



Prevalence of *Eomenacanthus stramineus* (Insecta, Phthiraptera, Amblycera, Menoponidae) on poultry birds (*Gallus gallus F. Domesticus*) of Jaunpur

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Abstract: A total of 1,020 poultry birds belonging to twelve different localities of Jaunpur district were surveyed during May 2006 to April 2007 to record the prevalence rate of *Eomenacanthus stramineus*. Prevalence of *E. stramineus* was noted more or less similar in both the sexes (Male – 38% and Female – 39%). Maximum birds bore very low infestation (32%) while only 7% birds exhibited very heavily infestation. Host sex, feather colour and locality had negligible effect on prevalence rate. However, prevalence rate remained slightly higher on birds with poor plumage/health. Significant positive correlation existed between mean monthly prevalence rate and mean monthly temperature as well as photoperiod. Mean monthly incidence rate were recorded higher during summer (May and June) as compared to winter months.

Keywords: Phthiraptera, Amblycera, Menoponidae, Poultry louse, *Eomenacanthus*, *Gallus gallus*, *F. domesticus*

INTRODUCTION

Eomenacanthus stramineus is one of the dreaded phthirapteran occurring in poultry. Researches reveal that the lice do not only affect the vitality and productivity of its hosts but also act as reservoir and transmitter of strains of various infectious pathogen among them (Derylo, 1974 and Saxena *et al.*, 1985). The prevalence and infestation intensity of different phthirapteran ectoparasites on certain avian hosts namely, sparrow (Hoyle, 1938 and Woodman and Dicke, 1954), starlings (Boyd, 1951), blackbirds (Baum, 1968), alcids (Eveleigh and Threlfall, 1976), procellariiform birds (Fowler *et al.*, 1984), wood ducks (Thul, 1985), reed bunting (Fowler and Williams, 1985), Wilson's petrels and storm petrels (Fowler and Price, 1987), leach's petrels (Fowler and Hodson, 1988), Manx shearwaters (Fowler and Shaw, 1989), five shorebird species (Hunter and Colwell, 1994), house martins (Clark *et al.*, 1994), swifts (Lee and Clayton, 1995), pied flycatcher (Potti and Merino, 1995), peacocks (Stewart *et al.*, 1996), Spanis raptors (Perez *et al.*, 1996), bee eaters (Kristofik *et al.*, 1996; Hoi *et al.*, 1998 and Darolova *et al.*, 2001), pigeon (Dranzoa *et al.*, 1999; Mushi *et al.*, 2000), california quail (Gonzalez *et al.*, 2003), Indian Red Avadavat (Gupta *et al.*, 2007) have been noted by selected workers. Only a few workers have examined birds belonging to different orders from this point of view (Ash, 1960; Klockenhoff *et al.*, 1973; Stranger and Palma, 1998;

Oniki, 1999). Rekasi *et al.*, 1997 and Rozsa, 1997 have discussed the pattern in abundance of avian lice.

The review on the prevalence rate of phthirapterans on Indian birds is not well-documented (Chandra *et al.*, 1990 and Singh, 1999). Trivedi *et al.*, (1992) recorded the prevalence and intensity of Phthiraptera on poultry birds of Dehradun. Prevalence of poultry shaft louse, *Menopon gallinae* on poultry birds of Garhwal was noted by Saxena *et al.* (1995). Recently, Saxena *et al.*, (2004) and Gupta *et al.* (2007) have noted different lice on poultry and Indian red avadavat in Rampur district, respectively. In the present study only one amblyceran poultry louse, *Eomenacanthus stramineus* has been taken into consideration. The said louse is one of the dreadful ectoparasite on poultry and economically importance to poultry industry that's why selected to the study. Prevalence and intensity of infestation of chicken body louse, *E. stramineus* has been noted in Jaunpur (U.P.) during May, 2006 to April, 2007.

MATERIALS AND METHODS

Twelve localities of Jaunpur (Table -1) were surveyed to record the prevalence and intensity of chicken body louse, *Eomenacanthus stramineus* during, May 2006 to April 2007. Poultry farm (Government and private) has been checked for the purpose. The examined fowls were mostly indigenous, broiler, leghorn or star brow. For examination, legs of birds were tied with the help of thick

Table 1. Locality-wise prevalence rate of chicken body louse, *Eomenacanthus stramineus* in Jaunpur.

