Prevalence of *Menopon gallinae* Linne (Phthiraptera: Amblycera) on Poultry Birds of Garhwal

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67.6% of the fowls examined in 18 different localities of Garhwal, during 1992-94 were found infested with poultry shaft louse, *Menopon gallinae*. Some factors like host sex, feather condition and mode of captivity had marginal effect on the prevalence of louse. Incidence rates remained distinctly higher on older birds as compared to younger ones. Mean monthly incidence did not fluctuate appreciably during different months of the year. However, intensity of infestation remained distinctly higher during the summer months.

**Key words:** *Menopon gallinae*, Poultry birds, Phthiraptera

*M. gallinae* is one of the dreaded phthirapteran occurring in poultry. They not only affect the vitality and productivity of their hosts (Derylo, 1974a, 1974b) but also act as reservoirs and transmitter of pathogens causing fowl cholera, typhoid and toxoplasmosis (Saxena *et al*., 1985).

Few workers have furnished information on the prevalence of *Phthiraptera* on certain avian hosts namely sparrows (Hoyle, 1938; Woodman and Dick, 1954), starlings (Beyd, 1951), blackbirds (Baum, 1968), orange crowned warblers (Foster, 1969), alcids (Eveleigh and Thriffall, 1976), common myna (Chandra *et al.*, 1988 & 1990) and few other birds species (Ash, 1960; Klockenhoff and Wink, 1973). As far as poultry birds are concerned, Ansari (1943) casually mentioned about prevalence of certain species, while making taxonomic studies on poultry birds of Punjab. Agarwal and Saxena (1979) also noted the incidence of one species, *Lipeurus lawrensis tropicalis* on the poultry birds of Varanasi, while studying its seasonal dynamics. Recently, the incidence of eight phthirapteran species on the poultry birds of Dehradun has been noted by Trivedi *et al.* (1992). They found *M. gallinae* to be the most prevalent species. Keeping in view the economic and epizootic importance of this louse, it was decided to work out the incidence and intensity of infestation of this species on fowls in the Garhwal region. This report also furnishes information on the impact of certain factors on the prevalence of *M. gallinae*.

**MATERIALS AND METHODS**

One thousand birds from 18 different localities belonging to 5 districts of Garhwal were examined during August, 1992 to August, 1994 to record the prevalence of *M. gallinae*. The examination was done with the help of thick thread and individual feathers were deflected with fingers/forceps to record the presence of lice. A magnifying lens was also used. While studying the economic effects of parasitism and the eradication measures like dusts and sprays, the workers have adopted different coding systems (Creighton *et al.*, 1947; Warren *et al.*, 1948; Edgard and King, 1950; Moore and Schwantl, 1951; Linkfield and Reid, 1958). In the present study the coding systems of Harshbarger and Raffensperger (1961) was adopted along with the modifications of Derylo (1974a). The numerical state of *M. gallinae* was estimated on the basis of number of lice found on the back, abdomen and breast (specially the covert feathers of tibial lip region). The infested birds were subjected to 1 minute examination and placed in one of the following category: (1) 1-25 lice, VL (2) 26-50 lice, L (3) 51-75 lice, M (4) 76-100 lice, H and (5) more than 100 lice, VH.

The sex, feather colour and age of the examined fowls was also taken into consideration. The infested fowls often had droopy wings and ruffled feathers. The overall feather condition and the general health status of the hosts was recorded under 3 categories - good, normal and poor. In the same way, the degree of cleanliness on the maintenance site was also recorded under 3 similar heads.

**RESULTS**

Out of 1000 birds examined during 1992-94, 67.6% were found infested with poultry shaft louse, *M. gallinae*. Incidence rate was slightly higher on female birds (70%, *n* = 830) than male birds (53%, *n* = 170) (Fig. 1).

The feather colour of examined birds was also taken into consideration. As many as 65% birds had white feathers, 17% brown-red, 9% black white rest 9% placed in other colors category (mostly mixed type). The prevalence of *M. gallinae* on four groups remained nearly similar (68, 64, 74 and 72%) respectively (Fig. 1).

An attempt was made to record the hygienic conditions (degree of cleanliness) prevailing at the sites of
Fig. 1. Showing impact of certain factors on prevalence of *Menopon gallinae* (Aug. '92 - Aug. '94).

Fig. 2. Incidence of *Menopon gallinae* in relation to host age.

Fig. 3. Monthly incidence of *Menopon gallinae* on poultry birds of Garhwal.

Fig. 4. Overall relative intensity of *Menopon gallinae* on poultry birds of Garhwal.

maintenance by placing the infected fowls in one of the three categories - good, average and poor. The incidence rate of *M. gallinae* was found slightly lower in the first category (52%, n=39) than in the other two (68%, n=845 and 69%, n=116) (Fig. 1).

Likewise, the feather condition of examined birds was also noted by placing them into one of three categories (good, normal and poor). Those birds having considerably damaged and ruffled feathers (may be due to continuous preening by host to, get rid of lice) were placed in 'poor' category. The incidence of *M. gallinae* remained higher in such bird (80%, n=501) than the "good" and "normal" categories (51%, n=246 and 59%, n=253 respectively) (Fig. 1).

The general health of examined hosts was also coded under one of the three heads - healthier, average and weaker. The categorization was solely arbitrary (first glance impression). The prevalence in these three categories remained 72% on healthier birds (n=232), 66% on average ones (n=583) and 76% on weaker birds (n=185). Thus, the differences were not as sharp as expected (Fig. 1).

