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## ABUNDANCE AND CORRELATIONS OF HELMINTH PARASITES WITH AGE AND SEX OF PIGEON *(COLUMBA LIVIA)* IN BANGLADESH

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A total of one hundred male and female pigeon of different age groups were examined for prevalence of helminth parasites. Male and female pigeons were divided into three groups. Out of the one hundred pigeons examined, 52 were male and 48 were female. All the male pigeon were found to be infected by any one or more of the 10 different species of parasites. *Ascaridia columbae* was found only in one male pigeon but not in female pigeon.

***Key words:*** Abundance, Correlation, Helminth parasite, Age, Sex, Pigeon.

### Introduction

Among domesticated birds, the pigeon plays an important role in the national economy by producing good quality meat. Raising squabs and selling them commercially for meat purposes are gradually decreasing but it is well recognized industry in Bangladesh. But squab raising in Bangladesh faces various hindrances. Among them, helminth infestation is playing a vital role. The climatic conditions of Bangladesh throughout the year are highly favourable for parasite growth, development and multiplication. Due to its manifold utility, diseases of the pigeon by various helminths have extensively been studied in different countries of the world [1-6]. But in Bangladesh pigeons did not receive due attention for commercial development as a source of meat supply in the rural areas. Different age and sex of pigeon may influence susceptibility to helminth infection. Having considered the economic importance of helminth infestation in pigeon, this study was undertaken to determine the abundance and correlation between the parasitic prevalence with the age and sex of pigeon.

### Materials and Methods

A survey of helminth parasites of domestic pigeons in the district of Mymensingh, Bangladesh was conducted during the year 1986. For this a total of one hundred pigeons of both sexes and different age groups were purchased from the local markets.

The birds were divided into three groups according to age:

*Group I.* Squabs and young pigeon upto 6 months of age (16 birds were examined);

*Group II.* Above 6 months and upto one year of age (42 birds were examined); and

*Group III.* Above one year of age (42 birds were examined)

Bangladesh Agricultural University poultry farm was not included in this study. A systematic autopsy examination was conducted and helminth parasites were collected from each organ separately. Representative specimens of trematodes, cestodes and nematodes were fixed, preserved and stained by routine procedures. For the identification of species of helminths the keys given by Wardle and McLeod [7], Yamaguti [8] and Skrjabin [9] were followed.

### Results and Discussion

The occurrence of a number of parasites in the case of age group II pigeon was higher and significantly ($p < 0.01$) differed from the number of parasites in case of age group III followed by age group I (Table 1). The occurrence of *Hymenolepis* spp. was highest ($\bar{x} = 661$) in pigeon and significantly ($P < 0.01$) varied from the occurrence. *Raillietina tetragona, Ornithostrongylus quadriradiatus, Ascaridia columbae, R. cesticillus, Capillaria obsignata,R. echinobothrida, Echinostoma revolutum, Hypoderaeum conoideum and Echinoparaphium paraulum* (Table 2). There were differences between the occurrences of *Raillietina tetragona and Ornithostrongylus quadriradiatus* but these were not significant ($p > 0.05$). Similarly the differences in occurrences of *Ascaridia columbae, Raillietina cesticillus, Capillaria obsignata* and *Raillietina echinobothrida* were recorded and it was insignificant ($p > 0.05$) in nature. Again, there was no significant ($p > 0.05$) difference observed between the occurence of *Echinostoma revolutum, Hypoderaeum conoideum and Echinoparaphium paraulum* (Table 2). The relationship between the occurrence of parasites in male pigeon ($r = 0.884$) and female pigeon ($r = 0.866$) was directly

TABLE 1. MEAN VALUES OF HELMINTH PARASITES OF THREE VARIOUS AGE GROUPS AND THEIR SIGNIFICANT DIFFERENCES AT 1% LEVEL OF PROBABILITY ARRANGED IN DESCENDING ORDER AFTER LSD TEST.

| Group | Mean value |
|---|---|
| II | 446 a |
| III | 275 b |
| I | 23 c |

Figures in uncommon letters differ significantly at 1% probability.

and strongly significant ($p < 0.001$). But the correlation coefficient value between the parasites and male pigeon was higher than that of parasites was present in female pigeon which indicate that the occurrence and infestation of parasites were more in the case of male pigeon (Table 3).

