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PREVALENCE OF BIRD LOUSE, *MENACANTHUS CORNUTUS* (PTHIRAPTERA: AMBLYCERA) IN FOUR SELECTED POULTRY FARMS IN KANO STATE, NIGERIA

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ABSTRACT
Study on the prevalence of bird lice in four selected farms in Kano metropolis was conducted to determine the lice species richness, lice abundance and percent prevalence in the four poultry farms. Two hundred and forty (240) birds were examined from four poultry farms within Kano in Tofa, Fagge, Brigade and Gwarzo area respectively, during the month of February-March, 2013. The average temperature of the study sites ranged from 26°C to 33°C with 60-70% relative humidity. Birds were randomly picked and viewed under day light with the aid of hand lens and dissecting forceps to facilitate collections. The louse prevalence and mean abundance varied significantly (P<0.001) among the four Poultry farms examined with Menacanthus cornutus having 85.5% was more prevalent than Goniodes gigas (14.5%). All the farms examined harbored lice with Brigade poultry farm having the highest prevalence of lice with 95% incidence. Age of birds, availability of birds per space and frequency of litter change were contributing parameters to the prevalence of Menacanthus cornutus. The present study suggests that more research should be done on the work with focus on managerial practice for effective suppression of its incidence.
Keywords: Bird Louse, Kano Sub-urb areas, Menacanthus cornutus, Poultry, Prevalence

INTRODUCTION

Birds can be found virtually in every town and city around the globe. They live side by side with human as a source of food, hobby and experimental purposes (Marques *et al*., 2007). Several health problems can affect birds but parasite infections play a major role. They constitute a major source of infection and transmission of diseases (Marques *et al*., 2007) The effects of louse parasitism on birds are often severe, including retarded growth, low egg production and susceptibility to other infections (Dranzoa, 1999). All poultry lice have chewing mouthpart and feed on dry skin scales, scab tissues, and feather parts. They also feed on blood when the host bird's skin and feather quills are punctured. Lice are commonly found on both the skin and feathers and can move from one bird to another when birds are kept in close contact (Price *et al.,* 2003). They are flightless, oviparous, obligate parasites that spend their whole life on their host species (Johnson *et al.,* 2005).

There are four lice suborders within the order Phthiraptera include the sucking lice (Anoplura); and the feather or chewing lice (Rhynchophthirina, Amblycera and Ischnocera). Anoplura have fully dispersed around the globe but only parasitise true mammals (Barker, 1994). Rhynchophthirina consists of a single genus *Haematomyzus*, which parasitises elephants and African wart hogs. Ischnocera and Amblycera (previously grouped as Mallophaga) parasitise birds and mammals. The life cycle of lice consists of three stages, nit, nymph and adult, and the duration from egg to adult stage is about one month (Hoel, 1998). This unique lifestyle has led to numerous adaptations according to their precise ecological niche on the host consequently; they are considerably diverse in terms of their size and general body form.

Specializations in the diet of lice underpin their major taxonomic divisions and they can be broadly separated into those that feed on skin debris, feathers and fur, and those that have specialized in blood feeding (Clay, 1951, Demastes, 1994).

Poultry lice are not known to transmit any avian pathogens, the presence of lice frequently accompanies poor poultry health that is attributable to other causes, and it is especially harmful to young birds where high number of lice may cause sleep disruption. Effective self grooming of poultry is an important means of reducing lice. Louse populations are generally higher on birds with injured beaks or on those that have their beaks trimmed (Clayton, 1991). Amblyceran lice may cause irritation of the skin, restlessness, overall weakening and cessation of feeding. Loss of weight and inferior laying capacity, and skin lesions that may become site of secondary infections (Mullen and Durden, 2002).

The most pathogenic are hematophagous species *Menacanthus straminieus* and *Menacanthus cornutus* Schommer. They may cause anaemia, heavy multi-focal lesion or even death of infested birds (Njunga, 2003; Prelezov *et al.,* 2006). Chewing lice living on feather such as ischnocerans, although causing damages to feathers, affect their host much less than the amblycerans (Murlen and Durden, 2002, Price *et al.,* 2003). With regards to the economic importance of chewing lice on poultry, various aspect of their biology have been studied, such as the distribution on host body, population dynamics, geographic distribution and economic harmfulness (Fabiyi, 1996, Clayton and Walther, 2001, Njunga, 2003).