In order to observe the impact of crowding on incidence rate the mode of captivity of examined birds was also noted. As many as 6.5% birds were being reared singly (in separate cages), 24% in groups of 2-5 while rest 69% in bigger groups (more than 5). Incidence rate in the three groups remained 80%, 64% and 68% respectively (Fig. 1).

The impact of age on the prevalence of *M. gallinae* was recorded by placing the hosts in the following categories : 0-6, 7-12, 13-18 and above 18 months in age (Fig. 2). The incidence rate remained lowest in younger birds (32%, n=130). It nearly doubled in 7-12 month old birds (62%, n=420) and further rose in case of 13-18 month age group (80%, n=249).
The incidence rate of *M. gallinae* did not show striking differences during different months of the two years (Fig. 3). Mean monthly incidence remained above 70% during April to September (78, 72, 78, 72, 74 and 78% respectively). It declined in October (57%) but showed slight increase in November (64%) and thereafter remained nearly similar in succeeding four months (61, 66, 64 and 62%, respectively).

Maximum percentage of birds bore very light infestation (11%), followed by moderately infected ones (27%) and thereby light infestation category (25%). Heavy infestation was observed in nearly 10% birds while only 7% were very heavily infested (Fig. 4). Highest number of very heavily/ heavily infested birds were encountered during May-June (20 & 12% VII, 25 & 21% II) (Fig. 5). In other months their percentage remained comparatively low (below 9% in case of VII and under 13% in case of II). Likewise, the percentage of moderately infested birds was comparatively higher during March-June (above 35%) than the other months (below 26%). On the other hand, percentage of lightly infested birds remained above 25% from July to February (except in August and January) but remained below 20% from March to June (Fig. 5). Lastly, in the same way, the percentage of very lightly infested birds was distinctly higher (above 30%) from July to February while it remained low (below 25%) from March to June. Thus, it is quite clear that the intensity of infestation (so called “degree of infestation”) increased during March to June (summer months) causing lowering of the numbers of very lightly and lightly infested birds and resulting increase in moderately/heavily or very heavily infected birds.

**DISCUSSION**

The common domestic fowl, is subject to attacks by about a dozen species of *Phthiraptera* whose degree of harmfulness in terms of productivity and vitality of host bird is quite variable. *M. gallinae* and *Menopon stramineum* are the two most injurious species and are also involved in transmission of pathogens among the hosts (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% birds infested with *M. gallinae*. The present studies indicate a slightly higher rate of incidence (67.6%) on poultry birds of Garhwal.

The impact of host sex, weight and age on the incidence of avian lice (other than poultry) has been noted occasionally by few workers. Eveleigh and Threlfall (1976) found that in case of Alcids (auks) infestation by 3 phthirapteran species, did not vary with sex and weight. But, they noted that the age of host influenced the incidence rate. However, in case of the phthirapterans occurring on orange crowned warbler the differences in incidence on different age groups have been found insignificant (Foster, 1969).

During the present investigations, the incidence remained slightly higher on females. Singly reared birds also exhibited comparatively higher incidence rates than those maintained in groups (25 or more than 5). Likewise, the birds having poor plumage (damaged feathers) also had higher incidence than the other two categories. It is quite difficult to ascertain whether the birds having damaged feathers are more prone to *M. gallinae* infestation or the heavy infestation of the lice results in greater destruction of feathers. It may be noted that during *M. gallinae* infestation the skin is most often wounded by birds beak (mainly under the wings). There the lice position themselves in characteristic manner by shaft of covert feathers. The covert feathers of such hens possess gaps next to the shaft. The louse infested fowl scratches its body and picks at the feathers repeatedly. Its plumage gets ruffled and dirty as the bird frequently wallows the dust.

As expected, the feather colour had least influence on the incidence rates. But, contrary to the general belief that unhealthy birds are more prone to infestation, the present data indicates that incidence on visibly weaker fowls remained nearly similar to healthier ones. However, in accordance with the general belief, the neatly maintained birds showed lesser prevalence than poorly/normally maintained host.

The impact of host age on prevalence of *M. gallinae* appears to be quite evident. The earlier workers have provided conflicting reports on the influence of host age on the incidence of Phthiraptera (Ash, 1960; Baum, 1968; Eveleigh and Threlfall, 1976; Foster, 1969). In the present study the incidence rate gradually increased with age and remained 2.5 times higher in older birds (above 1 year) than the younger ones (less than six months in age). At present, it is difficult to ascertain the reasons responsible for these findings.
During the present study the incidence rate became slightly higher during the summer months but did not change appreciably as per expectations. However, the intensity of infestation increased noticeably during May-June. The percentage of heavily/very heavily infested birds increased during summers with corresponding decrease in percentage of lightly/very lightly infested birds. The avian lice generally peak in summers (Boyd, 1951; Ash, 1960; Eveleigh and Threlfall, 1976; Agarwal and Saxena, 1979; Chandra et al., 1990). There is a lot of controversy regarding the reasons for a higher incidence of lice in summer. Apart from environmental factors, many biological factors reportedly participate in determining the seasonal incidence of lice. Baum (1968) regarded the host molting to be the most important factor. The role of breeding season has been acknowledged by Foster (1969) and Chandra et al. (1990). The nesting activity also reportedly influences lice infestation (Ash, 1960; Eveleigh and Threlfall, 1976). Klockenhoff and Wink (1973) felt that changes in the environment of lice (caused by alteration of host’s behavior, due to deformities or injuries) lead to increase or decrease of louse populations. The poultry birds are captive and hence lack definite breeding season. Furthermore, molting process of poultry is affected by many factors. Thus, in the case of poultry birds environmental temperature presumably plays a dominant role in determining incidence and intensity of lice infestations.

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