

Species wise and breed wise prevalence of lice infestation in poultry of Mumbai region, India

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Abstract

In the present investigation, prevalence of different species of lice was noted on poultry birds belonging to organized farm and backyard system. On organized farm the prevalence was 100% and on local desi birds it was 62%. Amongst all the birds screened *Lipeurus caponis* (41.30%) was found out to be the most predominant species. The other species of louse found in order of declining occurrence were *Cuclotogaster heterographus* (40.87%), *Menacanthus* spp (31.74%), *Menopon gallinae* (18.70%), *Goniodes gigas* (4.35%) and *Gonicotes gallinae* (2.61%). The lice encountered in the present study showed marked region specificity. Head, wing and body were the three regions which showed higher rate of occurrence of lice. *Cuclotogaster heterographus* and *Lipeurus caponis* were predominantly found on head and wing regions respectively. Similarly the *Menacanthus* spp and *Menopon gallinae* were predominantly encountered on the body region. The birds from organized poultry farm of Central Poultry Development Organistaion (CPDO) belonging to four distinct breeds viz. White Leghorn (WLH), Aseel, Giriraj and Kadaknath which also showed statistically significant difference ($P \leq 0.05$) in the occurrence rate of different species of lice.

Keywords: Poultry; Breed; Lice; Species; Mumbai

Introduction

Bird can be found virtually in every town and city around the globe. They live side by side with the humans as a source of food, hobby and for experimental purposes. In India, poultry meat represents almost 20% of all meat, with a projected rise of 20% in production per year (Kansal and Singh 2014). Poultry production is one of the economically important agricultural activities in India which is rapidly growing according to the recent data and it has risen to 12.13% (19th livestock census 2012) in just five years.

Like all other animals, poultry too suffer from a wide range of maladies and ectoparasitic infestation is one of them. The effects of louse parasitism on birds are often severe, including retarded growth, low egg production and susceptibility to other infections. Poultry lice are flightless, oviparous, obligate parasites that spend their whole life on their host. All poultry lice have chewing mouthparts and feed on dry skin scales, scab tissues, and feather parts. They also feed on blood when the bird's skin and feather quills are punctured. The ectoparasites causes irritation, interfere with the feed consumption and thus they are associated with emaciation, anaemia and eventually loss of production (Soulsby, 1982). Lice differ in preferred locations on the host, and these preferences have given rise to the common names applied to various species. These include four amblyceran species—*Menacanthus cornutus*, *M. stramineus*, *M. Pallidulus* and *Menopon gallinae* and eight ischnoceran species *Cuclotogaster heterographus*, *Gonicotes gallinae*, *Goniodes dissimilis*, *Goniodes gigas*, *Lagopoecus sinensis*, *Lipeurus caponis*, *L. tropicalis*, and *Oxylpeurus dentatus*. Most of these are cosmopolitan and, apparently, highly adaptive for various geographic regions and climatic conditions (Sychra *et al.* 2008).

In India, prevalence rate of phthirapteran ectoparasites on Indian birds is not well documented (Chandra *et al.*, 1990; Singh, 1999). Information is available on the prevalence of lice infestation and the deleterious effects caused by these ectoparasites on the health of poultry are scarce. Considering these points, the present research work was under taken with the following broad objective,

1. To determine the prevalence of lice infestation in poultry.
2. To identify the species of louse occurring in birds.

Materials and methods

Study location: For the purpose of the study, the birds from organized poultry farm of Central Poultry Development Organistaion (CPDO), Mumbai and slums of Mumbai were taken.

Collection of the lice: Individual bird was carefully screened by parting the feathers and spreading its wings, with a help of a powerful hand lens for the presence of lice. The body of the bird was divided into four region viz. i) Head and neck, ii) Wing iii) Body and iv) Fluff region. The lice from the respective regions were collected with help of the blunt plastic forceps in the glass vials containing 30% alcohol and labeled properly. The louse was detached carefully to avoid decapitation and bottled with a label denoting the identity of the host, Centre of collection, site of infestation, intensity at that site, date of collection and sample number. The specimens were brought to the laboratory for further identification. The specimens from each bottle were processed systematically for preparation of permanent mounts as per the method described by Soulsby (1982), i.e. dehydration, clearing and mounting.

Processing of lice for preparation of Permanent mount: The lice collected in 30% alcohol were further dehydrated using ascending grades of alcohols starting from 50%, 70%, 90% and absolute alcohol. In each grade of alcohol the specimen was kept for 20 minutes, followed by clearing with clove oil for 30 minutes. After clearing, each specimen was carefully taken on a glass slide and mounted with DPX. The slide was allowed to dry and solidify which took approximately 4 to 5 days.

Identification of lice: The lice were identified by the key given by Sen and Fletcher (1967).

Statistical analysis: Pearson's chi-square test (χ^2) was used to evaluate the association of different variables with the prevalence of ectoparasitic infestation and the data were analyzed by following IBM SPSS Statistics Microsoft version 16 for windows. P-value less than 0.05 (at 5% level of significance) were considered significant in all analysis.

Result and discussion

A total of 230 birds from Mumbai region were included in the survey conducted from March to May 2015. Out of 230 birds screened, 130 birds were from organized farm. The Farm was deprived of any anti-lice treatments 6 months before our study. The breeds selected from organized sector, belonging to four different breed viz. White Leghorn (WLH)-35 birds, Kadaknath,-25 birds, Aseel-35 birds and Giriraj-35 birds. Desi birds (100) raised in backyard farms from an unorganized sector were also screened for presence lice infestation and these desi birds are all mixed breeds and does not have any particular breed specificity.



