

A Survey of Ectoparasites in the Free Range Domestic Fowl, *Gallus Gallus domesticus*, In Amassoma, Bayelsa State, Nigeria

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Abstract

This study evaluated the ectoparasites in free range domestic chicken, *Gallus gallus domesticus*, in Amassoma, Bayelsa state, Nigeria. A total of 20 specimens of domestic fowls, comprising of 7 males and 13 females, were sampled in Amassoma, Bayelsa state, Nigeria, between September and October 2014. The specimens were physically examined for ectoparasites. The resultant parasites were viewed under the microscopy and the results compared with identification key based on their morphology. Results showed the presence of one species of lice, *Menacanthus stramineus* and mites, *Dermanyssus gallinae*, with prevalence rate of 30% and 20%, respectively. The intensity of infection was 1.00 and 0.65 for *Menacanthus stramineus* and *Dermanyssus gallinae*, respectively. As such, there is the need for a close study of free range domestic fowl ectoparasites to determine their level of public health importance since the fowls interact and sometimes feed on food sources of humans.

Keywords: Chicken; *Dermanyssus gallinae*; Free range; *Menacanthus stramineus*; Parasite;

Introduction

Poultry are typically domesticated birds (mostly guinea fowls, quails, pigeons, chickens, ducks, geese and turkey) managed by humans with the intention of obtaining one or more of these products such as meat, eggs and feathers (Jegade *et al.*, 2015; Lawal *et al.*, 2017). Poultry products are a major source of animal protein that is essential for the national economy (Ekpo *et al.*, 2010). Among the domestic birds, chicken are the most populated with regard to population and species composition. Chickens are among the most predominant poultry products available in most rural areas in many developing nations such as Nigeria (Akintunde *et al.*, 2015; Lawal *et al.*, 2015, 2017; Mohammed and Sunday, 2015).

Poultry system managed by humans are of two classes thus free range and non-free range system. Often at times, commercial poultry system are managed for profit making, while rural poultry are also managed for profit but predominantly for subsistence between the man and his family. In the rural poultry system, the movement of the birds is not controlled and they rarely receive vaccination against poultry diseases (Duru *et al.*, 2008; Lawal *et al.*, 2017; Musa *et al.*, 2008).

Furthermore, poorly managed poultry system could lead to adverse effects on both yield and productivity and even expected turn over. Rural/village fowls are reared under sub-optimal conditions including poor housing, veterinary care, insufficient supplementary feeding with regard to quality and quantitative and can predispose the chickens to predation, accidents, theft, and even diseases (Nwanta *et al.*, 2008; Lawal *et al.*, 2017; Bettridgea *et al.*, 2014; Uhoo *et al.*, 2013). Diseases in poultry are a major

factor limiting the productivity of fowls/ village chickens in most locations in Nigeria (Akintunde and Adeoti, 2014; Lawal *et al.*, 2017; Mohammed and Sunday, 2015).

Poultry disease includes microbial infections and endo- and ecto-parasites. The occurrence of microbial infection is because the gastrointestinal tract of poultry products contains several microbes that have the tendency to cause adverse or beneficial effects on the host depending on the prevailing condition. Some of the beneficial microbes in gastrointestinal tract aid in digestion, and conferring immunity to the host. Parasitic infection also affects the productivity of chickens reared in the village/rural areas (Yeshitila *et al.*, 2011; Lawal *et al.*, 2017; Nafyad *et al.*, 2015). Parasitic infection is a major problem in poultry business especially ecto-parasites (Banda, 2011). Ectoparasites such as mites, ticks, fleas live on free range chickens (Bala *et al.*, 2011). Specifically, ectoparasite infections in chicken cause different discomforts including dermatitis, irritation, and loss of blood thereby predisposing them to anaemia. In addition they could also cause serious diseases in human (Bala *et al.*, 2011).

In Nigeria several studies have been conducted to ascertain ectoparasites in chicken in different locations including Potiskum, Yobe State (Lawal *et al.*, 2017), Gwagwalada, Guinea Savannah zone (Jegade *et al.*, 2015), Gwagwalada Area Council, Abuja (Odenu *et al.*, 2016; Malann *et al.*, 2016), Sokoto Metropolis (Bala *et al.*, 2011), Maiduguri (Biu *et al.*, 2007), Awka, Anambra state (Eneanya *et al.*, 2008), Abeokuta, Ogun State (Ekpo *et al.*, 2010), Gombe (Lawal *et al.*, 2016; Muhammad and Malate, 2014). But information about ectoparasites of domestic fowls in Bayelsa state appears scanty in literature. Therefore, this study focused on the survey of ectoparasites associated with the free range domestic fowl, *Gallus gallus domesticus*, in Amassoma, Bayelsa state, Nigeria.

