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ABUNDANCE AND DISTRIBUTION OF THE GREAT BLUE TURACO (*Corythaeola cristata*) IN OKOMU NATIONAL PARK, EDO STATE, NIGERIA

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Abstract
The Great Blue Turaco (GBT) is widely distributed across the tropical West and Central Africa, including Nigeria. Few studies have shown the ecology of the bird but documented research on the Great Blue Turaco's abundance and distribution is sparse. This study assessed the abundance and distribution of Great Blue Turaco within Okomu National Park, Edo State, Nigeria. Ten Point transects with a radius of 20m each, separated by at least 100m apart, were established in each range with the aid of a Global Positioning System. Survey was carried out for 15minutes at each count station. All the sites were surveyed per week in a month during morning (7:00 - 10:00 hour) and evening (15:00 - 18:00 hour). Data was collected for five months: Wet Season (August - October) and Dry Season (November - December). All GBT encountered (sighted and calls) were recorded. The overall mean GBT abundance across all sites was 1.710 (SD = 0.824), with Julius Creek recording the highest mean (2.000, SD = 0.894) and Babui the lowest (1.000, SD = 0.000). Findings from this study revealed no significant difference in bird abundance across the sites, suggesting GBT can utilize different habitats evenly as well as a relatively uniform habitat conditions including resource availability pattern. Independent samples t-tests showed no significant variation in bird abundance between morning and evening observations (p = 0.774), nor between wet and dry seasons (p = 0.564). Pielou's Evenness Index (e = 0.917) suggested an even distribution of birds across study sites.

Keywords: *Great Blue Turaco, Abundance, Distribution, Okomu National Park, Seasonal variation*

Introduction

Anthropogenic activities is one of the major factors contributing to biodiversity loss, globally (Akande *et al*., 2022a). In the last four centuries, human factors such as encroachment and poaching have led to the loss and elimination of about 127 of approximately 9672 modern bird species (Okosodo and Okosodo, 2020). Numerous nations, especially developing nations, are undergoing swift population expansion, leading to increased strain on natural environments, indigenous plant and animal life, including bird species. Birds

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play a significant role in the establishment of climax communities and also several ecological functions such as being excellent bioindicators of the ecosystem's health (Olajesu, *et al.,* 2022). In the same vein, frugivorous birds, such as the Great Blue Turaco (GBT), play vital roles in seed dispersal of fleshy fruit producing plants, and plant pollinator (Turshak and Abdullahi, 2024).

The Great Blue Turaco (*Corythaeola cristata*) is considered the most important Turaco species in the Musophagidae family (Okosodo *et al.,* 2022). They are a unique group of birds endemic to Africa having ecological, cultural, and economic significance. One of the major threats faced by the bird, as discovered by Winiarska *et al.* (2024), is habitat loss, fragmentation due to deforestation, agricultural expansion, hunting and logging (Akande *et al.,* 2022b; Olajesu, *et al.,* 2025). Riegert *et al.* (2021) study underscores that illegal hunting is a possible factor that contributed to the near extinction of the Great Blue Turaco in Cameroon. In a recent study, Winiarska *et al.* (2024) suggests that long-term monitoring programmes of the Great Blue Turaco is especially important as it may soon disappear from Bamenda Highlands. Based on the rate of alarming declines of birds and other wildlife species across the globe, there has been an increase in the quantification of bird species abundance. Determining the abundance, status, and distribution of this distinct group of birds in various nations and areas is crucial and significant in environmental impact assessment, and particularly in ecological research and conservation planning (Sabo *et al.,* 2024).

The presence, availability, and location of environmental resources, which is largely determined by seasonal changes, majorly affects the abundance of bird species (Lawal *et al.,* 2020). Species occurrences and abundances drive the assortment of biological communities through local habitat structures which make a site suitable for species, and by the landscape context which makes areas where habitat types occur accessible to species (Basile *et al.*, 2021).

