



(RESEARCH ARTICLE)



The assessment of morphometrics characteristics of Clapperton's francolin (*Francolinus clappertoni*) in the Sudan-Sahel Savanna of Nigeria

Luka Yelwa Barde ^{1,*}, Tabita Sule Gaba ², Jamilu Adamu ², Mohammed Ahmed shinge ³, Maryam Sule Yusuf ⁴, Lawan Adamu ⁵ and Sunday Akwara ⁶

¹ African Centre of Excellence for Neglected tropical Diseases and Forensic Biotechnology Zaria, Kaduna State, Nigeria.

² Department of Biology Education, Umar Suleiman College of Education Gashua, Yobe State, Nigeria.

³ Department of social Development, College of Administration, Management and Technology (CAMTECH) Potiskum, Yobe State, Nigeria.

⁴ Department of Philosophical Foundation Umar Suleiman College of Education Gashua, Yobe State, Nigeria.

⁵ Department of Social Studies College of Education and Legal studies Nguru, Yobe State, Nigeria.

⁶ Department of Physics Education Umar Suleiman College of Education Gashua, Yobe State, Nigeria.

GSC Advanced Research and Reviews, 2022, 10(03), 146–150

Publication history: Received on 14 January 2022; revised on 09 march 2022; accepted on 11 March 2022

Article DOI: <https://doi.org/10.30574/gscarr.2022.10.3.0038>

Abstract

Studies on morphometrics, characteristics of Clapperton's Francolin the study conducted in Dala Village of Bade Local Government Area of Yobe State between August 2012 and April 2013. The study aimed at filling in the missing gaps in the knowledge of the species. Sixty (60) individuals' birds were collected by being shot and morphometric measurements taken using mettler weighing balance and a meter rule. The birds were cut open to collect the gut contents for food habit study. The average weight of the bird was 1.03 ± 0.43 kg, while the mean length of the species was 361 ± 30 mm. The body weight of the species showed a significant positive correlation with crook of wings ($r = 0.4$, $p = 0.002$). This was probably an adaptation for sustained flight. Total body length also showed a significant positive correlation with length of tarsus ($r = 0.3$, $p = 0.004$). This might also be an adaptation for flight and fast running.

Keywords: Assessment; Morphometric; Characteristics; Clappertons francolin; Sudan-sahel savanna

1. Introduction

The Clapperton's francolin is one of the resident wildlife of the Sudan Sahel Savanna, which has managed to survive the intense anthropogenic pressure on the wildlife of the area [1]. It is the only francolin of Nigeria Sahel. The species may be distinguish by red eye patch, white supercilium, black bill and dusky-red legs [2] It range from eastern Mali through central Niger to northern Nigeria where it replace Double-spurred Francolin.

The species inhabits sandy, dusty semi-arid scrub savanna with scattered trees such as *Acacia*, *Terminalia* and *Combretum* species [3]. They roosts in trees at night and occasionally during the day, and are usually found in pairs or small covoys [4]. They were sighted feeding on unidentified seeds, insects, small molluscs and berries. The nest is a well concealed scrape on the ground, the eggs are laid between March and May, it have very thick shells and usually dirty white or yellowish brown.

* Corresponding author: Luka Yelwa Barde; Email: bardeluka2009@gmail.com

Department of social Development, College of Administration, Management and Technology (CAMTECH) Potiskum, Yobe State, Nigeria.

As with the habitats of other wildlife species in Nigeria, the habitat of the Clapperton's francolin is undergoing significant natural and human-related degradation [5]. The hardiness of this species makes it a choiced candidate for consideration for domestication, to add to the domestic avifauna of the region. Besides the description of [6], the species has not been characterized as others with similar disposition. This study of the morphometric characteristics of the species is a crucial and sine qua non in that direction. It is the only francolin of Nigeria Sahel [7]. The species may be distinguish by red eye patch, white supercilium, black bill and dusky-red legs [7]. It range from eastern Mali through central Niger to northern Nigeria where it replace Double-spurred Francolin.

The species inhabits sandy, dusty semi-arid scrub savanna with scattered trees such as *Acacia*, *Terminalia* and *Combretum* species [8]. They roosts in trees at night and occasionally during the day, and are usually found in pairs or small covoyos [8]. They were sighted feeding on unidentified seeds, insects, small molluscs and berries. The nest is a well concealed scrape on the ground, the eggs are laid between March and May, it have very thick shells and usually dirty white or yellowish brown [8].

In Nigerian, the local names for Francolins guild are 'Makwarwa' or *Fakara* in Hausa, 'Aparo' in Yoruba, 'Gerral' in Fulani and 'Okwa' in Igbo language. According to [9] the Clapperton's Francolin distribution range stretches across Mali, Niger, Chad, Sudan and Northern Nigeria, where it is an endemic resident in the semi-arid Northern region [10].

