



## Ecto-parasites of Domestic Chickens (*Gallus gallus domesticus*) in Gwagwalada Area Council, Abuja, Nigeria-West Africa

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### Abstract

**Key words:**  
Ectoparasites,  
Gwagwalada,  
Infestation,  
Lice, Mites,  
Prevalence

Ectoparasites are generally considered as the primary cause of poor health conditions, growth retardations and decrease in production in local chickens in Nigeria. However, there is no data on the prevalence of the common ectoparasites of chickens in Abuja, Federal Capital Territory, Nigeria. In this study, a preliminary survey was conducted on the common ectoparasites on local chickens (*Gallus gallus domesticus*) in Gwagwalada Area Council, Abuja. Collection and identification of the ectoparasites were undertaken from the five selected areas of Gwagwalada between the months of September and November, 2014 (Hot rainy season). All visible individual ectoparasites were collected from 250 local chickens with 20% of the total sample size being randomly selected from each of the five areas viz Phases 1, 2 & 3, Dagiri, Kuje Road, Passo and Gwagwalada market (raised in cages) whilst all other chickens were from free range. The prevalence of ectoparasites was significantly higher in Gwagwalada market and was significantly associated with higher infestation rate ( $P < 0.05$ ). The overall prevalence of ectoparasitic infestation from a total of 327 birds was found to be 75.85%. Of this figure, 218 (87.90%) were infested with various species of lice (*Menacanthus stramineus*, *Gonicocotes gigas*, *Lipeurus caponis*, and *Goniodes meleagridis*) while 18 (7.26%) were infested with mites (*Knemidocoptes mutans*) and 12 (4.84%) were infested with fleas (*Echidnophaga gallinacea*). Effective ectoparasitic control programs should be formulated and implemented in the Gwagwalada Area Council and the entire Federal Capital Territory in order to boost local chicken production. This study has implication on the fulfillment of human protein nutritional requirement.

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### 1. Introduction

Local poultry production sub-sector in Africa and parts of Asia consists of indigenous domestic fowls (*Gallus gallus domestica*) variously referred to as local chicken, backyard poultry or village chickens and/or free range chickens (Al-Jamaien et al., 2013; Mohammed and Sunday, 2015). This sector has indeed become one of the most important protein sources for man throughout the world due to fewer social and religious taboos related to the production, marketing and consumption of the poultry products in relation to other livestock species (Beyene et al., 2014; Mohammed and Sunday, 2015). In Nigeria, the poultry population is estimated to be 160 million; with chickens comprising about 72.4 million. Of this figure backyard poultry constitutes about 43.4 million and thus the most important form of poultry production (Akintunde et al., 2015; Mohammed and Sunday,

2015). The industry contributes up to 15% to the country's gross domestic product (GDP) and accounts for 36% of total protein intake of the country (Akintunde et al., 2015). The domestic birds production system is characterized by minimal capital input, usually kept in small numbers and are allowed to scavenge for feed and water from the ground but occasionally supplemented with grain feed and domestic by products (Fitsum, 2014; Asresie and Eshetu, 2015). The main constraints of boosting domestic poultry production in Nigeria however are the common poultry diseases including arthropod-borne infections, poor housing and management (Akintunde and Adeoti, 2014; Mohammed and Sunday, 2015). Arthropod ectoparasites typically have a major impact on husbandry, productivity and welfare of domestic chickens (Bala et al., 2011; Desoky et al., 2015). Ectoparasites, such as ticks and fleas, live on

domestic chickens (Tamiru et al., 2015; Angyireyiri et al., 2015). They can cause severe dermatitis and allergies (Bala et al., 2011), anaemia due to loss of blood (Zeryehun and Yohannes, 2015) and may act as vectors for pathogenic agents, such as Rickettsia disease (murine typhus), bacterial disease (plague) and viral disease (myxomatosis) resulting in serious diseases not only in domestic chickens, but also in human population (Bala et al., 2011; Asresie and Eshetu, 2015; George et al., 2015). These eventually lead to loss of egg and meat production (Zeryehun and Yohannes, 2015). Notwithstanding the prevalent of ectoparasites as one of the major causes of decrease in productivity of domestic chickens, they are rarely studied (Dinka et al., 2010). Furthermore, there is dearth of information on the prevalence of ectoparasites of chickens in the different area councils of the Federal Capital Territory, Abuja, including Gwagwalada the current study area. The present study therefore was designed to determine the prevalence of ectoparasites of domestic chickens in Gwagwalada Area Council and compare the parasitic load between the domestic and exotic breeds of chickens. It is hoped that the results could be used in making objective decisions in control strategies.

