Rate of population increase of poultry shaft louse, *Menopon gallinae* in vivo condition

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Abstract Attempts were made to determine the rate of expansion of *Menopon gallinae* by releasing 10 healthier looking adult lice on each of the twelve similar aged fowls and delousing two fowls fortnightly (up to 90 days). The experiments were performed in the months of summer as well as in the months of winter. It was found that an initial inoculum of 10 *M. gallinae* could produce 636 lice in summers (doubling time 15 days). During winter months 323 *M. gallinae* were recovered from an inoculum of 10 lice (doubling time 18 days). Thus, summer months appear to be more favorable for the population build up of lice.

Keywords Phthiraptera · Amblycera · Poultry shaft louse

Introduction

All kinds of information on the rate of population expansion of parasitic insects attract the attention of Parasitologist/Veterinarians. A look on literature reveals that attempts to furnish information on the rate of population expansion of phthirapterans infesting avian host's in vivo condition have rarely been made. Some clues on the aspects can be drawn from the publications of Glees and Raun (1959), Stockdale and Raun (1960), and Brown (1970). The doubling time of population of two ischnocerans (*Brueelia amandavae* and *Goniocotes gallinae*) has been indicated through in vivo experimentations (Gupta et al. 2007; Saxena et al. 2007).

During present studies, an attempt has been made to observe the rate of population expansion of an amblyceran louse, *Menopon gallinae* in vivo condition.

Materials and methods

For the present studies, known numbers of lice were released on the body of chickens of nearly same age. Ten fresh looking healthier adults of *M. gallinae* were released on the body of each of the twelve louse free fowls. The lice obtained from the lousy hens were transferred with the help of camel hair brush. The artificially infested fowls were housed in wire meshed cages and provided with poultry feed and water. Two of these artificially infested fowls were subjected to delousing fortnightly (after 15, 30, 45, 60, 75 and 90 days) by fumigation method (fowls placed in large polythene bag containing a wad of cotton wool soaked with chloroform; after tying the legs; head protruded out to allow breathing; bird taken out after 15 min; feathers manually fluffed over a white plastic sheet to recover the louse load). After fumigation the body feathers of fowls were examined under Megascop (big sized hand lense of diameter 9 inches fitted with round light tube) to remove the remaining louse load. The louse load obtained through delousing and visual examination was stored in 70 % alcohol and separated sex-wise and stage-wise. The experiments were conducted during the summers (April 2013–June 2013) as well as winters (November 2013–January 2014).

Results

First two fowls deloused after 15 days in summers (April 2013–June 2013) yielded 34 *M. gallinae* (6 adults, 28

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nymphs). Two fowls deloused after 30 days yielded 76 lice (26 adult, 50 nymphs). Likewise, the number of lice obtained from fowls deloused after 45, 60 and 75 days remained 152 (76 adults, 76 nymphs), 324 (102 adults, 222 nymphs) and 434 lice (234 adults, 200 nymphs). Finally, last two fowls deloused after 90 days yielded 1272 lice (476 adults and 796 nymphs). Thus, an initial inoculum of 10 *M. gallinae* produced an average of 636 lice after 90 days. Thus, by applying the back roll method the doubling time of the population of *M. gallinae* appeared to be 15 days, during the months of summer.

Same experiment was repeated during winter months (November 2013–January 2014). Two fowls deloused after 15 days were found infested with 24 lice (08 adults, 16 nymphs). The number of lice recovered from fowls deloused after 30, 45, 60 and 75 days, remained 48 (18 adults, 30 nymphs), 106 (52 adults, 54 nymphs), 174 (74 adults, 100 nymphs) and 342 lice (130 adults, 212 nymphs). The last two fowls deloused after 90 days yielded 646 lice (250 adults, 396 nymphs). Thus, an initial inoculum of 10 lice could produce an average of 323 lice indicating its doubling time to be 18 days during the months of winter.

Discussion

While recording the economic effects of parasitism of chicken body louse, *Menacanthus stramineus*, Glees and Raun (1959) observed that an initial inoculum of 10 lice on each of domestic hens increased to 23,063 during a span of 14 weeks. However, similar experiments were performed by Stockdale and Raun (1960) on the same louse and they found that three adult female could increase up to 12,305 in

16 weeks. On the other hand, Brown (1970) released an initial population of 50 chicken body louse (*M. stramineus*) and found that numbers increased to 1,584 in 31 days on debeaked chickens while 50 lice released on beaked (normal) birds could not increase beyond 56 lice. Saxena et al. (2007) released 14 ischnoceran louse, *Goniocotes gallinae* per bird and found that their population became 1,267 in 14 weeks (doubling time 14 days). Likewise, Gupta et al. (2007) recorded the doubling time of *Brueelia amandavae* infesting red avadavats as 21.5 days. During present studies the doubling time of poultry shaft louse, *M. gallinae* appeared to be 15 days (in summers) under in vivo conditions in contrast 18 days in winter, indicating that environment plays important role in determining the rate of population expansion of avian lice.

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