TABLE 2. MEAN VALUES OF DIFFERENT SPECIES OF HELMINTH PARASITES AND THEIR SIGNIFICANT DIFFERENCE AT 1% LEVEL OF PROBABILITY ARANGED IN DESCENDING ORDER AFTER LSD TEST.

| Species of Helminth parasite | Mean value |
|---|---|
| *Hymenolepis spp.* | 661 a |
| *R. tetragona* | 536 b |
| *O. quadriradiatus* | 520 b |
| *A. columbae* | 341 c |
| *R. cesticillus* | 329 c |
| *C. obsignata* | 303 c |
| *R. echinobothrida* | 284 c |
| *E. revolutum* | 182 d |
| *H. conoideum* | 124 d |
| *E. paraulum* | 47 d |

Figures in common letter do not differ significantly at 1% level of probability.

TABLE 3. CORRELATION COEFFICIENT OF NUMBER OF PARASITES WITH INFESTATION IN MALE AND FEMALE PIGEONS.

| Sex | Correlation coefficient (r) | Regression equation |
|---|---|---|
| Male | 0.884* | $2.033 + 0.020x_1$ |
| Female | 0.866* | $2.020 + 0.015x_1$ |

*$p < 0.001$.

TABLE 4. CORRELATION COEFFICIENT OF NUMBER OF PARASITES WITH INFESTATION AND PERCENTAGE OF INFESTATATION OF THREE AGE GROUPS OF PIGEONS.

| Age group | % of Infestation | Correlation coefficient (r) | Regression equation |
|---|---|---|---|
| I | 02.80 | 0.885* | $0.034+0.033x_1$ |
| II | 52.80 | 0.921* | $2.494+0.014x_1$ |
| III | 44.40 | 0.896* | $0.796+0.022x_1$ |

*$p < 0.001$.

The correlation coefficient value of parasite occurrence with respect to three age groups were significant ($p < 0.001$) and are shown in Table 4 where in case of the age group II pigeons, it was higher than that in the age group III and age group I. The regression equations of the three age groups are also shown in Table 4. The correlation coefficient value ($r = 0.921$) between the occurrence of parasites and age group II pigeons indicates that the infestation of parasites were more than in case of age group III ($r = 0.896$) and age group I ($r = 0.885$).

From the present study, it appears that helminthic infestation in pigeon is prevalent in Bangladesh. Hossain *et al.* [10] ascertained the importance of disease in pigeons and their distribution. The previous researchers in Bangladesh did not consider the relationship of prevalence of helminth parasites with differences in age and sex. *A. Columbae* was found to occur in only one male pigeon. Rahman *et al.* [11] reported 59% infestation of *A. Columbae* in pigeons which differs from the findings of 1% infestation in the present study. But a similar occurrence was reported by Forrester *et al.* [12] in the case of adult doves. No other female pigeons were infested with this nematode and this reason is not clear to us. From this limited occurrence of *A. Columbae* it is difficult to draw a conclusion which age groups and sex are susceptible with this helminth. Infact, Buckley *et al.* [13] observed that hot weather is detrimental than cold in case of this helminth. They found high temperature of the summer heat in Kansas is almost similar to Bangladesh kill the eggs of *A. galli* of the ckickens. Same phenomena may happen in case of *A. columbae* of pigeons. The incidence was highest (52.8%) amongst the middle age group and it was lowest about 2.8%) upto the ages of 6 months. Adult pigeon had 44.4% infestation of helminths. The study of Table 5 shows the evidence of age susceptibility in as much as the intensity of the incidence increases with the age group II followed by age group III and group I. This finding shows the similarity with the observation of Qureshi [14]. Among the three age groups of pigeon, some of the

TABLE 5. PREVALENCE OF DIFFERENT HELMINTH PARASITES IN THREE AGE GROUPS OF PIGEONS.

| Name of the parasite | Group I (No. of parasite) | No. of pigeon Infested | Group II (No. of parasite) | No. of pigeon infested | Group III (No. of parasite) | No. of pigeon infested |
|---|---|---|---|---|---|---|
| *E. revolutum* | – | – | 411 | 10 | 133 | 5 |
| *E. paraulum* | – | – | 122 | 4 | 20 | 1 |
| *H. conoideum* | – | – | 279 | 10 | 84 | 4 |
| *R. tetragona* | 30 | 1 | 1104 | 17 | 475 | 12 |
| *R. echinobothrida* | 45 | 2 | 320 | 7 | 487 | 11 |
| *R. cesticillus* | 98 | 3 | 290 | 5 | 599 | 15 |
| *Hymenolepis* spp. | 85 | 3 | 1342 | 25 | 557 | 17 |
| *A. columbae* | – | – | – | – | 341 | 1 |
| *C. obsignata* | – | – | 259 | 5 | 650 | 17 |
| *O. quadriradiatus* | – | – | 780 | 11 | 780 | 18 |