Materials and Methods

Study Area

Amassoma is the host community of the Niger Delta University. Like other parts of Bayelsa state, the region lies in the sedimentary basin and fishing is the major occupation to the indigenous people of area (Kigigha *et al.*, 2018; Seiyaboh *et al.*, 2017). A major tributary of River Nun passes through the community. The Wet season (April to October) and dry season

Received date: April 30, 2018; **Accepted date:** May 21, 2018; **Published date:** May 28, 2018

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Citation: Bassey SE, Marroh R (2018) A Survey of Ectoparasites in the Free Range Domestic Fowl, *Gallus Gallus Domesticus*, In Amassoma, Bayelsa State, Nigeria. J Environ Bio Res. 2(1)

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(November to March of the following year) are the prevailing seasons in the area. Though in recent times, the rainfall pattern is beginning to shift from known conventional period. The atmospheric temperature (28±6°C) and relative humidity 50-95% is also comparable to other region in the Niger Delta region of Nigeria.

Study Design

A random study was conducted to determine the prevalence of ectoparasites infestation in Amassoma, Bayelsa state. The study was only carried out among households that were willing to participate in the study.

Physical Examination, Sample Collection and parasite identification

Physical examination was carried out by adopting the method previously described by Lawal *et al.* (2017). The fowl was gently grabbed at the shanks and manually restrained with caution not to allow the chicken go through struggle. The feathers of the chickens were gently rubbed at opposite direction of its alignment, and thereafter, the whole body was examined by close visual inspection and magnifying hand lens. The ectoparasites in the body of the fowl were collected by hand picking and gentle brushing of the skin onto a white cardboard paper.

The resultant parasites were separately preserved in 70% alcohol prior to microscopic examination using the dissecting microscope and the recovered parasites were compared with the morphology previously described by Walker (1994), Chandler and Read (1961), Harwood and James (1969).

Prevalence rate and mean intensity of infection

The prevalence rate and mean intensity of the ectoparasites were calculated based on the method previously described by Anderson (1993) and applied by Aisien *et al.* (2009). The mean intensity of infection was calculated for the total host population including the uninfected birds.

$$\text{Mean intensity of infection} = \frac{\text{Total number of parasites}}{\text{Number of host parasitized}} \quad \text{Equation 1 (Anderson, 1993; Aisien et al., 2009)}$$

$$\% \text{ Prevalence} = \frac{\text{Number of host parasitized by specific parasite}}{\text{Number of host examined}} \times 100 \quad \text{Equation 2 (Anderson, 1993; Aisien et al., 2009)}$$

Statistical Analysis

The prevalence was calculated in percentage and the charts were plotted using Microsoft excel.

Results and Discussion

The distribution of ectoparasites of domesticated fowls reared in Amassoma, Bayelsa state is presented in Figure 1. While the prevalence and intensity of infection are presented in Table 1. One species of lice, *Menacanthus stramineus* and mites, *Dermanyssus gallinae*, were found in the study area with prevalence rate of 30% and 20% respectively.

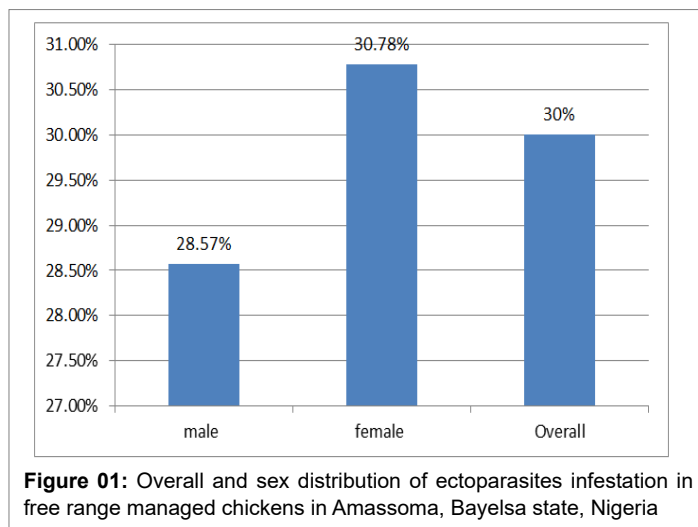


Figure 01: Overall and sex distribution of ectoparasites infestation in free range managed chickens in Amassoma, Bayelsa state, Nigeria

