

# **P**REVALANCE OF GASTROINTESTINAL PARASITES OF RED-BILLED QUELEA (*QUELEA QUELEA*) IN GYAWANA ECOSYSTEM, ADAMAWA STATE, NIGERIA

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## **ABSTRACT**

**A** research on the prevalence of gastrointestinal parasites of Red-billed quelea (*Quelea quelea*) was carried out to identify the species of gastrointestinal parasites and their prevalence in *Q. quelea* in Gyawana ecosystem. And also compare the prevalence of species of gastrointestinal parasites by gender in study area. The study was conducted for a period of three (3) months (February to April 2022). A total of sixty (60) adult male and female Quelea bird (*Q. quelea*), thirty (30) for each sexe were trapped using black nylon mist nets. Direct smear method for fecal examination was performed and stool specimen was processed following a formal-ether standing operation procedure. The gastrointestinal parasites were identified on the basis of morphological characteristics. The data obtained in this study was statistically analyzed using the chi-square to test for the differences by gender at

## **Introduction:**

Red-billed quelea (*Quelea quelea*) is a small afrotropical weaver bird or black-faced dioch (Dogget, 1968: Buba *et al.* 2013). Red-billed quelea, belong to the species of *Quelea quelea*, that descends on the crop in great flocks similar to locust swarms. Red-billed quelea is believed to have invaded areas outside its former territories. Quelea birds inhabit tropical and subtropical seasonally dry savannahs, grasslands, woodlands and croplands, at altitudes below 2000m. During the breeding season, they prefer thorny or spiny vegetation such as Acacia savannahs areas generally at

$P > 0.05$ . The result reveals five different species of gastrointestinal parasites were observed. *Ascaris* species has the highest prevalence of gastrointestinal parasites of 29 frequencies, followed by *Girdia* species with 14 frequencies and the least is *Entamoeba* species with 7 frequencies, the prevalence of the parasites are in this order *Ascaris* species > *Girdia* species > *Coccidia* species > *Strongyloides* species > *Entamoeba* species. There was significant difference between the species of gastrointestinal parasite based on their prevalence at ( $P < 0.05$ ). The prevalence of gastrointestinal parasites of *Q. quelea* by gender is 20 (66.67%) and 21 (70.00%), male and female respectively. However, there was no significant difference between gender and gastrointestinal infection ( $P > 0.05$ ). Base on the findings of this study, the researchers therefore recommend that, consumption of Red-billed quelea (*Q. quelea*) as bush meat should be minimized and well screened for possible parasites before consumption to avoid further transmission of these parasites to human.

**Key word:** Prevalence, Gastrointestinal, Parasites, Red-billed Quelea, *Gyawana-Ecosystem*

altitudes less than 1000 m (Sinclair *et al.*, 2005).

The bill of the female quelea birds is yellowish and slightly smaller than that of the male quelea bird. The male quelea bird's cheeks and chin are black, while the female quelea bird's cheeks and chin are ash-grey. The female superciliary stripe above the eye is bright and faintly red in color and the eye-rim is a faded dark line, as in the line between the lower part of the bill and the ear (GTZ, 1987). Male wear a facial mask which varies in color from black to white, and a breast and crown plumage which could also be yellow or bright red and the iris is a reddish brown (BirdLife International, 2004). The age determination of the birds was their eyes (iris) color as described by (GTZ, 1987). The adult birds have rust-brown, while the younger birds have grey-brown color and the juveniles have grey-black up to six-month age of the birds.

Quelea bird being a wild bird, may host a wide variety of internal and external parasites. Haemoparasites, those that inhabit the blood are some of the most significant known to cause septicemia, neonatal bacterial diarrhea, and marginal anaemia in birds (Vazquez *et al.*, 2010). Vectors commonly known to transmit haemoparasites to birds include mosquitoes (*Culicoides*), blackflies (*Simulidae*),