Measuring the abundance of wildlife species is crucial for the fields of ecology, evolution, and conservation, and is pivotal to improving the ecological system of a given ecosystem (Callaghan *et al.*, 2021). Though understanding how species abundance and diversity is key to many enduring inquiries in ecology, a poor understanding contributes to the low rate of conservation and distribution of avian species in the ecosystem (Adebayo and Halidu, 2019).

Study Area

Okomu National Park is an 181km^2 area of land located within the 1082km^2 Okomu forest reserve in Ovia Southwest local government area of Edo state. It was formerly known as Okomu wildlife sanctuary until May 1999 when it became a full-fledged National Park through the provision of Decree 46 of 1999. The park is located 60 km northwest of Benin city, south of Udo town; the nearest major settlement of the National Park.

The park topography ranges from 30m to 60m above sea level. Rainfall in the area is between 1524 and 1540 per annum. The mean annual rainfall temperature is 30ºc. The relative humidity is about 65% in the dry months and 100% during the wet months. It is divided into four major ranges: Arakhuan, Igwuowan, Julius Creek, and Babui Creek. Each range is 15% of the 1,200 km² Okomu Forest Reserve (Oladejo and Eghenure, 2021). The ranges have distinct vegetation and

anthropogenic influences. The park lies within a latitude of 6°15′ N to 6°25′ N and a longitude of 5°09′ E to 5°23′ E (Digun-Aweto, 2024).

The Julius creek range is characterised by freshwater swamp forest. It is prone to flooding which in turn helps a set of plant species to adapt to wet seasons. The Iguowan range is dominated by tall trees with dense canopies. The Arakhuan range is characterised by a secondary forest with short trees and shrubs. It is also impacted by human activities. While the Babui creek range is dominated by open grasslands with scattered and fewer trees and shrubs. The trees common to the park include *Kapok, Celtis zenkerii, Triplochiton scleroxylon, Antiaris Africana, Pycnathus angolensis* and *Alstonia congensis*. It serves as habitat for many endangered species of flora and fauna including the forest elephant, Loxodonta cyclotis, African Grey Parrot and *Corythaeola cristata* the Great Blue Turaco.

