate frequency tables. The mean density of mona monkeys was found to be high (220.75) in OOWHS. The morning and evening censuses revealed a significant statistical difference between the morning and evening censuses (P = value +0.353 at 0.05). The spatial distribution of mona monkeys was observed to be more in Transect A (near the gate of OOWHS) than in any other range within the selected ranges due to the fact that (*Cercopithecus mona*) is semi-habituated as a result of high tourism activities at this site and the presence of the tour guides offices that offered protection to the animals and their proximity to the flora composition of palm trees (*Elaes guinensis*) that serve as food sources and are mostly frequently utilized by the mona monkeys. It is suggested that sustainable management should be in place in monitoring the species in low relative abundance areas of the site,

Key words: Abundance, conservation, distribution, mona monkey, Nigeria

1. Introduction

The mona monkey (*Cercopithecus mona*) and other non-human primates occupy important ecological niches in their habitats; they are primarily fruit- and shoot-eating primates that consume a variety of plant components (Smith & Johnson 2019). Primates play a vital role in tropical forests, serving as pollinators, seed dispersers, seed predators, and even sequestering carbon, all of which are essential to the resilience and health of the forests.

.[1] Therefore, interactions between human groups and the mona monkey (*Cercopithecus mona*) remain complex and warrant additional study (Johnson et al. 2018). Lemurs, lorises, tarsiers, monkeys, apes, and humans are categorized as primates, a varied order of mammals (Rylands et al. 2017). Primates are classified into two main groups: Prosimians, which include tarsiers, lorises, and lemurs; and anthropoids, which comprise humans, monkeys, and apes (Sussman & Raven 2017). This is the method used in conventional classification.

There are more divides within the anthropoid group, such as new world monkeys and old-world monkeys (Rylands et al. 2017). Another significant group of primates are apes,

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which include gibbons, orangutans, gorillas, chimpanzees, and bonobos (Napier & Napier 2017). The predominant habitat of the mona monkey (*Cercopithecus mona*) is tropical rainforest and dense secondary forests found in West African nations like Nigeria, Ghana, Cameroon, and the Ivory Coast (Haffer et al. 2017).

Due to the dangers caused by human activity to the species' protection, the population of this species in the forest is declining. Activities such as logging, deforestation, and agricultural development have disrupted the mona monkey's native range and fragmented its habitat (Hernández-Lambrao et al. 2019). This has led to the species' designation as "Vulnerable" on the International Union for Conservation of Nature's (IUCN) Red List, highlighting the pressing need to ascertain its distribution and population status (IUCN 2021).

However, because of their ecological significance and susceptibility to various threats, researchers and conservationists have been interested in the abundance and distribution of mona monkeys (*Cercopithecus mona*). The monkeys are primarily found in West African tropical rainforests and gallery forests, mainly in Nigeria, Ghana, the Ivory Coast, and parts of Cameroon (Rödel, 2017). These tropical regions offer suitable habitats that provide the resources needed for the survival and reproduction of this primate species. Additionally, one factor influencing the distribution of mona monkeys (*Cercopithecus mona*) is the availability of suitable habitat.

According to Dunn and Chapman (2018), they have a predilection for dense, old forests with lots of tree canopies because they offer them plenty of food sources and defense against predators. The distribution range of these species has been greatly affected by habitat fragmentation and destruction brought about by human activity (Kamgang et al. 2019). Mona monkeys run a significant risk of isolation and restricted access to essential resources as a result of ongoing forest clearing brought on by human activity and the growing human population. This will have an impact on the diversity of the species. Studies have evaluated the number of mona monkeys in several habitats using a variety of techniques.

Utilizing line transect surveys is one popular strategy that entails walking along pre-established transect lines and documenting any signs or sightings of primates (Mbebi et al. 2018). Additionally, the food preferences of the mona monkey have been connected to its abundance. Although they are primarily fruit-eating primates, they also eat leaves, flowers, and insects (Ziegler et al. 2017). Their population size and general health are significantly influenced by the presence of these food sources in their habitat. Variations in fruit population dynamics are caused by changes in fruit availability brought on by anthropogenic or seasonal factors.