## 2. Experimental approach

### 2.1 Description of study area

The study was conducted in Gwagwalada Area Council in the Federal Capital Territory (FCT), Abuja, Nigeria. Gwagwalada has an area of 1,043 km<sup>2</sup> and is located between latitude 8°-25'' and longitude 6°-45'' and 7°-45'' east of Greenwich. It falls within the semi-seasonal equatorial climate zone with associated contrasting wet and dry period (Balogun, 2001). The rainy season begins from April and ends in October, when day time temperature reaches 28°C to 30°C and night time of 22°C to 23°C. During dry season, day temperature can drop to as low as 12°C. Rainy season is from March to November with mean annual rainfall of about 1400 mm (Aondoakaa, 2012). Gwagwalada

(Figure 1) comprises ten (10) wards viz Dobi, Giri, Gwako, Ibwa, Paiko, Kore, Kutunku, Tunga and Quarters (Phases 1, 2 and 3) with subsistence agriculture as the main economic activity of the rural populace (Nicholas and Patrick, 2015).

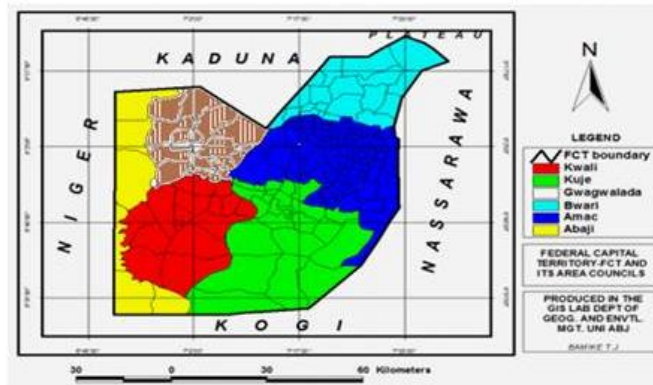
### 2.2 Protocol design and method

The sampled birds were examined for the presence of ectoparasites and any visible lesions related to parasitic infestation through palpation and inspection. Individual ectoparasites were collected from a total of 250 local chickens (*Gallus gallus domesticus*) between the months of September and November, 2014 (Hot rainy season). The ectoparasites collected were preserved in labeled universal bottles containing a mixture of 70% alcohol and 5% glycerol transported to the Veterinary Parasitology and Entomology Laboratory, Faculty of Veterinary Medicine, University of Abuja for identification using gross and microscopic identification using museum specimens and standard keys (Taylor et al., 2007; Agbede, 2013).

## 3. Results

A total of 327 birds (local birds, turkeys and exotic birds) from different parts of Gwagwalada were surveyed in this study for the presence of ectoparasitic infestation. Of this figure, two hundred and forty eight (248) (75.85%) had ecto-parasitic infestation. Two hundred and eighteen (218) (87.90%) were infested with various species of lice (*Menacanthus stramineus*, *Goniocotes gigas*, *Lipeurus caponis*, and *Gonoides meleagridis*) whilst 18 (7.26%) were infested with mites (*Knemidocoptes mutans*) and 12 (4.84%) were infested with fleas (*Echidnophaga gallinacea*) (Figure 1).

**Figure 1.** Shows the percentage prevalence of different species of ectoparasites from 327 birds (local birds, turkeys and exotic birds) in the surveyed Gwagwalada area council. *M. stramineus* has the highest prevalence (red) whilst *E. gallinacea* (orange) has the lowest.

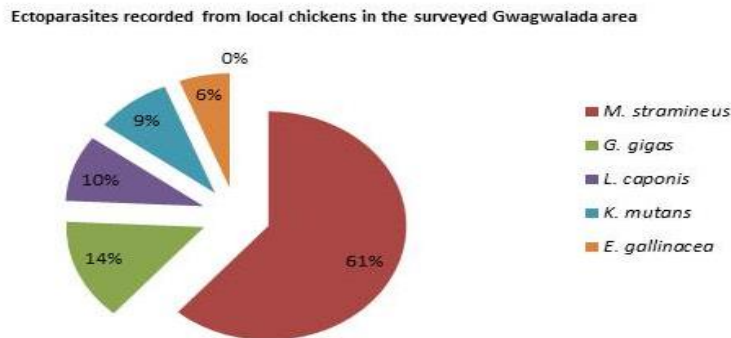


**Figure 1:** Shows Map of the Federal Capital Territory (FCT), Abuja, Nigeria showing Gwagwalada (indicated brown) the location of the study area. Adopted and modified from Aondoakaa, 2012. <http://www.ajol.info/index.php/ejesm/article/viewFile/82844/72965>

A total of 250 local chickens were randomly examined and surveyed for ecto-parasites. Out of this figure, two hundred and two (202) (80.8%) were infested with various species of ectoparasites. One hundred and twenty four (124) (61.4%) had *Menacanthus stramineus*, 29 (14.4%) had *Goniocotes gigas*, 19(9.4%) had *Lipeurus caponis*, 18(8.9%) had

*Knemidocoptes mutans*, and 12(5.9%) had *Echidnophaga gallinacea* (Figure 2).