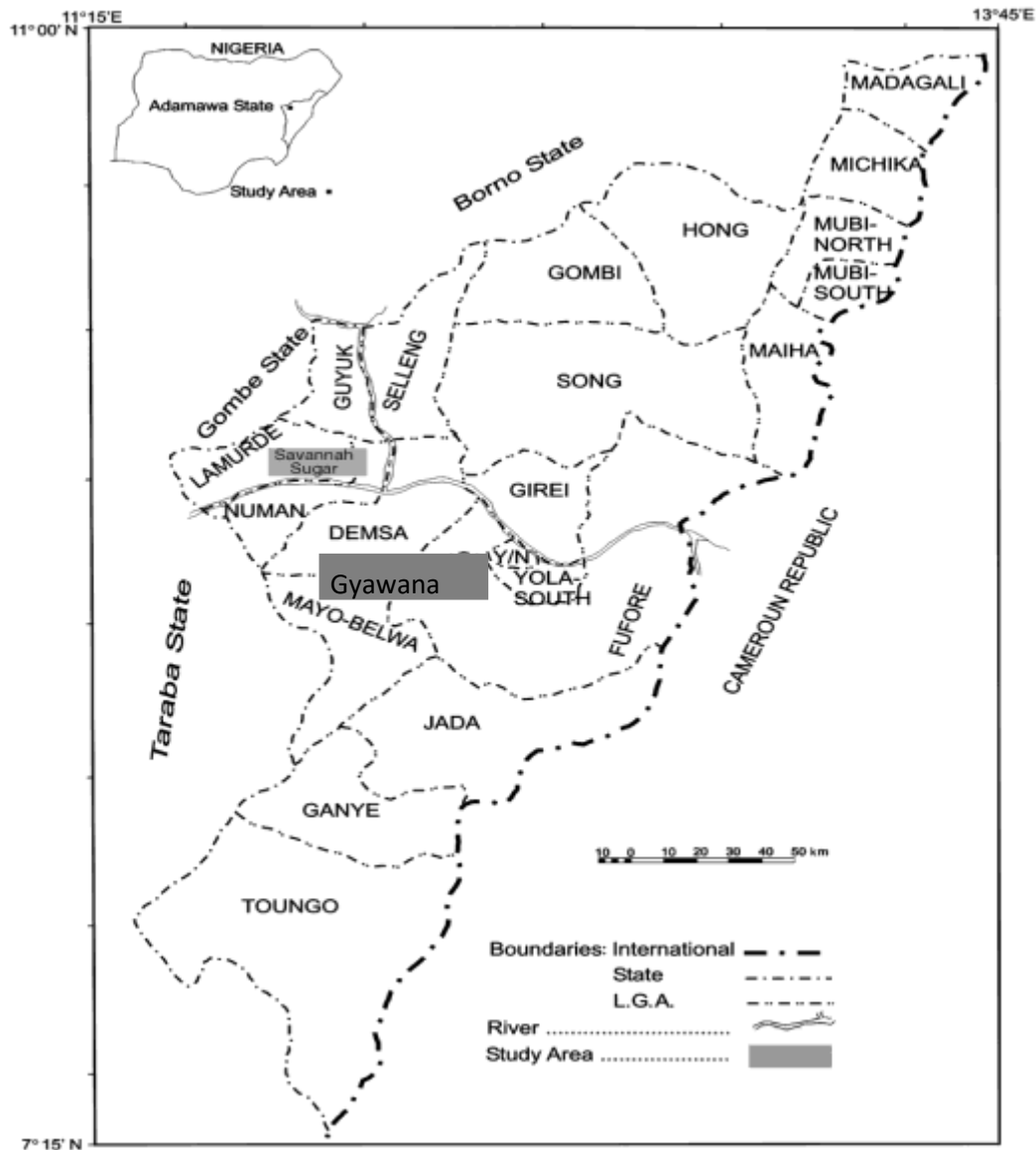
biting midges (*Ceratopognidae*) and Hippoboscid flies (*Hippoboscidae*) which are widely distributed geographically (Klein *et al.* 2008). Parasitic diseases such as those caused by helminthes, arthropods, blood and gastrointestinal protozoans especially Coccidian species of *Eimeria columbae*, *E. columbarium*, *E. labbeanae*, *E. tropicalis* have been reported to infect pigeons worldwide (Sari *et al.* 2008; Vazquez *et al.* 2010). These are very pathogenic and are best treated using sulphaguanidine anticoccidials or controlled by improved hygienic standard (Msoffe *et al.*, 2010).

Most of the Quelea birds consumed in Gyawana ecosystem Lamurde Local Government Area of Adamawa State, Nigeria, as bush meat come from different ecological environment within and around the ecosystem. Hence, Quelea bird (*Quelea quelea*) may get infected from their feeding habits which lead them to prey on grains from the plants and those that falls on ground as their source of food. These grains are readily found on the stalk of the plants and on the ground as reported by (Dawet *et al.* 2012). Therefore, there is need for a scientific approach to identify the gastrointestinal parasites of quelea bird (*Quelea quelea*) and to enhance their health condition. The study is aimed at examining the prevalence of gastrointestinal parasites of Quelea bird (*Quelea quelea*), through identifying the gastrointestinal parasites of the Quelea birds and also according to the gender.