To secure the survival of the species by providing bigger and more connected habitats, conservation initiatives have been launched to safeguard the mona monkey and its habitat in protected areas and wildlife corridors (Gadsby et al. 2020). Furthermore, educating people about the value of protecting the Mona monkey and its natural habitat is crucial to ensuring the survival of the species for future generations.

2. MATERIALS AND METHOD

2.1 Study area

The grove, one of the few remaining examples of a rainforest in Nigeria, has a core area of 75 hectares and is a prime example of a real primary rainforest, which is rapidly disappearing in the West African Sub-region. The Osun Osogbo World Heritage Site is situated in Osun State, southwestern Nigeria, along the banks of the Osun River in the Osogbo Local Government Area. The coordinates of its location are 7° 45' 02" N and 4° 33' 08" E. The holy grove is located on a high area that is roughly 350 meters above sea level on the edge of Nigeria's southern woods (NCMM 2019). The primary vegetation types in the OOWHS rain forest ecosystem are savanna trees, thicket islands, and grasslands (Wahab 2014).

In 1965, The Grove was initially designated as a National Monument. To safeguard the entire 75 hectares, this original designation was expanded and changed in 1992.

The Federal Government of Nigeria granted the Government of Osun State trusteeship for the Grove under the Land Use Act of 1990. Traditional practices, such as prohibitions against fishing, hunting, poaching, tree cutting, and farming, as well as myths and taboos, have been employed to safeguard the site against potential dangers. Osun Oshogbo Scare Grove is included in the National Tourism Development Master Plan, which was created in collaboration with the United Nations Development Program (UNDP) and World Tourism. It is also a significant hub for the conventional IFA oracle divination knowledge system.

The Osun Osogbo Sacred Grove was named a UNESCO World Heritage Site in 2005 in honor of its cultural and natural value. The UNESCO inscription has contributed to increasing public awareness of the grove's conservation and preservation efforts, guaranteeing the grove's survival for upcoming generations (NCMM 2019).