Various researches have been conducted on the prevalence of lice on free ranging birds but much emphasis has not been laid on poultry birds. Previous research has indicated that, *Menacanthus cornutus* is among the most pathogenic hematophagous species affecting birds. They may cause anaemia, heavy multi-focal lesion or even death of infested birds (Njunga, 2003; Prelezov *et al.,* 2006). Detailed information on infestation levels and prevalence of this insect pest has not been reported in the study area. It is therefore considered imperative to investigate the prevalence and incidence of this insect in the study areas.

MATERIALS AND METHODS

Study Area and Study Population

A total of 240 laying birds were randomly selected from four poultry farms in Tofa, Gwarzo, Fagge and Brigade areas, Kano state. The area is located in the North western of Nigeria and lies between Latitude 13^0 North and 11^0 North in the South and Longitude 8^0 West and 10^0 East. The average temperature of the study sites ranges from 26°C to 33°C and 60-70% relative humidity.

Sample collection and Identification

Birds (*Gallus gallus domestica)* were examined under day light with the aid of hand lens to locate the lice on different parts of the birds. This was done firstly by physically restraining the birds to minimize movement. The feathers around the head, breast, thighs, dorsal region and wing region were examined for the presence of lice. To collect moving lice, a dissecting forceps and hand picking were used to capture fast moving lice. The lice for each bird were collected in various glass vials containing 40% formalin (Walls and Shearer, 1997; Clayton and Drown, 2001).

Insect Identification

Identification of louse samples was done to species level following their morphological description and location on the host. The parasites were identified by preparing slide where each was viewed with an electronic microscope and captured with photographic lens for easy identification, using keys and description given by Walls and Shearer (1997).

Determination of Mean Body mass of Birds

From the infested birds examined, each bird was randomly selected and transfer into a basket of known weight. The chicken is allowed to stand by physical restraining to minimize movement before weighing on a digital weighing balance approx.0.01kg (Satorius standard). The weight of individual bird was then estimated as the difference after subtraction from the overall weight of sample (bird and basket) to obtain the actual weight. This procedure was repeated three times and the mean weight was recorded (Moller and Rozsa, 2005).

Data analysis

The prevalence of infestation (%) of lice from each farm was calculated using prevalence (%) as the number of individual host infested divided by the number of individual host sampled multiplied by 100. The mean abundance (MA) of infestation was calculated by dividing total number of lice identified on birds (louse specie richness) by the total number of birds sampled (infested and uninfested), (Clayton and Drown, 2001).

RESULTS

Prevalence and Species Abundance of *Menacanthus cornutus*

The mean percentage louse prevalence and abundance varied significantly ($P<0.001$) among the four Poultry farms examined. Brigade farm had the highest mean louse abundance while Dan' andala had the lowest louse species abundance (Table 1).

The overall lice prevalence also varied significantly with respect to the four farms. Brigade farm had higher louse prevalence while it was generally low in the other farms. In terms of species prevalence, *Menacanthus cornutus* was more prevalent in all the farms sampled than *Gonoides gigas* (Figure 1).

Relative Body Mass and Birds Age

The mean body mass index reduced markedly with level of infestation. Farm with higher louse incident were heavily infested and is found to have low mean body mass of poultry. The overall mean body mass of the poultry in all the four farms fall within 1.0-1.7kg (Table 1).

With respect to the Birds age older laying birds had higher lice prevalence than the younger poultry having low incidence. This was observed with reference to Brigade farm which has 85% louse incidence (Figure 2).

Table 1. Prevalence and Species Abundance of *Menacanthus cornutus* in the four poultry farms.

POULTRY FARMS	Location (L.G.A)	N	n	Host infected	Mean louse abundance	Mean body mass (kg)	Prevalence (%)
Uzor's farm (black layers)	Fagge	60	5	3	0.08	1.5	5
Bakaba Farm (black layers)	Tofa	60	11	6	0.18	1.4	7.67
Dan'andalaFarm(brown layers)	Gwarzo	60	2	2	0.03	1.7	3.33
Brigade poultry farm (brown layers)	Nassarawa	60	201	51	3.35	1.1	85

L.G.A-Refers to Local Government Area

- ***N*** **=** the number of individual birds sampled for lice
- ***n*** **=** the number of species of lice identified
- ***Mean louse abundance*** **=** mean louse abundance was estimated using Shannon index
- **Prevalence (%) =** number of host infected/total number of birds examinedx100.

Louse specie richness, louse abundance and incidence are the three contributing parameters used for determining the prevalence of bird louse.

