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GASTROINTESTINAL HELMINTHS IN PIGEON *COLUMBA LIVIA* (GMELIN, 1789)

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Abstract

A total of 60 pigeon, *Columba livia* (25 males and 35 females) were examined to observe helminth parasite infection. All the birds were found to be infected by eleven species of helminth parasites: four species of trematoda: *Echinostoma revolutum* (15%) *E. trivolvus* (5%), *Patagifer bilobus* (5%), *Ehinoparyphium recurvatum* (8.33%); six species of cestoda: *Hymenolepis columbae* (63.33%), *Raillietina echinobothrida* (100%), *R. bonini* (43.33%), *R. cesticillus* (100%), *Cotugnia celebesensis* (68.33%), *C. cuneata* (100%); and one species of nematoda: *Ascaridia columbae* (28.33%). Females showed slightly higher intensity of infestation than the males**.** Trematode parasites were found in intestine and rectum, cestode parasites were found in duodenum and intestine, nematode parasite *Ascaridia columbae* was found in caeca. Oesophagus, crop, proventriculus, gizzard, gallbladder, liver, kidney and muscles were free of parasites. Considering among seasons highest intensity of infection was found in autumn.

Key words: Helminth parasites, pigeon, prevalence, intensity, season.

Introduction

Pigeons (*Columba livia*) are among poultry species kept in the Bangladesh where they are a part of subsistence farming done by most poor families. However, little is known about their socio-economic importance, management and health aspects. Due to perceived little importance of pigeon little attention in term of research has been directed towards the species in Bangladesh. However, in many parts of the country pigeons are seen daily scavenging for food together with other poultry species. It's interaction with man and other domestic and wild birds, portends it as a potential carrier of zoonotic parasites.

The prevalence and intensity of parasitic infestations may be influenced by a number of epidemiological factors including host factors such as age, sex and breed and environmental factors such as climatic conditions (Nadeem *et al*. 2007). Investigations on chickens and ducks managed under similar conditions like pigeons have shown higher prevalence of gastrointestinal helminths (Muhairwa *et al.* 2007) which impair productivity and health of these birds.

As helminth parasites of poultry cause a great economic loss to poultry in Bangladesh, therefore, the present study has been designed to investigate the occurrence, prevalence, intensity, organal distribution and seasonal infestation of helminth parasites of pigeon.

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Materials and Methods

A total of 60 pigeon (25 males and 35 females) were randomly collected from February 2010 to January 2011. The pigeons were examined at the parasitology laboratory of Zoology Department, Dhaka University. The separated parts of the alimentary canal of the pigeons were taken in 0.85% normal saline solution to collect helminth parasites. Binocular dissecting microscope was used to detect and collect parasites. The trematode, cestode and nematode parasites were fixed with AFA solution and preserved in 70% alcohol. Before preparing permanent slides the parasites were removed from alcohol and cleaned in lactophenol. A suggestive method was used for the fixing, clearing and staining of the worms (Cable 1963). The collected helminths were identified according to Yamaguti (1958, 1959 and1961).

Prevalence of individual parasite species was calculated as a percentage of the host population that was infested with a specific parasite at a point in time (Thrusfield 1995). Intensity was calculated as number of parasites per infected birds.

Results and Discussion

Of the 60 pigeons examined, all the birds were found to be infested by helminth parasites (Table 1). Eleven species of helminth parasites were identified, of which four species of trematoda were *Echinostoma revolutum* 21 (15%), *E. trivolvus* 8 (5%), *Patagifer bilobus* 11 (5%), *Ehinoparyphium recurvatum* 17 (8.33%); six species of cestoda were *Hymenolepis columbae* 185 (63.33%), *Raillietina echinobothrida* 244 (100%), *R. bonini* 121 (43.33%), *R. cesticillus* 139 (100%), *Cotugnia celebesensis* 177 (68.33%), *C. cuneata* 213 (100%) and one species of nematode was *Ascaridia columbae* 49 (28.00%). According to Radfar *et al.* (2011), the prevalence of helminth *Ascaridia colombae*, *Cotugnia digonopora*, *R. magninumida* and *R. achinobothridia* were 16.66, 13.79, 18.62,

Table 1. Prevalence and intensity of helminth infections in *C. livia.* (n=60).