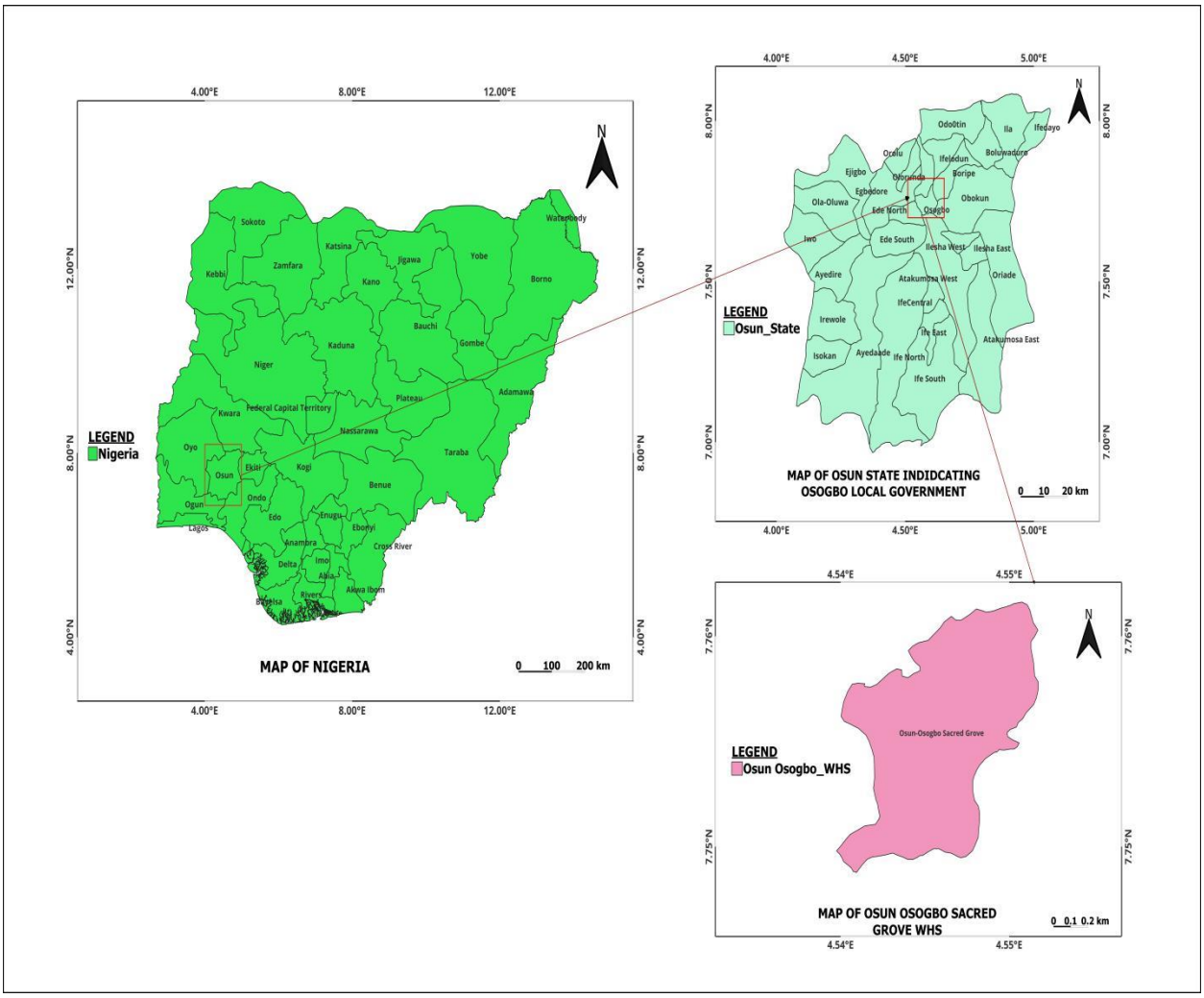

Figure 1: Map Showing the location of Osun Osogbo World Heritage Site

2.2 Sampling technique

For the population census, the total count approach was applied online transects (Olaleru et al. 2020; Spaan et al. 2017). Using the line transect approach to survey mona monkeys, the following assumptions were made. 1) The transect clearly shows the presence of every mona monkey. 2) Before being noticed, mona monkeys stay on the transect.3) There is precise distance measuring and the Mona monkeys' placement is not affected by transects.

For this investigation, distance measurements were gathered using line transects. Due to its relative simplicity, accuracy, speed, cost-effectiveness, and precision, it is the primary approach used to survey diurnal primates.

2.3 Field Procedure for Ecological Data Collection

Five transects were randomly and systematically selected from the study area using preexisting or established trails, tracks, and roads as transect lines. Each transect measured approximately over 0.15km and had a width of 0.02km. The transects were divided into two groups: one from the grove's first market and second palace side, one from its other side known as the first palace, and two from the main road between the two sides. To facilitate the identification of animal locations on transects, distances were indicated with flagging tapes at intervals of 0.05 km.

The survey was carried out for a total of four months from March to June 2023. In four days over the course of a month, enumerations were done between the hours of 8:00 am and 3:30 pm. At least two observers counted the monkeys they saw inside each transect interval as the transects were walked at the 1.5 km/h advised by White and Edwards. The transects began at the main entrance gate and went through the grove. Witnesses counted the monkeys from both sides of the transect for ten to fifteen minutes after spotting a group. Every fifty meters, there was a ten-minute rest period. When a single Mona monkey (*Cercopithecus mona*) was sighted within 20 meters of a troop, it was regarded as a member of the group, increasing the likelihood of finding other Mona monkeys that might hide or run away when approached. Other primate species that were sighted within 20 meters of Mona monkey sightings were also recorded.

The parameters were recorded using a Garmin eTrex 30X GPS, which was used to monitor the species name, time of observation, estimated population size, sighting distance, names of the trees the species was spotted on, and sighting positions (coordinates). Signs of illegal grazing, noise pollution, animal disturbance, and the gathering of non-timber forest products (NTFP) were also seen on transects. The entire hike was 5.2 km. The troop size and composition were analyzed based on the gender and body size of everyone. They were separated into alpha males, adult males, adult females, and juveniles. The alpha males were the biggest guys in the group. Males were larger than females in adulthood due to sexual dimorphism. All adult males were identified by well-developed testicles. Adult females were noticed by protruded of the nipples of nursing females

Those who were not reliant on their mothers and were larger than infants but smaller than adult men or females were considered juveniles. Maternal clinging has been observed in infants (Olaleru et al., 2020). The diet and feeding patterns of the mona monkeys were studied using the direct observation approach during the transect walk. It was noted which plant species the animal consumed as well as the sections of them.