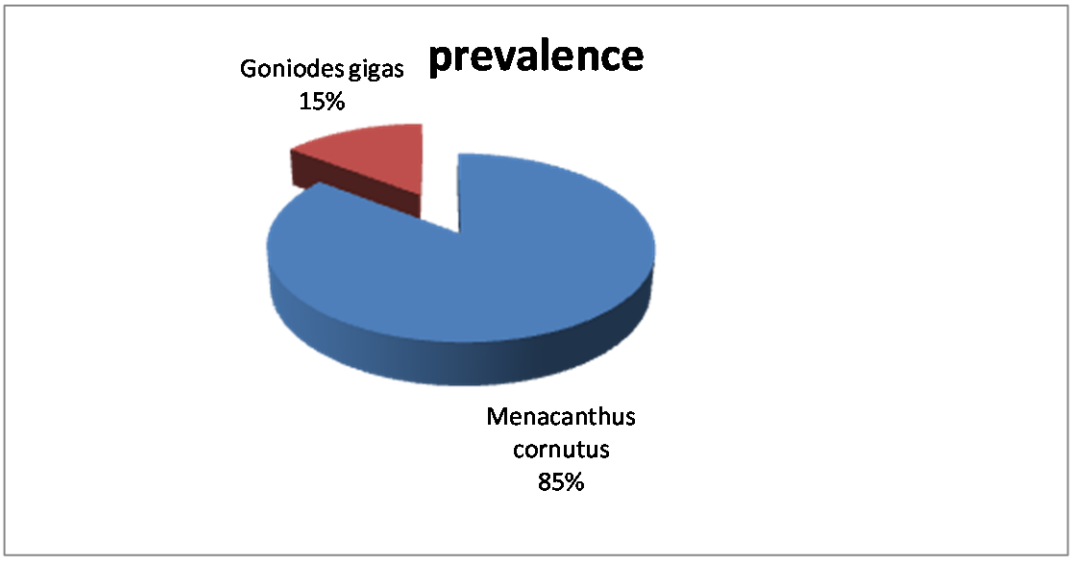

Figure 1: Prevalence of lice species collected from the four poultry farms

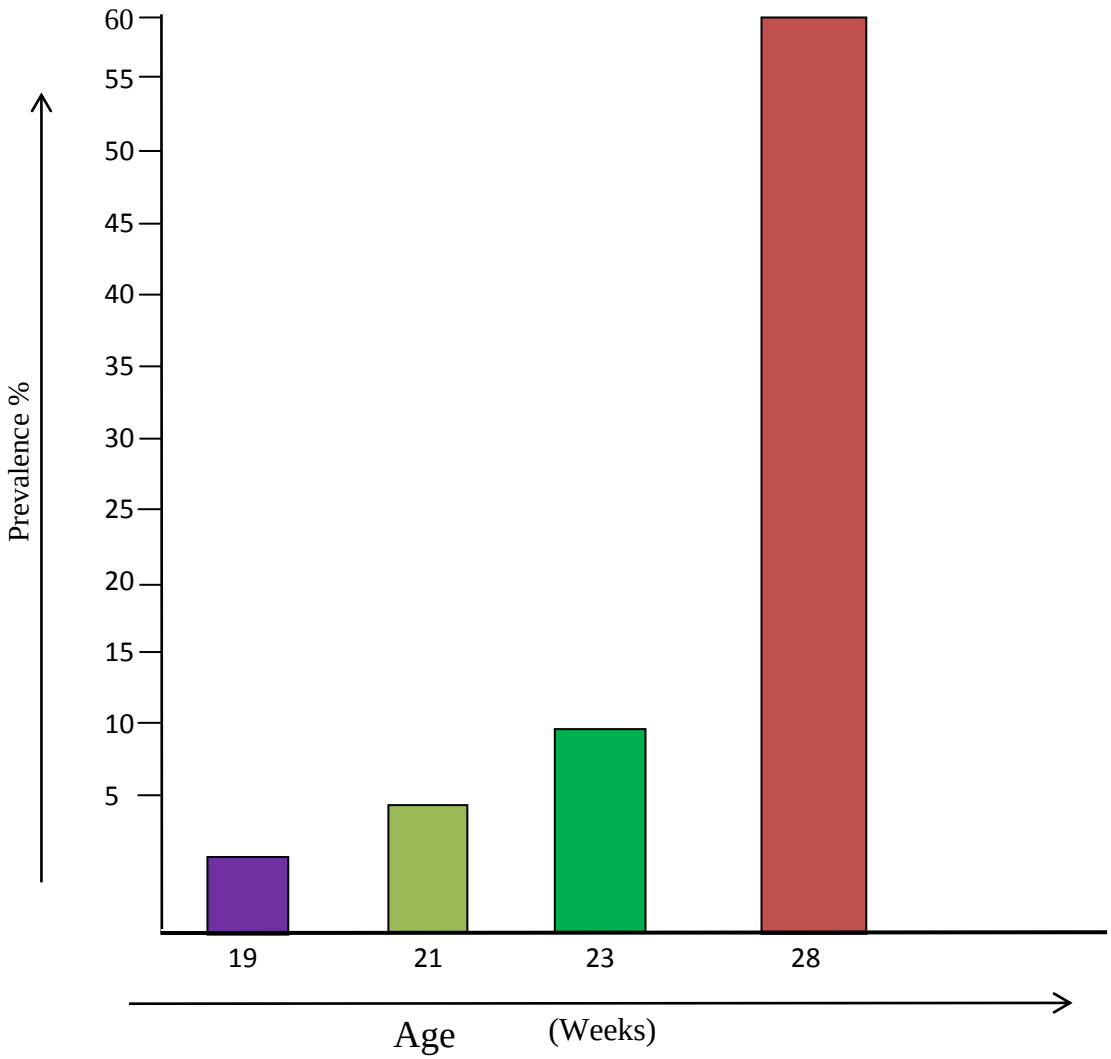

Figure 2: Age specific prevalence of *Menacanthus cornutus* in the four poultry farms

DISCUSSION

The mean body mass index reduced markedly with level of infestation. Farm with higher louse incident were heavily infested and is found to have low mean body mass of poultry. It may be explain that, the dominant louse parasites during the sampling were haematophagous probably feeding on the haemoglobin of the infected chicken. This may render the chicken week and anaemic leading to heavy loss of weight. Although massive mortality had not been observed during survey continuous infestation may lead to heavy loss in terms of production. This observation agrees with the findings of Njunga, (2003) and Prelezov *et al.,* (2006) that, infestation by hematophagous louse species may cause anaemia, heavy multi-focal lesion or even death of infested birds. Others also similarly reported that, Amblyceran lice may cause irritation of the skin, restlessness, overall weakening and cessation of feeding, Loss of weight and inferior laying capacity (Mullen and Durden, 2002).

The prevalence of bird louse varied among the four farms examined with Brigade poultry farm having the highest prevalence of louse with 95% incidence. Birds in brigade poultry farm that practice deep litter system where the birds come in close contact with their faeces were found to have the higher louse prevalence. Similar effect was observed in Bakaba farm with little space per birds, infestations in this farm were found to be more than those birds kept in battery cages with high space per birds. These can related with the findings of (Clayton, 1991) who reported that Local host population density could conceivably be correlated with louse abundance since transmission rates are known to increase with increasing host density.