1.1. Statement of Research Probelms

The Clapperton's francolin is one of the resident wildlife of the Sudan Sahel Savanna, which has managed to survive the intense anthropogenic pressure on the wildlife of the area.

1.2. Justification for the Study

This study is designed to investigate the external morphology, food habits and some synecological correlates of the species. The result of the study will reveal the morphological characteristics, their food preferences and the essential habitat requirements of the species. The information derivable from the results is necessary for use in future habitat management interventions that encompass areas where the species and its congeners are found and are vital for future decisions to domesticate the species.

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2. Material and methods

2.1. Study Area

The study was carried out in Dala of Bade Local Government Area of Yobe State (Fig. 1) which lies in the Sudan-Sahel Savanna zone of northern Nigeria. The climate of the study area is characterized by a long dry season (from the month of October to May) and a short-wet season of 3 months (June to September). The range of temperature is 12.1°C in January due to cold north easterly harmattan, 29.1°C in June during the rainy season and 39.8°C in April. The location of the site is 12°48'N, 010°46'E, the Elevation is 1132 meters above sea level. Figure 1 is the map of the study site. The human settlement is not far from the habitat where the birds were collected and anthropogenic activities were going on at the site.

2.2. Collection of the Bird

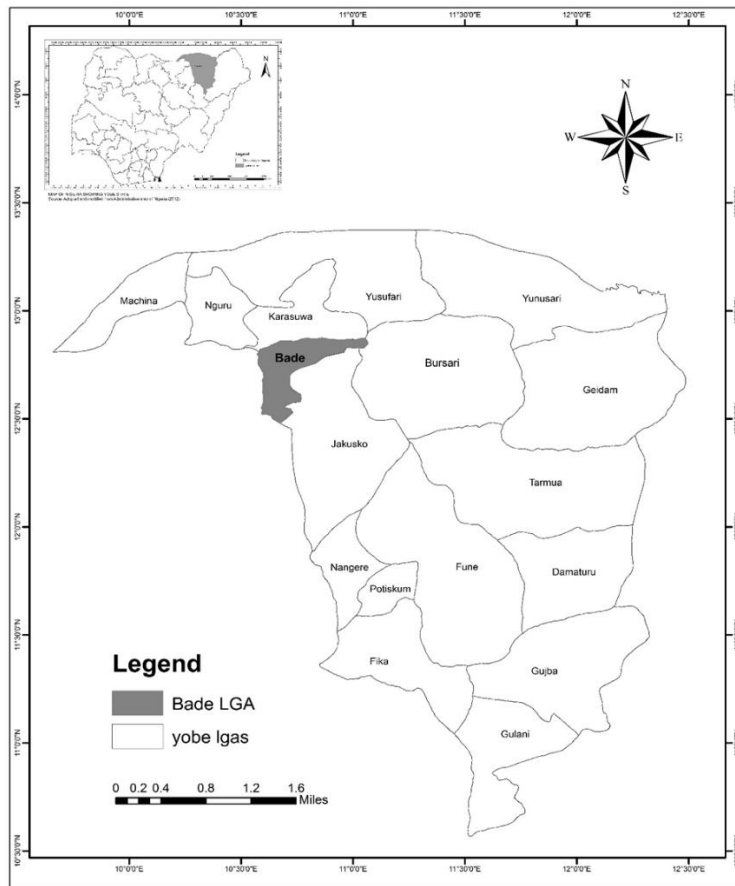
A sample of (Sixty) 60 *Francolinus clappertoni* were collected through shooting at the study area. The birds were preferred instantly killed over trapping to arrest the digestion of food eaten, to enhance identification of the food items fed on. The collection period lasted nine months (August 2012-April 2013).

2.3. Measurement of External Morphological Characters

Upon collection, each bird was taken to the laboratory for morphometric measurement. The morphometric indices measured included; Total Body Length (TL) by placing tailors tape from the bill upto the tail (Rectrices), Crook Wing Length (CWL) from the arm to the primaries, Length of the Bill (LB) from under forehead to the end of the bill, the Spur (SP) is from the edge to the tip of the spur using meter rule, and Tarsus (TR) from the tibia to the tarsus. Figure 2 is showing the morphometric measurements taken while Plates I a and b shows the researcher taking the measurement.

2.4. Data Analysis

Correlation analysis was used to determine relationship between the external morphological characters of the birds.