2.4 Method of data analysis

The data were analyzed using both descriptive and inferential statistics, with the results shown in tables. The population of the troops was examined for significant differences ($P < 0.05$) using the Duncan test. The study was performed using the Duncan test in the Statistical Package for the Social Sciences (SPSS) version 23 (IBM Corp., 2015).

By methodically inspecting several transects marked inside the grove and recording and gathering data (such as animal observations and GPS locations), it was possible to examine

the geographical distribution of Mona monkeys and pinpoint areas of high and low abundance. The method as described by Akinsorotan (2017) was used to determine the encounter rate and species relative abundance for the species (Equations 1 and 2).

Mean Encounter Rate = Number of sightings/Total distance walked
Equation (1)
Species relative abundance= Species abundance/total abundance x 100
Equation (2)

3. RESULTS

3.1 Mean Encountered Rate

The species' encounter rate, according to the survey was 6.9 troops/km. It demonstrates that 6.9 troops of the species were seen for every kilometer travelled along the transects.

3.2 Population Size and Relative Abundance

According to the findings, there were 220.75 mona monkeys on average in the Osun Osogbo World Heritage Site. Table 1 also displays the relative abundance of mona monkeys. Transect A had the largest relative abundance of Mona monkeys, with a relative frequency of 0.353. With a score of 0.345, Transect B exhibited the second-highest relative abundance. At a value of 0.22, Transect C showed a moderate relative abundance of mona monkeys. At a value of 0.058, the relative abundance of mona monkeys in Transect D (the Ontoto market region) was comparatively low. Transect E had the lowest relative abundance of mona monkeys (0.024) of all the transects (Table 1).

3.3 Group Composition

During the investigation, the mean group structure of mona primates in Osun Osogbo World Heritage Site was noted. A balanced sex ratio within the mona monkey (*Cercopithecus mona*) groups is compatible with the research's findings, which showed an average of 48 adult females and 46 adult males in the survey. We witnessed eight Alpha Males in all. With an average of 21.25 infants during the survey, an average of 97.5 juveniles was alsorecorded.

3.4 Troop Size and Analysis of Variance for the Troop Size

The average troop size of mona monkeys seen in Osun Osogbo World Heritage Site was investigated during the survey. Table 3 also showed the average troop size for each troop, with the greatest estimated troop size being 48.5 ± 2.65 (T7) and the lowest estimated troop size being 5.25 ± 1.50 (T9).

3.5 Food and Feeding Habits

During the survey, observations about the eating and drinking behaviors of mona monkeys were looked at. *Elaesis guineensis* is the most consumed and favored plant, with its fruits being used as food (Table 5). On the other hand, *Alstonia boonei* was found to be the least used plant species in the grove by the mona monkeys, with its leaves being used as food.

Table 1: Relative Abundance and average population size of Mona Monkeys in Osun Osogbo WHS.

Transects	Replicate	No of colonies	No of individuals	Total no of individual per transect	Average no of individual per transects	Relative abundance	Percentage %
A	1	3	77				
	2	3	82	312	78	0.353	35.3%
	3	3	73				
	4	3	80				
B	1	3	82	305	76.25	0.345	34.5%
	2	3	78				
	3	3	75				
	4	3	70				
C	1	1	49				
	2	1	52				
	3	1	47	194	48.5	0.22	22%
	4	1	46				
D	1	1	17				
	2	1	8	51	12.75	0.058	5.8%
	3	1	11				
	4	1	15				
E	1	1	4				
	2	1	6	21	5.25	0.024	2.4%
	3	1	4				
	4	1	7				
Total				883	220.75	1	100
Average Population Size					220.75		

Note that Transect A= Main entrance gate, Transect B=from the metal gate along the first palace to the suspended bridge area, Transect C= from metal gate area to the boundary of Fountain University and the grove, Transect D= Ontoto market area and Transect E=second place area