Similar report have confirmed host density as a significant predictor of parasite richness in mammals (Morand and Poulin, 1998), and similar results may be expected with total host population size (Nunn *et al.,* 2003).

With respect to the Birds age older laying birds had higher lice prevalence than the younger poultry having low incidence. These findings are in conformity to those reported by (Biu *et al*., 2007), in which adult birds were compared to young birds, comparison of ectoparasites prevalence among three chicken age group (chicks, growers and adults), which concluded that, older birds may be are exposed longer to the infested environment than the young chicks, hence a higher prevalence rate.

Dan andala farm and Uzors farm that changes their litter frequently and their litters are entirely separated from their feeds, had lower louse infestation. It seems that fewer birds hosted ischnoceran lice (live on feathers) than amblyceran lice (live on the feathers and skin) because more *Menacanthus cornutus* were collected. Ischnocerans were however more likely to infest hosts with a larger body size than were amblyceran lice. It also appears that black layer birds have more lice density than their brown counterpart.

CONCLUSION

The findings revealed that, louse prevalence varied significantly with respect to the four farms investigated. Brigade farm that practice deep litter systems where the birds come in close contact their faeces were highly infested and therefore higher louse incident while Dan'andala had low lice incident. Farm with higher louse incident were heavily infested and is found to have low mean body mass of poultry. In terms of louse prevalence however, *Menacanthus cornutus* was more prevalent in all the farms sampled while *Gonoides gigas* was less prevalent. The present study suggests that more research should be conducted on bird lice with emphasis on managerial practices by the farmers that will minimize the pest incidence.

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