Fig1: Lice in wing region of White leg horn

Prevalence of poultry lice: Out of the total birds screened, 192/230 were found to be positive for the presence of lice. The overall prevalence of lice infestation in poultry birds from Mumbai region was found to be 83.48% (Table 1). All the birds screened from the organized flock (CPDO) were infested with poultry louse whereas only 62/100 desi birds showed lice infestation. Statistically there was a very high significant ($p \leq 0.05$) difference between the prevalence of poultry louse in organized and unorganized sector. This may be due to overcrowding and limited space constraints in flocks raised under organized farm unlike in unorganized sector, where birds are let loose during day time and they do not come in close contact with each other. As the lice spread by close contact, the prevalence rate was higher in organized sector as compared to unorganized sector. These findings are contradictory with the findings reported by Chaddha *et al.*, (2005) and Rani *et al.*, (2008) in Himachal Pradesh and Tamil Nadu respectively, in which backyard poultry had a higher prevalence of lice infestation than the organized farm birds. The overall prevalence of various parasites differed greatly when compared with present observation. This may be due to different geographical location, seasonal variation and period of study.

Table 1: Prevalence of poultry lice

Sector	Bird examined	Birds positive	Prevalence (%)
Organized	130	130	100
Unorganized	100	62	62
Total	230	192	83.48%

*(Values are significant $p < 0.05$)

Species wise prevalence of poultry louse: In this study six species of chewing lice/ biting lice were encountered. The lice recorded from the fowl were *Lipeurus caponis*, *Goniodes gigas*, *Menacanthus* spp, *Goniocotes gallinae*, *Cuclotogaster heterographus* and *Menopon gallinae*. Similar findings were also been recorded by Salam *et al.* (2009), Panda *et al.* (1992) and Kumar and Sahai (1974) from Kashmir valley, Orissa and Bihar, respectively.

From the Table-2, it is evident that overall prevalence of *Lipeurus caponis* (41.30%) was highest followed by that of *Cuclotogaster heterographus* (40.87%), *Menacanthus sp.* (31.74%), *Menopon gallinae* (18.70%), *Goniodes gigas* (4.35%) and *Goniocotes gallinae* (2.61%). This trend was also seen on organized poultry farm. Salam *et al.* (2009) also reported similar finding in Kashmir valley with highest prevalence of *Lipeurus caponis*. However in the other group i.e. Desi birds, prevalence of *Menacanthus* spp. (39%) was highest followed by that of *Menopon gallinae* (18%), *Cuclotogaster heterographus* (9%), *Goniodes gigas* (8%), *Goniocotes gallinae* (4%) and *Lipeurus caponis* (2%). The difference in the prevalence rate of lice infestation in organized and unorganized poultry farms included in the present study was statistically significant ($p \leq 0.05$). The reason for this discrepancy in the occurrence of lice on the birds of these two groups could be the reflection of intimacy and length of the contact required for transfer lice from infested to clean birds. Probability for transfer of *Lipeurus caponis* and *Cuclotogaster heterographus* very intimate and prolonged contact is necessary and hence in the present study prevalence of these lice was highest in CPDO as the birds were confined to restricted area in each poultry pen. In contrast in desi birds this factor was lacking and hence comparatively low prevalence pertaining to these two species was recorded.

Table 2: Species-wise prevalence poultry lice and its statistical analysis

Lice	Organized Sector (n=130)	Unorganized sector (n=100)	Total (n=230)	Chi square Value	P-Value
<i>L.caponis</i>	93 (71.5%)	2 (2.0%)	95 (41.3%)	112.736	0.000*
<i>C.heterographus</i>	85 (65.4%)	9 (9.0%)	94 (40.8%)	74.358	0.000*
<i>Menacanthus spp.</i>	34 (26.1%)	39 (39.0%)	73 (31.7%)	4.305	0.046*
<i>M. gallinae</i>	25 (19.2%)	18 (18.0%)	43 (18.7%)	0.056	0.866
<i>G. gigas</i>	2 (1.5%)	8 (8.0%)	10 (4.3%)	5.674	0.022*
<i>G. gallinae</i>	2 (1.5%)	4 (4.0%)	6 (2.6%)	1.348	0.407

* (Values are significant p<0.05)

Breed wise prevalence of poultry lice: Four different breeds were included in the survey, viz. WLH (White colour), Kadaknath (Black colour), Giriraj (Golden colour) and Aseel (Colourful) with an intention to find out if the colour of the birds had any influence on the occurrence of lice. All the representative birds including 25 each from WLH and Kadaknath and 40 each from Giriraj and Aseel were positive for one or other species of lice. However these different breeds did show statistically significant difference pertaining to occurrence of different species of lice. In poultry pens housing WLH, *Lipeurus caponis* and *Cuclotogaster heterographus* were the predominant species as against *Menacanthus spp* and *Menopon gallinae* which showed mild prevalence and *Goniodes gigas* and *Goniocotes gallinae* were not encountered. The birds belonging to other three breeds also depicted similar trend with exception of two cases of *Goniodes gigas* and two cases of *Goniocotes galliane* on Giriraj birds. There was a significant difference found between the occurrences of lice on different breeds of chicken (P< 0.05).

Conclusion: The above study conducted to generate a basic data on prevalence of poultry lice from Mumbai region. Owing to scanty information available in the literature about the prevalence of poultry lice in India, it is recommended to conduct large scaled research on prevalence of different species of lice and their harmful effects on the host.

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