Table 2: Group Composition of mona monkeys in Osun Osogbo World Heritage Site

Troops	Replicate	Alpha Male	Adult Female	Adult Male	Juvenile	Infant	Total
T1	1	1	4	3	2	2	12
	2	1	2	6	15	1	25
	3	1	3	5	6	2	17
	4	1	2	3	8	1	15
T2	1	1	12	6	6	3	28
	2	1	5	3	5	2	16
	3	1	4	4	7	2	18
	4	1	4	7	8	2	22
T3	1	1	10	7	15	4	37
	2	1	12	6	17	5	41
	3	1	10	8	15	4	38
	4	1	9	9	18	6	43
T4	1	1	4	2	10	0	17
	2	1	3	2	7	1	14
	3	1	4	3	7	1	16
	4	1	2	6	6	0	15
T5	1	1	10	6	15	3	35
	2	1	8	8	18	5	40
	3	1	6	7	13	4	31
	4	1	4	5	8	4	22
T6	1	1	4	7	16	2	30
	2	1	2	4	15	2	24
	3	1	7	5	13	2	28
	4	1	8	7	14	3	33
T7	1	1	13	10	20	5	49
	2	1	12	9	24	6	52
	3	1	13	6	22	5	47
	4	1	6	8	25	6	46
T8	1	1	3	5	7	1	17
	2	1	2	2	3	0	8
	3	1	2	4	4	0	11
	4	1	2	5	6	1	15
T9	1	0	0	1	3	0	4
	2	0	0	2	4	0	6
	3	0	0	1	3	0	4
	4	0	0	2	5	0	7
Total		32	192	184	390	85	883
Average		8	48	46	97.5	21.25	220.75

Table 3: Average Troop Size of Mona Monkeys Sighted in Osun Osogbo World Heritage Site

Month	Troop 1	Troop 2	Troop 3	Troop 4	Troop 5	Troop 6	Troop 7	Troop 8	Troop 9
March	12	28	37	17	35	30	49	17	4
April	25	16	41	14	40	24	52	8	6
May	17	18	38	16	31	28	47	11	4
June	15	22	43	15	22	33	46	15	7
Average Troop Size	17.25± 5.6	21±5. 29	39.75±2. 75	15.5±1. 29	32±7. 62	28.75±3. 78	48.5±2. 65	12.75±4. 03	5.25±1. 50

Significant differences in the study were found among the troops based on observations made from the analysis of variance results for troop size. As seen in (Table 4), it was demonstrated that there were no appreciable variations among all the soldiers.

Table 4: Analysis of variance for Troop size of mona monkeys in Osun Osogbo World Heritage Site.

Troop	Average Troop Size
T1	17.25 ± 5.56^{b}
T2	21.00 ± 5.29^{b}
T3	39.75 ± 2.75^{cd}
T4	21.50 ± 13.03^{b}
T5	32.75 ± 8.14^{c}
T6	32.00 ± 8.21^{c}
T7	48.50 ± 2.65^{d}
T8	12.75 ± 4.03^{ab}
T9	5.25 ± 1.50^{a}

Note: Mean with same superscript are not significantly different from each other (P = 0.05)

3.5 Food and Feeding Habits

During the survey, observations about the eating and drinking behaviors of mona monkeys were looked at. *Elaesis guineensis* is the most consumed and favored plant, with its fruits being used as food (Table 5). On the other hand, *Alstonia boonei* was found to be the least used plant species in the grove by the mona monkeys, with its leaves being used as food.

3.6 Spatial Distribution of Mona Monkeys within the World Heritage Site

During the study, a survey of the spatial distribution of mona monkeys in Osun Osogbo World Heritage Site was conducted. It can be concluded that the distribution of *Cercopithecus mona* in the grove is primarily driven by food sources, such as fruit trees, and that the species was most abundant in habituated areas with humans. The transects that are closest to these habituated areas, such as transects A, B and C, are concentrated with more species of mona monkeys, whereas this species is slightly distributed at transect D and E (Figure 2).

Table 5: Plants species and parts utilized by mona monkey (*Cercopithecus mona*) in the study area