**Figure 2.** Shows the percentage prevalence of different species of ectoparasites from a total of 250 local chickens in the surveyed Gwagwalada area council. *M. stramineus* has the highest prevalence (red) whilst *E. gallinacea* (orange) has the lowest.

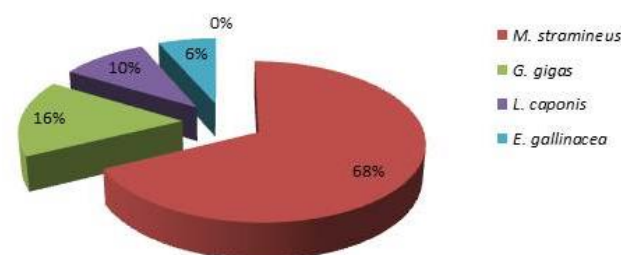


**Figure 2.** Shows the percentage prevalence of different species of ectoparasites from 327 birds (local birds, turkeys and exotic birds) in the surveyed Gwagwalada area council. *M. stramineus* has the highest prevalence (red) (61%) whilst *E. gallinacea* (orange) (6%) has the lowest.

A total of 27 turkeys were also examined for the presence of ectoparasites. All the sampled turkeys (27) (100%) had infestation with two species of ectoparasites. Six (6) (22.2%) had only *Lipeurus caponis* infestation, whilst 11 (40.74%) had *Gonoides meleagridis* infestation. The rest 10 (37.04%) had mixed infestation with both species of the lice

(*Lipeurus caponis* and *Gonoides meleagridis*) (Figure 3).

**Figure 3.** Shows the percentage prevalence of different species of ectoparasites from a total of 27 turkeys in the surveyed Gwagwalada area council. *G. meleagridis* has the highest prevalence (green) whilst *L. caponis* (red) has the lowest.

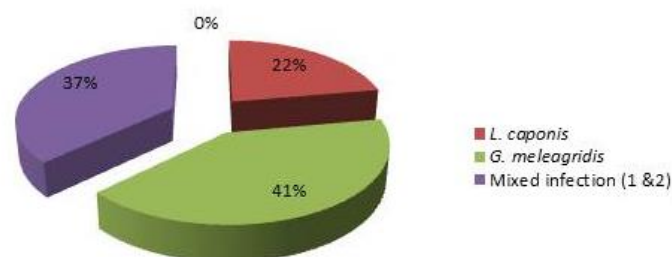


**Figure 3.** Shows the percentage prevalence of different species of ectoparasites from a total of 250 local chickens in the surveyed Gwagwalada area council. *M. stramineus* has the highest prevalence (red) (68%) whilst *E. gallinacea* (orange) (6%) has the lowest.

A total of 50 exotic chickens from different areas of Gwagwalada kept under intensive system were also examined for ectoparasites. A total of 19 (38%) of the exotic birds had infestation with various species of ectoparasites, 17 (89.5%) had *Menacanthus stramineus*, 2 (10.5%) had *Goniocotes gigas*, 1 (5.25%) of the total 19 positive birds had mixed

infestation with both *Menacanthus stramineus* and *Goniocotes gigas* (Figure 4).

**Figure 4.** Shows the percentage prevalence of different species of ectoparasites from a total of 27 turkeys in the surveyed Gwagwalada area council. *M. stramineus* has the highest prevalence (purple) whilst *G. gigas* (green) has the lowest.



**Figure 4.** Shows the percentage prevalence of different species of ectoparasites from a total of 27 turkeys in the surveyed Gwagwalada area council. *G. meleagridis* has the highest prevalence (green) (41%) whilst *L. caponis* (red) (22%) has the lowest.

Table I shows that the prevalence of ectoparasites was not significant in Gwagwalada market but was significantly higher in all the other areas studied ( $P < 0.05$ ).

**Table I.** Prevalence of ectoparasites on local chickens in Gwagwalada Area Council

Location for sample collection	No. collected	%	Prevalence *n%	*OR	T-test P-value	95% CL,OR
Phases 1,2 and 3	50	20	27 (10.8)	4.4	0.001	2.5-8.5
Gwagwalada market	50	20	6(2.4)	1.4	0.650	0.4—11.3
Passo	50	20	32(12.8)	4.6	0.001	2.5-8.5
Dagiri	50	20	29(11.6)	4.5	0.001	2.5-8.5
Kuje road	50	20	38(15.2)	4.8	0.001	2.5-8.5

\* n= number positive

OR= odd ratio

Table II shows that *Menacanthus stramineus* and *Goniocotes gigas* are the two most predominant ectoparasites of local birds with the infestation rates of 52.8% and 50.4% respectively. Moreover, these two parasites are known to cause nuisance to the birds due to irritation caused by their movement; thereby interfering with the general wellbeing of the birds.