Source: Adopted and modified from the administrative map of Yobe state (2012)

Figure 1 Map of Yobe state showing Bade LGA

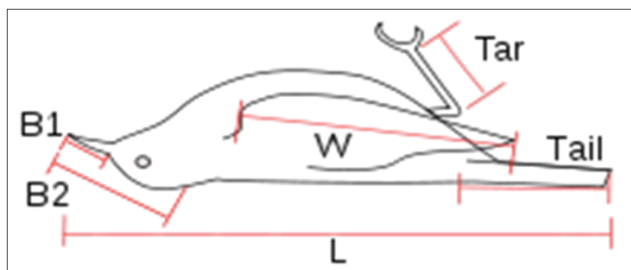


Figure 2 Morphometric Measurement of Birds. (Source: Ornithology Wikipedia Access ,1-05-2014)



Figure 3 The Researcher taking the morphometric indices of the bird (a) measuring the total length of the bird (b)

3. Results

3.1. Morphometric Characteristic of the Species

The morphological characteristics measured from the sixty (60) *Francolinus clappertoni* collected from the study area are presented in Table 1. The mean weight of the birds was 1.03 ± 0.43 kg with a range of between 0.5 kg to 1.8 kg. The crook of wings was 19.9 ± 2.20 mm which range between 17.0 and 27.0 mm in length. The mean total length of the bird was 36.1 ± 3.0 mm and range between 27.0 and 39.2 mm. The mean spur length was 0.49 ± 0.31 mm and range of 1 to 16 mm, while the mean length of tibia/tarsus is 5.7 ± 1.34 mm with a range of between 3 and 7.3 mm. Their mean bill

length was 2.8 ± 0.49 mm in a range of 1.5 and 3.5mm.. The relationship between the morphometric indices of the francolins collected are shown in Table 4. 2. The correlation analysis indicated a positive and significant ($r = 0.4, p = 0.002$) relationship between the body weight and crook of wings, but a negative and non significant ($r = -0.2, p = 0.150$) relationship between body weight and total body length. Similarly, there was a negative and non-significant relationship ($r = 0.2, p = 0.067$) between the crook of wing and total body length. However, total body length showed a significant and positive ($r = 0.3, p = 0.004$) relationship with length of tibia tarsus. The total body length were proportionally and significantly related with the length of bill ($r = 0.5$ and $p \leq 0.0001$), where the length of tibia tarsus was significantly related with a length of bill of the bird ($r = 0.3$ and $p \leq 0.01$).

Table 1 Mean values of the morphological characteristics of *Francolinus clappertoni* (n = 60) Collected in Data

	Morphological parameters					
	Weight (kg)	Crook of Wing length (mm)	Total Body length (mm)	Length of Tibia Tarsus (mm)	Length of Spurs (mm)	Length of Bill (mm)
Mean± S.E.	1.03±0.43	19.90±2.20	36.14±3.00	5.75±1.34	0.49±0.31	2.80±0.49
Range (Min-Max)	0.5 -1.8	17 - 27	27 - 39.2	0.3 -7.3	0.1- 1.6	1.5 - 3.5

Table 2 Relationships between morphometric indices of *Francolinus clappertoni* (n=60).

	W	CW	TL	LT	LS	LB
W	1.0					
CW	0.4	1.0				
TL	-0.2	0.2	1.0			
LT	0.0	0.3	0.4	1.0		
LS	0.0	0.0	0.1	0.0	1.0	
LB	0.0	0.0	0.5	0.3	0.1	1.0

Key: W = weight, CW = crook of wing, TL= total body length, LT = length of tibia / tarsus, LS = length of spur, LB = length of bill.

4. Discussion

4.1. Morphometric Characteristics of the *Clapperton's Francolin*

The morphometric measurements of the species showed that the species is slightly smaller than the Double-spurred Francolin but comparably of same size with other francolins species. The wing length were comparably larger than those of Coqui Francolin, White throated Francolin and Grey-striped Francolins (Borrow and Demey, 2004). The significant positive correlation between the body weight and wing length may probably be an adaptation to ease flight. The heavier a bird, the longer the wing span to enable it fly efficiently. The result also showed a significant positive relationship between the length of the birds and the tarsus. This may also be connected with flight efficiency. Tarsus plays major role in take-off of birds for flight. It serve for a balance while landing. The species are fast runners, especially when confronted by a predator. The length of tarsus will determine how fast the birds can run.

The bill length was also significantly proportional to the body length. It is worth noted that the entire topography of a bird is design to increase efficiency in flight. This will reduce drag and therefore help to sustain the birds in flight.

5. Conclusion

The study revealed some important aspects of the morphometric characteristics of Clapperton's francolin. Some of these are; the relationship in the birds morphological parameters, where there is positive relationship between some of the morphological characteristic while negative relationship between others.

Compliance with ethical standards

Acknowledgments

The research team wishes to acknowledge the support of Mrs Yaye Adamu Koya who act as a research assistant and did a tremendous efforts in data collection, we appreciate the efforts of the Provost Umar Suleiman College of Education Gashua Yobe State, in person of Dr Hassan Bulama for his efforts and support that led to the completion of this work successfully.

Disclosure of conflict of interest

There was no conflict of interest throughout the research work, however, constructive criticism was evident at some point between researchers but a mutual understanding help in realizing the desired objectives.

Statement of informed consent

A consent letter was drafted and obtained approval from the schools head (principals) and Yobe state teaching service board before questionnaire were distributed in schools. All information retrieved were agreed to be used for the purpose of research only.

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