Locality	Observed	Infestation (in %age)
Keraket	87	34 (39.1)
Shahaganj	76	27 (35.5)
Mariahu	93	33 (35.5)
Jalalpur	81	38 (46.9)
Thanagaddi	101	36 (35.6)
Trilochan Mahadeo	74	29 (39.2)
Vazidpur Farm	78	34 (43.6)
Chakkey	82	30 (36.6)
Zafarabad	88	26 (29.5)
Shakar Mandi	83	34 (41.1)
Line Bazar Jaunpur	92	38 (41.3)
Matapur	85	35 (41.2)
Total	1,020	394 (38.6)

thread and individual feathers were deflected with fingers/forceps to record the presence of lice. A magnifying lens has been found useful for the said purpose. Few workers (Creighton *et al.*, 1947; Edgar and King 1950; Moore and Schwardt, 1952; and Linkfield and Reid, 1958) have adopted different coding system for recording the intensity of lice while studying the economic effects of parasitism and eradication measures. In the present study the coding systems of Harshbarger and Raffensperger (1961); and Clayton and Drown (2001) was adopted. The infested poultry were subjected to two minute examination and placed in one of the following category: VL = 1-25 lice; L = 26-50 lice; M = 51-75 lice; H = 76-100 lice and VH = more than 101 lice.

RESULTS

A total of 1,020 poultry bird were surveyed from 12 different localities of district Jaunpur during May 2006 to April 2007, to record the prevalence and intensity of *Eomenacanthus stramineus*. Out of which only 38.6% birds were found infested. Prevalence rate remained slightly higher in females (male - 37.5%, n = 104 and female - 38.8 %, n = 916) (Fig. 1).

Maximum birds (66%) had white feathers, 20% brown – red, 5% black while other 9% has been placed in mixed colour category. The prevalence of *E. stramineus* in the said four groups remained more or less similar (39, 37, 35 and 38%, respectively) (Fig. 1). The feather conditions of examined birds were noted by placing them into ‘good’,

‘normal’ and ‘poor’ category. The birds having considerably damaged and ruffled feathers (due to regular preening by host to get rid of lice) were placed in ‘poor’ category. Likewise, lesser-affected birds put into ‘good’ category. The incidence of *E. stramineus* were found 55% (highest infestation, n = 281) in ‘poor’ category while ‘good’ and ‘normal’ categories remained lower infested (31 and 34, respectively) (Fig. 1).

The general health of examined host was also coded under one of the three heads – healthier, average and weaker. The categorization was first glance impression. The prevalence of *E. stramineus* in these three categories remained 34% on healthier birds (n = 583), 39% on average ones (n = 295) and 56% on weaker birds (n = 142). Thus, the results indicate that unhealthy birds were more prevalent for louse (Fig. 1).

The hygienic conditions (around the area of maintenance) has been noted by placing the infested poultry in one of the three categories – good, average and poor. The birds reported from slum areas were considered as poor hygienic conditions. The incidence rate of *E. stramineus* was found nearly similar in first two categories (31%, n = 202 and 34%, n = 337, respectively) while comparatively higher in poor category (45%, n = 481) (Fig. 1).

In order to observe the impact of crowding on incidence rate, the mode of captivity of examined birds, were also noted. Only 10% poultry bird were found being reared singly, 34% in groups of 2-5 and 56% in bigger groups (more than 5). Bigger groups were found more prevalent (45%) than the smaller one (32%) and singly reared birds (22%) (Fig.1).

The impact of age on the prevalence of *E. stramineus* was recorded by placing the poultry in one of the following age categories: 0-6, 7-12, 13-18 and above 19 months. The incidence rate found lowest in younger birds (23%, n = 138). It remained 31% (n = 384) in 7 – 12 aged birds and 47% (n = 403) in 13-18 month aged birds, respectively. Maximum incidence (57%, n = 95) have been found in aged birds (above 19 months) (Fig. 2).

Maximum percentage of poultry birds bore very light infestation (32%), followed by moderately infested ones (27%) and then by light infestation category (25%). Heavy infestation was observed in 10% birds, while rest 7% were very heavily infested (Fig. 3).

The incidence rate of *E. stramineus* was also noted in different months during, May 2006 to April 2007. Mean monthly incidences were found 57% in the month of May 2006. The highest infestation (76%) occurred in the month of June and remained 62% in the month of July. Afterwards, it declined in succeeding six months (57, 46, 35, 24, 14 and 11, respectively) (Fig. 4). But in the latter three months, the infestation increased gradually (16, 26 and 32%, respectively). Thus, the results indicate that

the louse peaks in summer and remained lowest in winter resulting shows the seasonal fluctuation in the prevalence of *E. stramineus* (Fig. 4).

An attempt has also been made to find the degree of correlation between mean monthly lice prevalence of the period May 2006 to April 2007 and the mean monthly temperature, photoperiod and relative humidity of the corresponding period. Significant positive correlation existed between mean monthly prevalence and mean monthly temperature as well as photoperiod ($r = 0.87$ and 0.83 , respectively). However, correlation with mean monthly relative humidity ($r = -0.29$) was not found significant, at 0.05 level of significance.