Furthermore, the intensity of infection was 1.00 and 0.65 for *Menacanthus stramineus* and *Dermanyssus gallinae*, respectively. *Menacanthus stramineus* were found on the thigh and breast area, while *Dermanyssus gallinae* were found on the breast and wing areas which is in accordance with the report of Lawal *et al.* (2017). The level of prevalence may be associated with the general sanitation and hygienic level of the area. This is because poor sanitation enhances the propagation and life cycle progression of parasites (Lawal *et al.*, 2017). The occurrence of these parasites could be due to the free range management system which could expose the fowl to arthropods (Lawal *et al.*, 2017) and other parasites found in the environment.

Both species reported in this study are among the species of ectoparasites (lice include *Lipeuruscaponis*, *Menopon gallinae* and *Menacanthus stramineus*) and (mites including *Cnemidocoptes mutans*, *Cnemidocoptes gallinae* and *Dermanyssus gallinae*) reported in domesticated fowls in Potiskum, Yobe State by Lawal *et al.* (2017). The authors further reported higher number of ectoparasites in local chickens to include 3, 1, 1 and 3 species of lice, flea, tick and mites, respectively in Potiskum, Yobe State. Ekpo *et al.* (2010) reported the prevalence of *Menacanthus stramineus* and *Lipeurus caponis* as 90.0% and 60.0% respectively in free range chickens in Abeokuta, Ogun state. Banda (2011) reported the occurrence of species of lice (viz: *Lipeurus caponis*, *Goniocotes gigas*, *Goniocotes hologaster*, *Menacanthus stramineus*, *Menopon gallinae*), mite, *Dermanyssus gallinae*, and the scaly leg mite, *Cnemidocoptes mutans* in addition to fleas and ticks in Malawi chickens. Bala *et al.* (2011) reported lice with prevalence of *Menopon gallinae* (8.1%), *Menacanthus stramineus* (6.9%), *Lipeurus caponis* (5.0%), *Gonoides gigas* (4.4%) and *Gonoicotes gallinae* (3.1%) and mites viz: *Cnemidocoptes mutans* (9.4%) and *Cnemidocoptes gallinae* (8.1%) in addition to 2 species of ticks and 1 species of fleas on chickens in Sokoto metropolis.

Table 1: Prevalence and mean intensity of ectoparasites infestation in free range managed chickens in Amassoma, Bayelsa state, Nigeria

Order	Common name	Scientific names	Number of birds examined	No infested	Prevalence (%)	Total number of parasite	Intensity of infestation
Acarina	Red mite	<i>Dermanyssus gallinae</i>	20	6	30	20	1.00
Mallophaga	Body louse	<i>Menacanthus stramineus</i>	20	4	20	13	0.65

Furthermore, the trend of ectoparasites rate of being lice greater than mites were in accordance with the report of Lawal *et al.* (2017), Malann *et al.* (2016). The prevalence rates in this study were lower than the value of 57% for lice and higher than 14.25% for mites reported in Potiskum, Yobe State by Lawal *et al.* (2017). Malann *et al.* (2016) also reported a

prevalence of 88.52% in lice being greater than the findings of this study, and 3.69% in mites which is lower when compared with the result of this study.

Based on sex, the prevalence of male (28.57%) being lower than females (30.78%) observed in this study has same trend with the work of Malann

(2016) who reported ectoparasites infestation of 88.34% and 61.03% in females and males respectively in Gwagwalada Area Council, FCT-Abuja. This suggests that females are more prone to ectoparasites compared to males.

According to Banda (2011), Lawal *et al.* (2017), variation in prevalence rates may be associated with several factors including geographical distribution/ nature of settlement, environmental conditions (seasonal influence, temperature, relative humidity etc), method of study, sample size, community husbandry and management system, breed or ecotypes of chickens, ecology of the parasites, level of implementation of control measures against ectoparasites diseases.

Conclusion

This study surveyed the ectoparasites in the free range domestic fowl, *Gallus gallus domesticus*, in Amassoma, Bayelsa state, Nigeria. The study revealed the overall prevalence of 30% for ectoparasites while lice (*Menacanthus stramineus*) and mites (*Dermanyssus gallinae*) had 30% and 20% prevalence rates respectively, and 1.00 and 0.65 intensity of infection respectively. Since these free range domestic fowls sometimes come in contact with food sources of man, there is the need to study the public health importance of these parasites to humans.

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