Troop	Plant species	Common name	Local name	Parts Utilized	Plant Form	Family
T1	*Bambusa vulgaris*	Common bamboo	Oparun	leaves	Tree	Poaceae
	Annona senegalensis	African custard-apple	Arere	Fruit	Tree	Annonaceae
	Albizia procera	White siris tree	Ayunre	Seeds	Tree	Fabaceae
	Elaesis guineensis	Palm tree	Igi ope	Fruit	Tree	Aracaceae
T2	*Annona senegalensis*	African custard-apple	Arere	Fruit	Tree	Annonaceae
	Albizia procera	White siris tree	Ayunre	Seeds	Tree	Fabaceae
	Funtumia elastic	Silk rubber	Ire	Fruit	Tree	Apocynaceae
	Cola millenii	Monkey Cola	Obi- edun	Fruit/seeds	Tree	Sterculiaceae
	Anthocleista djalonensis	Cabbage tree	Sapo	Fruit/seeds	Tree	Gentianaceae
	Elaesis guineensis	Palm tree	Igi ope	Fruit	Tree	Aracaceae
T3	*Cola millenii*	Monkey Cola	Obi edun	Fruit/seeds	Tree	Sterculiaceae
	Anthocleista djalonensis	Cabbage tree	Sapo	Fruit/leaves	Tree	Gentianaceae
	Antiaris toxicaria	Sacking	Ooro	Fruit	Tree	Moraceae
	Lecaniodiscus Cupanioides	Monkey Pot	Aka	Fruit	Tree	Sapindaceae
	Elaesis guineensis	Palm tree	Igi ope	Fruit	Tree	Aracaceae
T4	*Ceiba pentandra*	White-silk cotton tree	Araba	Fruit	Tree	Malvaceae
	Lecaniodiscus cupanioides		Aka	Fruit	Tree	Sapindaceae
	Anthocleista djalonensis	Cabbage tree	Sapo	Fruit/seeds	Tree	Gentianaceae
	Elaesis guineensis	Palm tree	Igi ope	Fruit	Tree	Aracaceae

4. DISCUSSION

According to a survey carried out at the Osun Osogbo World Heritage Site, an average of 6.9 troops of mona monkey troops were found per kilometer using the line transect method. Put differently, we observed about 6.9 troops for every kilometer we went along the transects. This suggests a rather healthy mona monkey population in the research region. Compared to Uloko and Lameed (2019) in the Omo Forest Reserve, the estimated mean encountered rate of 6.9 km^{-1} was higher. The average population size of mona monkeys in Osun Osogbo World Heritage Site appeared to be 220.75 which was higher than that of 57 mona monkeys reported by Uloko and Lameed (2019) in Omo Forest Reserve but was lower than that of 247 individuals reported by Williams (2017) in Lekki Conservation Centre. A high population size of mona monkey (*Cercopithecus mona*) observed in Osun Osogbo WHS could be attributed to its lack of predators as traditional activities have been used to protect the site from any form of threats such as traditional laws, customs, myths, and taboos that forbid and prohibit people from killing this species of monkeys in the grove. . The highest relative abundance of aona monkeys was observed in Transect A(around the main entrance gate to metal gate), where we encountered