Table II. Ectoparasites of domestic chicken identified in Gwagwalada Area Council

Ectoparasites spp	Predilection site	No. infected	Infestation rate
<i>Menacanthus stramineus</i>	All over the body	132	52.8
<i>Goniocotes gigas</i>	- do-	126	50.4
<i>Lipeurus caponis</i>	-do- but mainly in the ventral abdomen	71	28.4
<i>Echinophaga gallinacea</i>	Head, eye, comb and wattles	74	29.6
<i>Knemidocoptes mutans</i>	Mainly on the shank	99	39.6

Adult ticks were not found on the birds during the sampling period. This was not very surprising because soft ticks are intermittent feeders and during the day tend to hide in cracks and crevices of the poultry house. However, casual sampling demonstrated larval ticks in the wing web of some of the birds but this was not recorded, as they were immature stages.

In the same vein, night sampling presented its own problems; it was difficult to determine when the adult ticks come out to feed. Sampling the ticks in the crevices was also dangerous because of the possible presence of other dangerous arthropods such as scorpions etc

#### 4. Discussion

The results in this study showed a wide range of ectoparasitic infestations amongst local, & exotic birds and turkeys in Gwagwalada, Abuja. The prevalence of these ectoparasites was very high (75.85%). This is partly because the study period coincides with hot rainy season (a period when arthropods are in abundance). The result also concurs with the studies in Bangladesh (100%) (Shanta et al., 2006), Ethiopia (84%) (Tolossa et al., 2009), Zimbabwe (Jinga et al., 2012) (*E. gallinacea* 100%, while for *A. persicus*, *D. gallinae* and *C. mutans*, the prevalence was 81.67, 75.00 and 56.67%, respectively., Tanzania (84%) (Swai et al., 2010) and North-east Nigeria (92%) (Zaria et al., 1996), which also reported high prevalence of ectoparasites in local free-range chickens and included all the species found in this study. Lice infestation had the highest occurrence (87.90%). Similar results were obtained with earlier studies in different parts of Nigeria (100%) (Ekpo et al., 2010), (Adene and Dipeolu, 1975; Nnadozie, 1996; Agbede, 2013). Mites (*Knemidocoptes mutans*) had the second highest occurrence with prevalence rates of 7.26%. This is however contrary to previous studies in other parts of the country which reported fleas as being

the second highest occurring ectoparasite of birds (Nnadozie, 1996). It was therefore speculated that this variation in results could be attributed to varied season, sampling period and the study location with respect to urban, periurban or outright village settlements. Ticks were however absent in the samples studied. Furthermore, earlier studies demonstrated *Haemophysalis hoodi hoodi* as the only tick species among the local birds in the southern parts of Nigeria (Nsukka) (Agbede, 1981; Nnadozie, 1996). The report however stated that tick infestation was not widespread. A cursory examination of crevices and cracks in the various sampled locations also yielded no results for ticks. Turkeys had a higher prevalence of ectoparasitic infestation (100%) in this study, followed closely by local birds (80.8%) whilst exotic birds had a far lower prevalence of infestation (38%). This result is in agreement with earlier studies from both the North and Southern part of the country (Nnadi and George, 2009). This is due to the extensive nature of managing local birds and turkeys as opposed to the more intensive management of exotic birds which reduces exposure of the birds to various ecto-parasitic infestation. In the local birds sampled, lice were the most prevalent ectoparasites found (61.4%) followed by mites and then fleas. Adene and Dipeolu (1975) also found lice to be the most prevalent ectoparasites in the local birds followed by fleas. This disagrees with the findings of Aini et al., (1989) that resistance to ectoparasites infestation such as lice has been reported elsewhere among domestic poultry as previously reported by (Bobbo et al., 2013). In the turkeys and exotic birds sampled, only lice was found which also agrees with other studies (Nnadi and George, 2010).

#### 5. Conclusions and Recommendations

It can be concluded that lice, fleas and mites are the common types of ectoparasites of poultry in Gwagwalada Area Council, Abuja. The overall

prevalence rate of lice infestation (87.9%) was higher than that of mite (7.26%) and fleas (4.84%) in all the birds (local, exotic and turkeys). Among the species of lice identified, *Menacanthus stramineus* was the most prevalent whilst *Knemidocoptes mutans* and *Echidnophaga gallinacea* were the only species of mites and fleas found respectively. In view of the high ectoparasitic infestation of birds in the Gwagwalada Area Council, Abuja as demonstrated in this study, it is recommended that; appropriate control measures be employed to mitigate the profound effects of ectoparasitic infestation. Most significantly, improved management system is ensured which may include keeping local chickens and turkeys intensively; thus may help reduce ectoparasitic load on the local birds. Effective control of ectoparasitism is ensured by rearing exotic and local chickens separately.

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