## **MATERIALS AND METHODS**

### **Study area**

The study was carried out in Gyawana ecosystem, Lamurde Local Government Area, Adamawa State of Nigeria. Gyawana is located at latitude 9°35' and longitude 11°55'E and is 35meters above sea level. Lamurde Local Government Area lies between longitude 9°36'03.92"N and latitude 11°47'36.25"E at an elevation of 137 meters above the sea level and has a population of 77,522 people (Adebayo 2012). Adamawa State is located in the North Eastern part of Nigeria, and lies between latitudes 7° and 11°N and between longitudes 11° and 14°E. It is on an altitude of 185 meters above sea level and covers a land area of about 39,741km<sup>2</sup>. The State shares boundaries with Taraba State in the south and west, Gombe State in the northwest, Borno State in the north and an international boundary with the Republic of Cameroon along its eastern border.



**Figure:** Map of Adamawa showing the study Area

### Sampling techniques

The study was conducted for a period of three (3) months (February to April 2022). Quelea bird (*Quelea quelea*), were collected fortnightly from sugar cane farms in Gyawana ecosystem, Lamurde Local Government Area of Adamawa State, Nigeria. A total of sixty (60) adult male and female Quelea bird (*Quelea quelea*), thirty (30) for each sexes were trapped using black nylon mist nets. The

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quelea birds were captured at their water drinking points. The black nylon mist net was set between 7:00a.m and 9: 00a.m to catch the birds that went to drink water after morning feeding and 5: 00p.m to 6: 00p.m to catch those that went to drink water before going to their night roost as in (Lester and Van. 2014; Buba *et al.*, 2019)

### **Laboratory analysis**

The trapped quelea birds (*Quelea quelea*) were taken to the Laboratory of the Department of Zoology, Adamawa State University, Mubi and they were sacrificed, dissected and the intestines were collected for analysis based on their sex. Using an applicator stick, the fecal spacemen were collected from the intestine and transferred into a clean sample bottle for microscopic examination and formal-ether concentration technique described by (Ochei and Kolhatkar, 2008; Jajere *et al.*, 2018).

### **Direct microscopy technique**

Direct smear method for fecal examination was performed; using glass rod, placing 2gms of the fecal sample on a clean grease free slide, a drop of normal saline was added to the sample, emulsified and debris removed. Cautiously and gently the smear was covered with cover slip avoiding air bubble and over flow of the samples. The smear was mounted onto a phase contrast microscope and examined under 10x and 40x objective lens. The intestinal parasites were identified on the basis of morphological characteristics as in (Taylor *et al.*, 2007).

### **Formal-ether concentration method**

Stool specimen was processed following a formal-ether standing operation procedure. About 1g of fecal sample was transferred into a clean centrifuge tube containing 7ml of 10 percent formalin solution and mix thoroughly using Vortex mixer. The suspension was filtered through a sieve into a 15ml centrifuge tube. Then 4ml of diethyl ether was added to the formalin solution. The content was centrifuged at 3000rpm for 1 minute. The supernatant was discarded and smear was prepared using a slide from the sediment. Finally, the slide was examined under a microscope with magnification power of 10x and 40x objective lens for the presence of intestinal parasite. The intestinal parasites were identified on the

basis of morphological characteristics as in (Ochei and Kolhatkar, 2008; Buba *et al.*, 2018).

### Statistical Analysis

The data obtained in this study was statistically analyzed using the chi-square test at  $p = 0.05$ .

### RESULTS

From the sixty (60) Red-billed quelea (*Quelea quelea*) sampled in Gyawana ecosystem, the result reveals five different species of gastrointestinal parasites (*Girdia* species, *Ascaris* species, *Strongyloides* species and *Coccidia* species), were recovered in the intestines of Red-billed quelea (*Quelea quelea*) and were presented in Tables 1 and 2

Table 1: Species of gastrointestinal parasites found in Red-billed quelea (*Q. quelea*) in Gyawana ecosystem

S/N	Species	Frequency	Male frequency	Female frequency
1	<i>Girdia</i> Sp.	14	5	9
2	<i>Ascaris</i> Sp.	29	11	18
3	<i>Strongyloides</i> Sp.	8	0	8
4	<i>Coccidia</i> Sp	12	3	9
5	<i>Entamoeba</i> Sp.	7	3	4

( $P < 0.05$ )

### Species of gastrointestinal parasites found in Red-billed quelea (*Q. quelea*) in Gyawana Ecosystem

The findings of this study on the species of gastrointestinal parasites found in Red-billed quelea (*Q. quelea*) in Gyawana ecosystem shows that, *Ascaris* species has the highest prevalence of gastrointestinal parasites 29 frequency. Followed by *Girdia* species with 14 frequencies and the least is *Entamoeba* species with 7 frequencies. The prevalence of gastrointestinal parasites of Red-billed quelea (*Q. quelea*) in Gyawana ecosystem are in this order *Ascaris* species > *Girdia* species > *Coccidia* species > *Strongyloides* species > *Entamoeba* species. There was

significant difference between the species of gastrointestinal parasite at ( $P < 0.05$ ).