DISCUSSION

This is the specific study on prevalence of *Eomenacanthus stramineus*, parasitizing poultry bird (*Gallus gallus F domesticus*) in Jaunpur. About a dozen species of phthirapteran ectoparasite (namely, *Menopon gallinae*, *Menacanthus cornutus*, *Eomenacanthus stramineus*, *Lipeurus lawrensis tropicalis*, *L. caponis*, *L. heterographus*, *Goniocotes gallinae*, *Goniodes dissimilis* *G. gigas*) reportedly infest the poultry, so far. Out of these, nine lice species have been reported from India. *Menopon gallinae* and *Menacanthus stramineus* are the two most injurious lice species and are also

involved in transmission of pathogens among the hosts (Derylo, 1974; Saxena *et al.*, 1985). While recording the prevalence of eight different phthirapteran species on poultry birds of Dehradun, Trivedi *et al.* (1992) found 44.7% *M. gallinae*, 40.4% *M. cornutus*, 26.2% *M. stramineus*, 19.2% *G. gallinae*, 14.3% *G. dissimilis*, 13.8% *L. caponis*, 9.2% *L. lawrensis tropicalis* and 4.8% *G. gigas*, respectively. Similarly, Saxena *et al.*, (2004) have reported 51.3% *M. gallinae*, 25.4% *G. gallinae*, 15.8% *L. lawrensis tropicalis*, 11.5% *L. caponis*, 8.1% *M. cornutus*, 7.9% *G. dissimilis*, 6.9% *L. heterographus*, respectively. The present studies indicate more or less similar trend of prevalence rate for the said lice as compared to Saxena *et al.* (2004) and Gupta *et al.* (2007). *M. cornutus* was not reported from this area during study. *M. gallinae* was already studied by Saxena *et al.* (1995), so *E. stramineus* has been selected.

The impact of host sex, weight, feather conditions and age (on the incidence of avian lice) has been noted by few workers (Eveleigh and Threlfall, 1976; Potti and Merino, 1995; Saxena *et al.*, 1995; Barbosa *et al.*, 2002 and Doucet and Montogomerie, 2003). During the present investigations, the incidence remained slightly higher in female (39%) in comparison to male (38%). Singly reared birds exhibited comparatively lower incidence rates than those maintained in groups (2-5 or more than 5). Likewise,

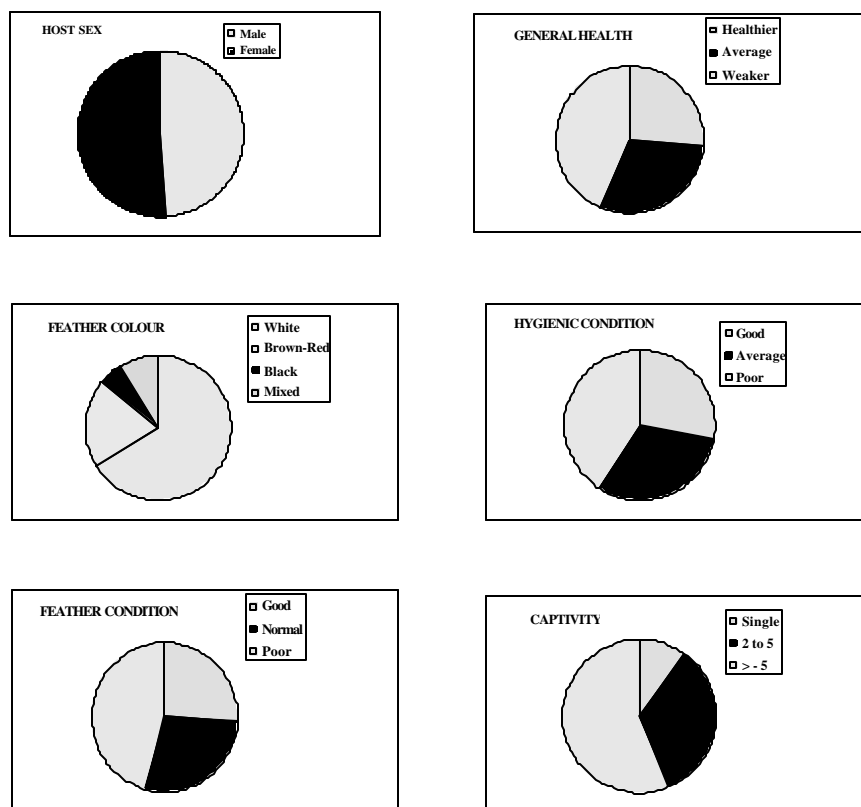


Fig. 1. Showing impact of certain factors on prevalence of chicken body louse, *Eomenacanthus stramineus* (May, 2006 to April, 2007).