cestodes are recorded fewer in number in squabs (Table 5). No trematode and nematode was found in this group. The squabs at their early ages feed upon their pigeon milk and this feed and feeding system produce natural immunity in the body of squabs which may prevant infestation. Moreover, squabs are prone to contract germs of disease before the adult and for that reason farmers may take care of them properly with good sanitation. Short period of exposure of squabs in the environment might be a factor to become less infested. In two other age groups, three different helminths are greater in number of middle age group except nematodes are more in older groups (Table 5). The first helminth infestation with higher number recorded in pigeons was *Hymenolepis* spp. followed by *R. tetragona* and *O. quadriradiatus* and the trematodes *E. revolutum, H. conoideum* and *E. paraulum* were not numerous (Table 2). Upto the age of four months no parasite was observed (Table 5). The abundance of infestation with trematodes was lowest as they rarely visited watery places. In most of the cases the infection was mixed with three different helminths. The rate of infestation of cestodes was higher to that of nematodes due to greater number of availability of intermediate host. One the basis of the present study it may be affirmed that with the increase of age the rate of infestation of helminth parasites also increases. The infestation rate may be declined gradually after the age of one year which may be due to the development of acquired immunity. No seasonal and regional variations in the distribution of these parasites were recorded in this study. Clinical helminthiasis was recorded in some of the pigeons with *Hymenolepis* spp., *R. tetragona* and *O. quadriradiatus* due to heavy infestation. *A. columbae* caused serious gross reaction in the small intestine of a single pigeon with little instestinal perforation. All helminths were located in the small intestine except *E. paraulum* was in the large intestine and *O. quadriradiatus* was found both in the small intestine and proventriculus. General health condition of the infected bird was not good. Both male and female birds were naturally infected at a higher intensity than recorded during the present study (Table 6). It was observed that the male pigeons were more susceptible than the females. Male pigeons were more susceptible to *Hymenolepis* spp. followed by *R. tetragona* and *O. quadriradiatus* and *E. paraulum* was lesser in number, but *A. columbae* was almost absent except in only one male pigeon. In case of female pigeon *Hymenolepis* spp. also found to highest in number followed by *O. quadriradiatus* and *E. paraulum* was the lowest in number. The higher intensity of cestodes in male pigeons is in agreement with the observations of Shotter [15]. From the above analysis it may be expressed that parasitic infestation may increase or decrease as to the sexes of pigeon. The influence of host sex on parasitism is very difficult to explain. But a sex related resistance has been observed in the case of other species of host. For example Miller [16] reported the resistance in female dogs with *Ancylostoma caninum*. There is no information concerning the influence of sex of pigeon on the harbouring of parasites. But it may be due most likely to the fact that hormonal differences between sexes or roaming habit of the male, who might get more chance to ingest the intermediate hosts and other insects which may carry ova of helminths. These results substantially correlate the findings of Islam [17]. However, no scientific basis is available to support this view. Higher intensity of helminth infestation reveal that the feeding ground becomes grossly contaminated with the infective eggs of these worms and offer more chances to pick up the infection easily. The present study shows that the pigeon farmers has little to fear from different helminths. Therefore, to avoid clinical helminthiasis the basic steps to be taken includes free from overcrowding, sanitation, removal of droppings, protection of young birds especially and proper nourishment.

TABLE 6. PREVALENCE OF 10 HELMINTH PARASITES IN MALE AND FEMALE PIGEON.

| Name of the parasites | No. of parasites in male pigeon | No. of male pigeon infested | No. of parasites in female pigeon | No. of female parasites infested |
|---|---|---|---|---|
| *Hymenolepis* spp. | 1478 | 28 | 506 | 17 |
| R. tetragona | 1266 | 21 | 343 | 9 |
| O. *quadriradiatus* | 996 | 13 | 547 | 16 |
| *C. obsignata* | 682 | 13 | 244 | 9 |
| *R. cesticillus* | 660 | 14 | 327 | 9 |
| *R. echinobothrida* | 658 | 14 | 194 | 6 |
| *E. revolutum* | 414 | 02 | 130 | 5 |
| *H. conoideum* | 221 | 08 | 142 | 6 |
| *A. columbae* | 341 | – | – | 0 |
| *E. paraulum* | 96 | 02 | 46 | 3 |

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