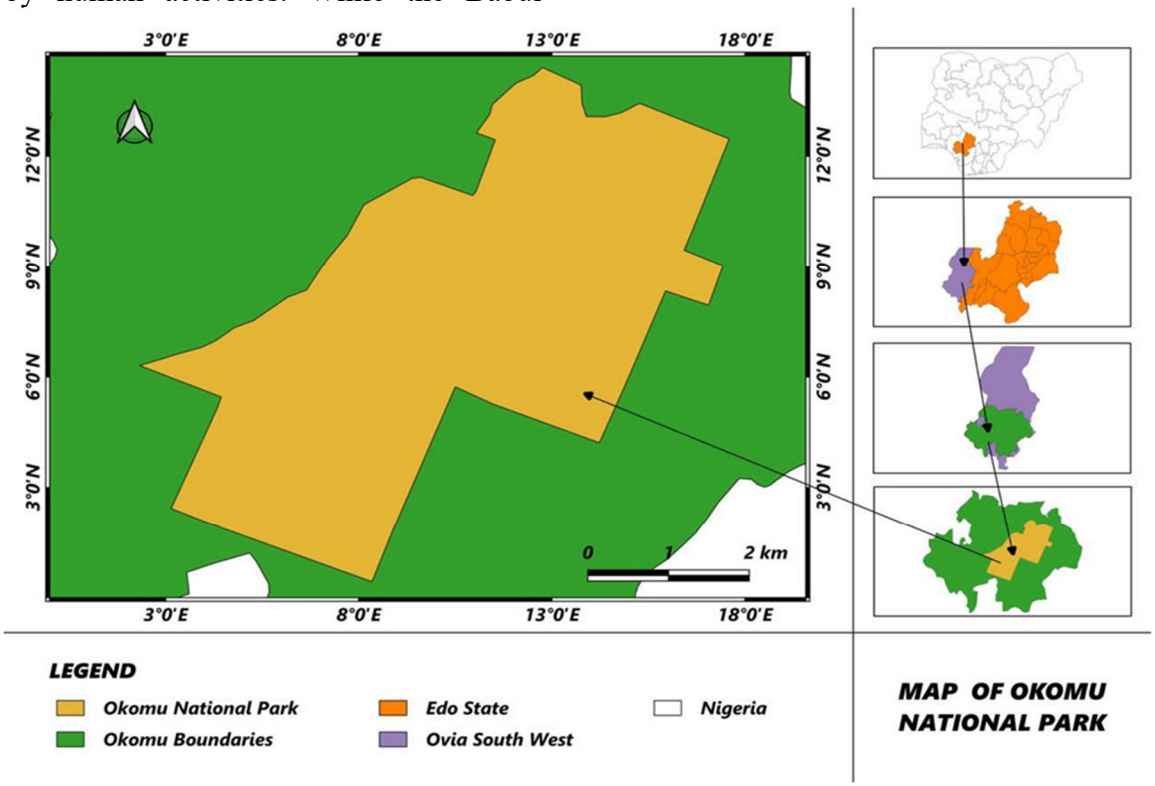


Fig. 1: Map of the Study Area
Source: Olajesu *et al.* (2026)

Materials and Method

Data Collection

Data was gathered using point transect method. For each sampling site, ten (10) point count stations with a 20m radius were established (at least 100m apart) with the aid of a Global Positioning System (GPS) and observation recorded for 15 minutes on each point. Observations were made in the morning (7:00 - 10:00 hour) and evening (15:00 - 18:00 hour) once (first week) a month over a five-month period from August to December, which included, wet season (Aug - Oct) and dry season (Nov - Dec). All GBT that were sighted and calls were documented.

Data Analysis

Analysis of variance (one-way ANOVA) was employed to determine the variation in the abundance of Great Blue Turaco. Independent sampling T-tests was used to show seasonal variations. The relative abundance of Great Blue Turaco was calculated using

$$A = \frac{n}{N} \times 100$$

Where A = relative abundance
n = number of Great Blue Turaco in the site
N = Total number of Great Blue Turaco in the study area

Results and Discussion

The result presented below in Table 1 showed the abundance of Great Blue Turaco across the study sites. The overall mean of bird observations per range was 1.710 with a standard deviation of 0.824, implying a low to moderate variability of bird numbers across different observation points. The minimum to maximum values recorded span from 1 to 4 birds per observation. Arakhuan range shows a mean of 1.560 with standard deviation of 0.527, indicating that bird counts in that range were stable. The average mean value at this range seems to imply that Arakhuan might be a consistent habitat place with stable food availability and vegetation cover to host the bird species (Olajesu *et al.,* 2022). On the other hand, Babui had the lowest bird count with a mean of 1.000, and a standard deviation of 0.000. This shows that Babui contains data with exactly one observation of the bird species. This could be because of less favorable habitat conditions, or environmental constraints including limited food resources, higher predation as well as high level of human disturbances (Winiarska *et al.,* 2024; Olajesu *et al.,* 2025).

Iguowan has a mean of 1.850 and standard deviation of 0.987, which is higher compared to all other groups (Table 1). The high value could be because of food availability and habitat stability. Julius Creek has the highest mean of 2.000 with a standard deviation of 0.894. This could be because of food availability, bird density or vegetation density.

Table 1: Abundance of Great Blue Turaco across the Study Sites

S/No	Range	N	Mean	Std. Deviation
1	Arakhuan	9	1.56	0.527
2	Babui	3	1.00	0.000
3	Iguowan	13	1.85	0.987
4	Julius Creek	6	2.00	0.894
	Total	**31**	**1.71**	**0.824**

Statistical Tests for Differences in Abundance

Bird abundance was tested with a one-way ANOVA to see if abundance was significantly different across the four study sites or ranges (Table 2). The *p value* (0.314), which is greater than 0.05, indicates that there is no statistically significant difference in bird abundance across the sites.

This test shows that any change in bird counts across the ranges is probably random and not due to ecologically significant difference. The similar abundance patterns might suggest that habitat conditions, food availability or environmental factors at the sites do not

differ greatly enough to affect bird distribution. Moreover, there may be homogeneity due to bird movement between sites.