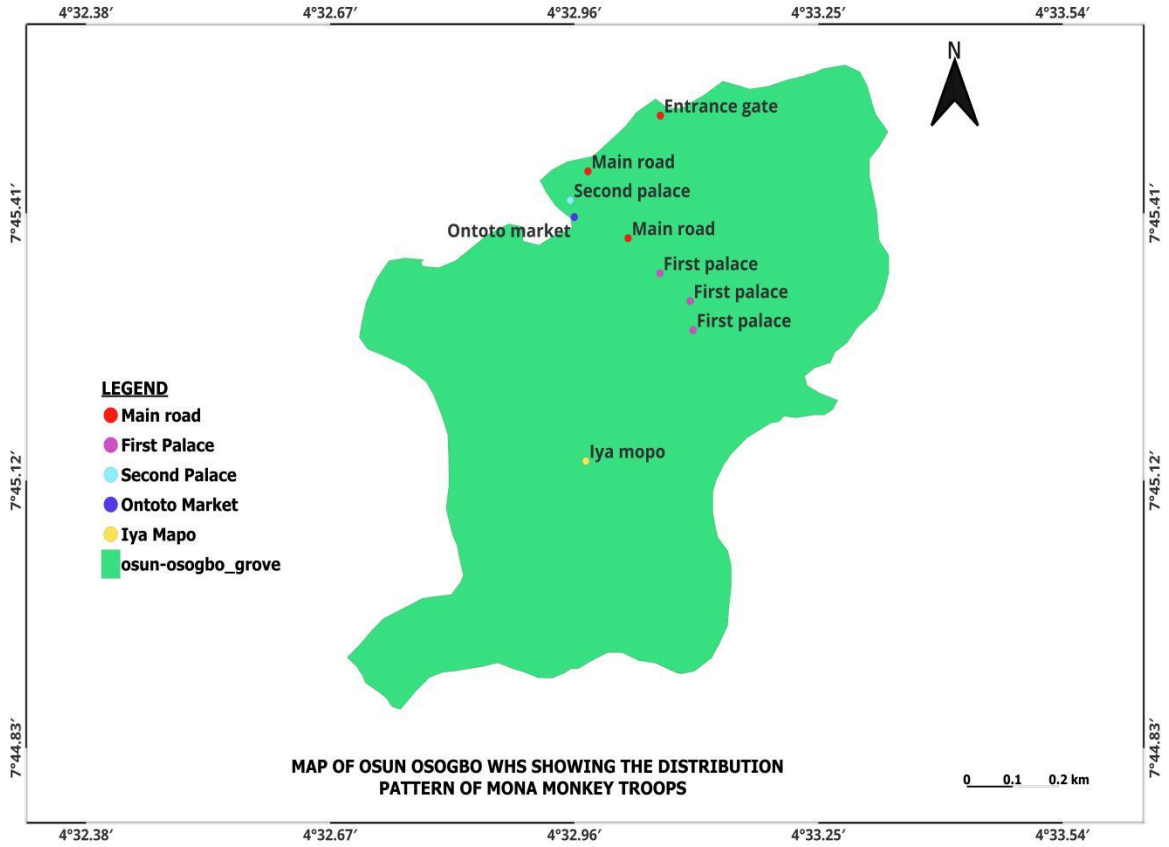

Figure 2: Map of Osun Osogbo Sacred Grove WHS showing the distribution pattern of mona monkey.

the species at a relative frequency of 0.353. This suggests that Transect A had the most significant number of mona monkey (*Cercopithecus mona*) individuals or groups during the survey. Transect B (from the metal gate along the first palace to the suspended bridge area) had the second-highest relative abundance, with a value of 0.345. This indicates a substantial presence of mona monkeys in this transect, though slightly lower than in Transect A. Transect C (from metal gate area to the boundary of Fountain University and the grove) exhibited a moderate relative abundance of mona monkeys, with a value of 0.22. While this value is lower than those of Transects A and B, it still indicates a notable presence of the species in this area. Transect D (Ontoto market area) had a relatively low relative abundance of mona monkeys, with a value of 0.058. This suggests that the number of encounters in this transect was considerably lower compared to the other transects surveyed. Transect E (second palace area) showed the lowest relative abundance of mona monkeys among all the transects, with a value of 0.024. This indicates that the presence of mona monkeys was scarce in Transect E during the survey. The variation in relative abundance across the five transects suggests that mona monkeys are not uniformly distributed within the Osun Osogbo World Heritage Site. Transects A and B appear to be

hotspots for the species, with the highest encounter rates and relative abundance, while Transects D and E seem to have lower numbers of mona monkeys. The areas with the highest relative abundance of species were those along the main road (transect A), the first palace (transect B), and Iya Mopo (transect C). Conversely, the areas with the lowest relative abundance were those near the second palace (transect E) and the Ontoto market (transect D). These differences can be attributed to factors such as the variation in fruit tree abundance across each transect, supplemental feeding provided by Osun Osogbo WHS management, and sufficient food provided by tourists. The population is growing because the research area is small and there is no hunting of mona monkeys, because they are well protected by customs, taboos, and beliefs. As an alpha male always leads a troop, it was easy to spot them in groups, and the presence of one in a troop signified that troop's seniority (Olaleru et al. 2020). A systematic social hierarchy exists within the mona monkey groups, as evidenced by the observation of eight Alpha Males in total. The number of alpha males in the research region corresponds to the number of unique social units or troops. Alpha males are dominant individuals who usually lead the group. Alpha men are essential to the upkeep of group cohesiveness and successful group functioning (Haus, 2018). A balanced sex ratio within the mona monkey (*Cercopithecus mona*) groups is consistent with the research's findings, which showed a total of 48 adult females and 46 adult males during the survey. There are comparatively many young people making the transition from infancy to maturity in the research region, as evidenced by the presence of 97.5 juveniles. Ensuring the survival and successful development of juveniles is crucial for maintaining balanced population dynamics, as they are essential for the future expansion of the population. The youngest and newborns are most vulnerable. Because mothers provide most of the care and protection for their infants, their survival is crucial to the long-term viability of the population. While larger than the 3 to 12 mona monkeys per group observed by Bukie et al. (2021), the nine (9) groups of mona monkeys observed in this study area and the estimated number per group, which ranged from average of 3 to 49 individuals, were closely similar to the average of 7 and 51 individuals per group reported by Olaleru et al. (2020). As a survival tactic, these sizable groups, nevertheless, can be the result of the merging of multiple groups. This study has demonstrated that the mona monkey is, in fact, a problematic species, as previously thought (Bukie et al. 2021). Because of their proximity to the adjacent village, the people who were frequently discovered in this location appeared to be reaping the benefits of raids, and the troop in the second palace lacked an alpha male. At the Lekki Conservation Center, the largest troop size of 48.25 ± 2.65 was found to be greater than the 32.75 ± 4.11 recorded by Olaleru et al. (2020) as well as the 20 ± 1.9 reported by Odewumi and Ogunjemite (2016).