Table 2: Prevalence of intestinal parasites in Red-billed quelea (*Q. quelea*) in Gyawana Ecosystem by gender

Sex	NO. Examined	NO. Infected	NO. Uninfected	% Infected
Male	30	20	10	66.67%
Female	30	21	09	70.00%
Total	60	41	19	68.33%

$P > 0.05$ .

Prevalence of gastrointestinal parasites in Red billed quelea (*Q. quelea*) in Gyawana Ecosystem by gender

The result of the prevalence of intestinal parasites in Red-billed quelea (*Q. quelea*) in Gyawana ecosystem revealed that the overall prevalence of the gastrointestinal parasite of the Red-billed quelea infected was 41(68.33%). The prevalence of gastrointestinal parasites in *Q. quelea* by sex is 20(66.67%) and 21(70.00%), male and female respectively. However, there was no significant difference between gender and gastrointestinal infection ( $P > 0.05$ ).

## Discussion

The prevalence rate of gastrointestinal parasite of Red-billed quelea (*Q. quelea*) in Gyawana ecosystem, Lamurde Local Government Area of Adamawa State, Nigeria, the result revealed that out of the total number of 60(100%) Red-billed quelea sampled, 41(68.33%) were infected. The prevalence rate is slightly higher in female than male Red-billed quelea with the rate of 21(70.00%) female and 20(66.67%) male infection. The finding of this study is similar to previous results of (Ogbaje *et al.*, 2012), who also reported higher rate of infection (63.6%) prevalence rate of gastrointestinal parasite of bird in Makurdi. The result of this study is in line with the work of Msoffe *et al.* (2010), who reported that there was high infection rate in the free ranged birds compared to birds kept in enclosures and hard floors. The findings of this study which was conducted during dry season does not agree with the result of Backford (2014), who recorded 58% infection rate in *Columba livia domestica* of Plateau State, that there is more

infection in the rainy season than the dry season. This high infection rate may be attributed by the fact that most of the birds are reared on free range, thereby making their movement uncontrollable and hence exposing them to contacting infection from different places visited during their flight.

The finding of this study is not in line with the results of (Mikail and Adamu, 2008), who reported 92% rate of infection in birds. 81.5% inflectional rate was also reported by (Junaidu *et al.* 2014) in Giwa, Kaduna State of Nigeria. The disparity may be due to the ecological environment the research was conducted. In Ethiopia Yehualashet, (2011), reported prevalence of intestinal parasite infection in birds was 59.64%, which was lower than the result of this present study. This could be related to the differences in the geographical location of where they carried out their research, management system, control practice in farms, and seasonal differences in the study area. The result of this study shows that, the Red-billed quelea was infected with one or more or more parasite. The findings are in line with the results of (Buba *et al.*, 2018), who carried out their study on prevalence of gastrointestinal parasite of domestic pigeon (*Columba livia*) in Mubi North Local Government Area of Adamawa State, Nigeria. And reported that, out of the 30 pigeons examined, 18 (60%) of them were infected with one or more parasite.

The study further revealed that nematodes, *Ascaris* species and *Girdia* species are the most common intestinal parasites of red-billed quelea. The difference in the number of parasites infecting the birds may be as a result of the areas which birds visited, that is, those visiting infected areas are more likely to be infected by more parasites than those that do not. This is in accordance with the works of (Luka and Ndams, 2007; Junaidu *et al.*, 2014) in Zaria, were they reported that the major cause of helminth infection in bird more especially, *Girdia* species generally undergo an indirect mode of transmission where they make use of intermediate host such as insects to perpetuate their transmission. These organisms serve as food for scavenging birds and hence transmit the infective stage of the parasites to the bird upon ingestion. Their prevalence also indicates the availability of their infective stages in the study area and the ability of the infective stages to withstand environmental conditions for a long time before they are taken in by the host. Though Red-billed quelea is a grainvorous bird



## Conclusion

Among the gastrointestinal parasites found in Red-billed quelea (*Q. quelea*) in this study area, *Ascaris* species have the highest frequency (prevalence rate), followed by *Girdia* species and the least is Trachuris species. Multiple infections are common in the gastro intestine of Red-billed quelea (*Q. quelea*) in the study area. The female Red-billed quelea (*Q. quelea*), has higher prevalence rate of infection than the male counterpart.

## Recommendation

Base on the findings of this study, the researchers therefore recommend that, consumption of Red-billed quelea (*Q. quelea*) as bush meat should be minimized and well screened for possible parasites before consumption to avoid further transmission of these parasites to human. Further study should be carried out on other organisms that are consumed as bush meat from the study area.

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