Table 2: ANOVA test for Differences in Abundance

	Sum of Squares	**Df**	**Mean Square**	**F**	**P-Value**
Between Groups	2.473	3	0.824	1.242	0.314
Within Groups	17.915	27	0.664		
Total	20.387	30			

To further compare bird abundance between morning and evening observation, an independent sample t-test was conducted (Table 3). Mean bird count in the evening was 1.78 (SD = 0.833) and in the morning it was 1.68 (SD = 0.839). A t-test of bird abundance gave a t value of -0.29, p = 0.774 which is greater than 0.05. This implies that there is no statistically significant difference in abundance of the bird between the two periods.

The result then indicates that birds are equally active during both the morning and in the evening observation periods without a strong preference for one or the other. This may suggest that environmental variables such as temperature, food availability, or susceptibility to predation risks are probably not significantly different between those periods in the study area. The observed bird species (Great Blue Turaco) in Okomu National Park clearly exhibit diurnal activity patterns, which could account for the relatively stable counts during the day. This is because they are most commonly heard at dawn and dusk and also during mating season.

Table 3: Independent samples t-test showing bird abundance between morning and evening observations

Period	**N**	**Mean Bird Count**	**Std. Deviation**	**p-value**
Morning	22	1.68	0.839	0.774
Evening	9	1.78	0.833	

Also, for the seasonal variations in Great Blue Turaco Abundance, the independent samples t-test analyzed whether the Great Blue Turaco population displayed different levels in abundance between the wet and dry seasons (Table 4). Result showed that mean in wet season reached 1.80 birds (SD = 0.941) whereas the dry season recorded a mean of 1.63 (SD = 0.719). The statistical test (t = 0.584, p = 0.564) showed that the increase in abundance observed in the wet season was not a significant difference.

The Great Blue Turaco population demonstrates a steady equilibrium of numbers which remains constant throughout different seasons. The rise in wet season abundance might result from an increased availability of fruit-bearing trees and elevated moisture levels leading to better food conditions. The dry season brings about lower productivity among fruiting trees which may have caused the Great Blue Turacos to extend their foraging movements. Seasonal fluctuations seem to have minimal impact on Great Blue Turaco populations because this species readily relies on diverse food sources available throughout each year.

Table 4: Independent samples t-test showing seasonal variations in bird abundance

Period	N	Mean Bird Count	Std. Deviation	p-value
Wet	15	1..80	0.941	0.564
Dry	16	1.63	0.719	

Conclusion and Recommendations

This study provided insight into the abundance and distribution of the Great Blue Turaco in Okomu National Park. The Great Blue Turacos exist in different habitat in Okomu National Park, although their population density differs but across habitat but not statistically. The Turaco population count at Arakhuan was moderate, but Babui showed the lowest number of sampled Great Blue Turaco individuals. The scarcity of Great Blue Turaco in Babui is presumably correlated to environmental disturbances and reduced tree species richness along with inadequate food availability.

The region with a smaller population of Great Blue Turacos exhibited a reduced number of mature trees, alongside a significant presence of species with small diameters at breast height (DBH), suggesting it is either a neglected forest or an area undergoing regrowth. Earlier research by Campos-Cerqueira *et al.* (2021) supports this finding, as their study demonstrated that birds favor old-growth forests as their habitats, particularly showing a preference for established tree species, especially for larger frugivorous birds like the Great Blue Turaco.

It is therefore recommended that proactive measures be carried out in protecting mature fruit-bearing trees such as *Guarea cedrata, Entandrophragma cylindricum*, and *Ficus mucuso,* as these trees provide essential food sources and appropriate nesting locations. Also, planting native tree species in areas where they are scarce within Babui habitat will improve food availability and draw more species to the restored regions. Engaging local communities through conservation awareness initiatives will help safeguard the species, as these communities play a vital role as seed dispersers and forest regenerators. The survival of the Great Blue Turacos in Okomu National Park may rely on these measures

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