There was no significant change in T1, T2, T4, and T8; there was also an estimated non-significant difference in T3, T5, and T6. The results of this survey indicate that the primary food source for the *Cercopithecus mona* species found in the Osun Osogbo World Heritage Site is fruits and seeds. These findings are consistent with those of Olaleru et al. (2020), who found that the primary food source for mona monkeys in a strictly private nature reserve is fruits and seeds. The survey concluded that fruit pulp is a superior source of carbohydrates for monkeys Lambert et al (2015). Since most of the plant materials that are fed on have seasonal fruiting, while some, like palm trees, are available year-round, *Elaeis guineensis* was the most used species of flora in the grove. It may be because *Alstonia boonei* is not a major food source for the species, or because its fruit is not available all year round, that the mona monkeys appear to consume the least of it. The availability and accessibility of food may vary with the seasons. The monkeys' eating habits may change at different periods of the year depending on the availability of various fruits and food items. It can be concluded that the distribution of *Cercopithecus mona* in the grove is primarily influenced by food sources, such as fruit trees, and that the highest abundance of the species occurs in areas where humans have become accustomed, which is consistent with the availability of extra food provided by tourists. These findings are supported by Matsuda's

research (2020). More species of mona monkeys are concentrated in the transects near human-habitat areas (first palace, main road, and Iya Mopo area). In contrast, this species was slightly dispersed in the Ontoto market and second palace area, which may be due to a lack of fruit trees and insufficient supplemental feeding, as suggested by (Wahab 2014). More significantly, *Elaeis guineensis* was more common in Transects A, C, and B, which had more fruit trees. This species has been noted as the most exploited species of monkeys in the grove. *Cercopithecus mona* was found to be more prevalent in these locations (Wahab et al. 2017). Troops have been seen stopping by the side of the road at specific times, generally in the afternoon or early in the morning, to wait for farmers to arrive from fields close to the Osun Osogbo WHS buffer zone. Farmers typically pass the main road that runs to the outside of the grove and towards Fountain University. The primates have become accustomed to waiting for the farmers at the side of the road as they are returning from their agricultural settlements because these farmers kindly give away some of their gathered fruits and crops (such as maize, bananas, and mangos) to the animals.

5. CONCLUSION

The availability of food sources determines the distribution and abundance of the species (*Cercopithecus mona*). Data on the prevalence and distribution of the primate species, as well as factors affecting their range in connection to the kinds of vegetation and canopy layers that support their arboreal activities, were provided by the study. The study found that the relative abundance of mona monkeys at Osun Osogbo World Heritage Site is highly significant for conservation status, management, and development. It also illustrates the significance of the species in ecosystem dynamics and how they are seen as indicators of the ecosystem's overall health. The existence and abundance of this species act as markers for the condition of the forest and the availability of essential resources.
Thus, the study's findings are relevant for the efficient and fruitful management of the forest reserve with comparable biological circumstances and the Osun Osogbo World Heritage Site. It is recommended that more research be done on population dynamics evaluation based on the number of criteria that best fit the population index, and the kinds of primates found in the Osun Osogbo World Heritage Site and Reserve. This will help grow ecotourism in areas with similar ecosystems.

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