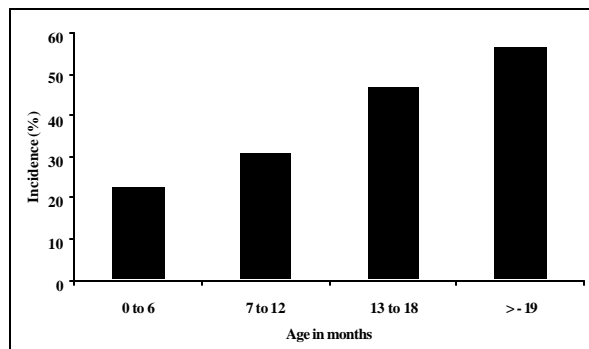


Fig. 2. Incidence of chicken body louse, *Eomenacanthus stramineus* in relation to host age.

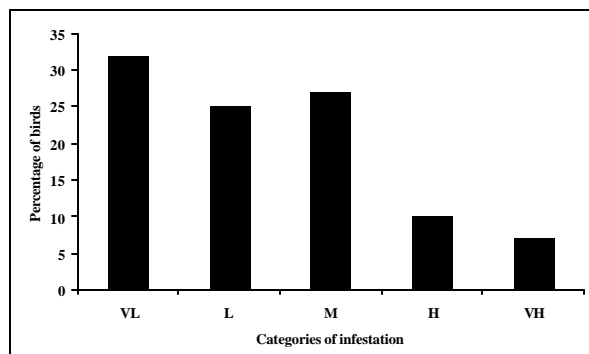


Fig. 3. Overall relative intensity of chicken body louse, *Eomenacanthus stramineus* on poultry birds of Jaunpur.

the birds having poor plumage had higher incidence than the remaining two categories. The fowl infested with lice scratches its body and picks at the feathers repeatedly. Its plumage gets ruffled and dirties (poor) as the bird frequently wallows the dust. Host feather colour had least influence on the incidence rate but unhealthy birds were found more prone to infestation of lice. However, in accordance with the general belief, the neatly maintained bird showed lesser prevalence than poorly or normally maintained host. Effect of low humidity, host feather molt and host bill shape on prevalence of lice species has also been noted by Moyer *et al.*, (2002a, b and c). The impact of host age on prevalence of *E. stramineus* appears to be quite evident. The earlier workers (e.g., Ash, 1960; Baum, 1968; Eveleigh and Threlfall, 1976 and Foster, 1969) have provided conflicting reports on the influence of host age on the incidence of Phthiraptera. In the present study the incidence rate gradually increased with age and remained nearly 2.5 times higher in older birds (above 19 months) than the younger ones (less than six months in age).

The bird lice generally peak in summers (Boyd, 1951; Ash, 1960; Eveleigh and Threlfall, 1976; Agarwal and Saxena, 1979; De Vaney, 1980; Chandra *et al.*, 1990; Saxena *et al.*, 1995; Lane *et al.*, 2006; Gupta *et al.*, 2007 and Nadeem *et al.*, 2007). In the present study higher prevalence rate

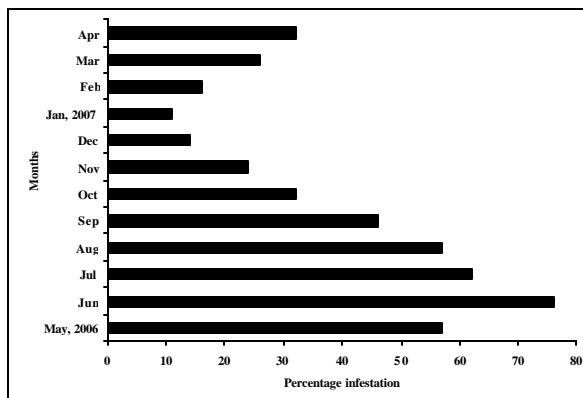


Fig. 4. Monthly incidence of chicken body louse, *Eomenacanthus stramineus* occurring in Jaunpur during May, 2006 to April, 2007.

were noted in summer (May - 57% and June - 76%) in comparison to rainy season (July - 62% and August - 57%) and winter (December - 14% and January - 11%). There is a lot of controversy regarding the reasons for a higher incidence of lice in summer. Baum (1968) and Moyer *et al.* (2002a, b and c) regarded the host moulting to be the most important factor.

The poultry birds are captive and hence lack definite breeding season. Moreover, moulting process of poultry is affected by many other biological and environmental factors. Thus, in the case of poultry bird, environmental temperature, health condition, captivity, hygienic condition etc. seems to play a dominant role in determining incidence and intensity of lice infestation.

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