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Population ecology of a phthirapteran occurring on the common Baya (*Ploceus philippinus*) (Ploceidae: Passeriformes: Aves)

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Abstract: One hundred common Bayas (*Ploceus philippinus*) were examined for their ectoparasites, during April 2006 to December 2008 in the Rampur district of India (28°49'12"N 79°1'11"E). Seventy-four animals were found infested (mean intensity 13.97, sample mean abundance 10.3, range of infestation 1-45) with an ischnoceran louse, *Brueelia plocea*. The frequency distribution pattern of the louse on the aforesaid bird was aggregated but did not conform to the negative binomial model. The sex ratio was female biased while the nymphal population was dominant over adults.

Key words: *Brueelia plocea*, common Baya, India, Phthiraptera, prevalence

Introduction

The population characteristics of Phthiraptera infesting selected avian hosts in India have been noted (1,2). An analysis of the known distributions of 27 species of lice on 15 avian hosts indicated that phthirapteran ectoparasites generally exhibit aggregated (contagious or clumped) distribution (3). The negative binomial distribution is commonly used to describe such patterns (4).

A survey of the literature indicated that there was no report on the population levels of Phthiraptera infesting the common Baya, *Ploceus philippinus*. The present report furnishes information on the prevalence and population structure of one phthirapteran species occurring on this bird.

Materials and methods

One hundred common Bayas (Ploceidae: Passeriformes: Aves) were live trapped during April 2006 to December 2008, in district Rampur (India).

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After the legs were tied, each bird was examined under a stereozoom trinocular microscope. Infested birds were subjected to delousing by modified Fair Isle method (2). The efficacy of different methods available for quantifying avian lice has already been discussed by Clayton and Drown (5). The head was separately examined after delousing. The entire louse load was transferred to 70% alcohol and separated according to species, stage, and sex for further analysis. The data were used for recording the prevalence and variance to mean ratio of the louse population. The exponent (k) of the negative binomial distribution and index of discrepancy (D) were estimated with the help of software offered by Rozsa et al. (6). The goodness of fit between the observed and the expected frequencies (negative binomial) was determined by the chi-square test.

Results

Only one Ischnoceran louse, *Brueelia plocea*, was recovered from 100 common Baya examined for the

presence of lice, during 2006-2008, in the district of Rampur, India. The prevalence was 74%. The sample mean abundance was 10.34, while mean intensity was 13.97 (range of infestation, 1-45).

As many as 26 birds were louse free. The frequency distribution pattern is shown in the Figure. The pattern of distribution was clumped. The variance to mean ratio (11.9) of the population was higher than unity. The value of exponent negative binomial (k) was computed as 0.56. The index of discrepancy was also found to be 0.56. The observed frequencies differed significantly from the frequencies expected by the negative binomial model ($\chi^2= 59.9$; $P = 0.05$).

Thus, the negative binomial model was not found to be a good fit in the present case. A total of 1034

lice were collected. An attempt was made to analyze the population composition of *B. plocea* at different levels of infestation. The overall male to female ratio was 1:1.2. The adult nymph ratio was 1:1.4, while the ratio of first, second, and third instars of nymph was 1:0.9:0.9 (Table).

Discussion

A survey of the literature reveals that prevalence of Phthiraptera on Indian common birds exhibit considerable variance viz. 7%-51% on domestic fowls, 21%-37% on red avadavats, 29%-61% on blue rock pigeons, 13%-42% on common Mynas, 14%-31% on house sparrows, 17%-34% on Indian parakeets, 40% on kingfishers, 30%-54% on house

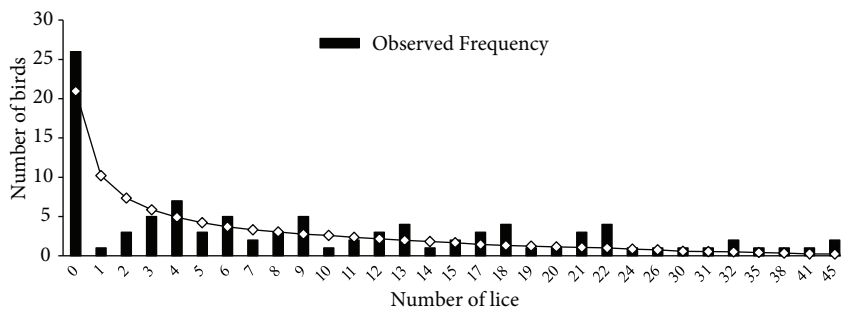


Figure. Showing frequency distribution pattern of the common Baya louse (*Brueelia plocea*); joined closed squares indicate the expected frequency for a negative binomial distribution.

Table. Population composition of *Brueelia plocea* on 100 common Bayas.

No. of lice	Freq.	Mean Number of							Ratios			
		Male	Female	Total	I N	II N	III N	Total	Grand Total	M: F	A: N	IN:IIIN:IIIN
0-10	35	1.11	1.17	2.28	0.86	1.0	1.23	3.09	5.37	1:1.1	1:1.4	1:1.2:1.4
11-20	21	2.52	3.00	5.52	3.86	2.52	3.14	9.52	15.04	1:1.2	1:1.7	1:0.7:0.8
21-30	10	3.25	6.6	12.21	3.70	3.50	3.70	10.9	23.1	1:1.2	1:0.9	1:0.9:1.0
31-40	05	4.50	9.0	16.2	4.40	7.20	5.80	17.4	33.6	1:1.3	1:1.1	1:1.6:1.3
>40	03	6.00	7.33	13.33	12.0	11.3	7.00	30.3	43.6	1:1.2	1:2.3	1:0.9:0.6
Total	74	2.73	3.21	5.94	2.79	2.61	2.65	8.04	13.97	1:1.2	1:1.4	1:0.9:0.9

(IN = First instar nymph; IIN = Second instar nymph; IIIN = Third instar nymph; M = Male; F = Female)

crows, and 31%-48% on bank Myna (1,2,7-10). In our study, the prevalence of *B. plocea* on the common Baya was comparatively high but its mean intensity (13.97) was low.

Phthirapteran ectoparasites reportedly exhibit a clumped distribution on their hosts in which most of the host have few parasites and a few hosts have a lot of them (4,11-13). Crofton (4) and Rekasi et al. (3) advocated the use of the negative binomial model to describe the pattern. However, the frequency distribution pattern of *B. plocea* somehow did not conform to the negative binomial model, although it was clearly skewed.

As per expectation, the sex ratio of *B. plocea* was female biased. Marshall (14) and Gupta et al. (2) have discussed the reasons responsible for skewed sex ratio in the phthirapteran population. As far as adult nymph ratio is concerned, it exhibits considerable variance on different avian hosts. The presence of few nymphs and more adults indicates a declining population, while the occurrence of more

nymphs and few adults point out that the population is expanding. In the case of *B. plocea*, the nymphs outnumber the adults in the natural population. However, the lice population on avian hosts fluctuates seasonally. Therefore, the ratio is bound to vary with time. The present paper provides the first report on population characteristics of Phthirapteran infesting the common Baya (*Ploceus philippinus*).

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