Name of the parasites	No. of host infected	Prevalence (%)	total no. of parasites collected	Intensity ± SD
Trematoda				
Echinostoma revolutum	09	15.00	21	2.33 ± 0.032
E. trivolvus	03	5.00	08	2.67 ± 0.298
Patagifer bilobus	03	5.00	11	3.67 ± 0.049
Ehinoparyphium recurvatum	05	8.33	17	3.40 ± 0.035
Cestoda				
Hymenolepis columbae	38	63.33	185	4.87 ± 0.061
Raillietina echinobothrida	60	100.00	244	4.07 ± 0.056
R. bonini	26	43.33	121	4.65 ± 0.027
R. cesticillus	60	100.00	139	2.32 ± 0.029
Cotugnia celebesensis	41	68.33	177	4.32 ± 0.029
C. cuneata	60	100.00	213	3.85 ± 0.045
Nematoda				
Ascaridia columbae	17	28.00	49	2.88 ± 0.065

32.35%, respectively. Natala *et al.* (2009) also reported that *Raillietina tetragona* (4.9%), *R. cesticillus* (3.0%), *R. echinobothrida* (7.6%), *Ascaridia columbae* (1.2%), *A. galli* (1.2%) and *Cappillaria anatis* (0.8%). The values found in the present study of helminth infestation were significantly higher than those of helminth infestation of pigeon observed by Radfar *et al.* (2011) and Natala *et al.* (2009). So far, information on the helminth parasites of *Columba livia* is scanty in Bangladesh, except that of Begum *et al.* (2008) who observed epidemiology and pathology of protozoan parasites in *Trichomonas gallinae* in the common pigeon (*Columba livia*). The present study thus provides baseline or preliminary information on the subject. Almost all the birds were found to be infested with different types of endoparasites throughout the year and each bird was found to harbour more than one type of endoparasites. The overall prevalence of endoparasites on pigeons in the present study appears to be high. Msoffe *et al.* (2010) in Tanzania also found high prevalence (79.5%) of helminth infection. The overall prevalence of various parasites differs greatly among the previous reports as well as when compared with present observation. Diversity of bird endoparasite assemblages may be related many factors, which may include home range, behaviour, size and roosting habit of the host. This may also be attributed to difference in the geographical areas and period of study.

Table 2. Organwise distribution of helminth parasites in *C. livia.* (n=60).

Name of the parasites	Duodenum	Intestine	Caecum	Rectum	Total no. of parasite
Echinostoma revolutum	-	3 (14.29%)	-	18 (85.71%)	21
E. trivolvus	-	1(12.5%)	-	7 (87.5%)	8
Patagifer bilobus	-	4 (36.36%)	-	7 (63.64%)	11
Ehinoparyphium recurvatum	-	2 (11.765)	-	15 (88.24%)	17
Hymenolepis columbae	91 (49.19%)	94 (50.81%)	-	-	185
Raillietina echinobothrida	184 (75.41%)	60 (24.59%)	-	-	244
R. bonini	69 (57.02%)	52 (42.98%)	-	-	121
R. cesticillus	52 (37.41%)	87 (62.59%)	-	-	139
Cotugnia celebesensis	89 (50.28%)	88 (49.72%)	-	-	177
C. cuneata	104 (48.83%)	109 (51.18%)	-	-	213
Ascaridia columbae	-	-	49 (100%)	-	49
Total no. of parasites (% of parasites in different organ)	589 (49.70)	500 (42.19)	49 (4.14)	47 (3.97)	1185

The helminth parasites were removed from different parts of the alimentary canal. Maximum infestation was found in duodenum. The rate of helminth infection in duodenum was 49.70%, in intestine it was 42.19%. Rectum was found to be less infected than the other organs (Table 2). Parasites of vertebrate hosts feed either on the digested contents of the host in the alimentary canal or the hosts own tissues. The duodenum and intestine seems to be a preferable site for helminth parasites (Marcov 1946). The abundance of trematode and cestode parasites in the intestine may be related to their feeding behaviour as they are partially or completely devoid of digestive system. Hence, they absorb the simplest form of nutrients through the cuticle.

The results presented in Table 3 show that the overall prevalence of infestation was 100% in both sexes and the intensity of females was higher (20.09) than the males (19.28). The male and female birds had eleven endoparasite species each. *Raillietina echinobothrida*, *R. cesticillus* and *Cotugnia cuneata* showed 100% prevalence both in male and female birds. Highest intensity of infection (5.77) was found in *C. celebesensis* male and 4.46 was in *Hymenolepis columbae* female pigeon. Differences between the overall intensity of male and female hosts were very poor, so with this study, it has been proved that gender is not important in helminth infections in pigeon. It was found that the infection rates of male and female were very close to each other, which was statistically insignificant (P>0.05). Senlik *et al*. (2005) reported that the gender was not important factor for helminth infections in pigeons.

Table 3. Prevalence of endoparasites according to sex in *C. livia*. (Female (F) =35; Male (M) =25)

	No. of birds infested		Prevalence (%)		Total no.of endoparasites recovered		Mean intensity (± SD)	
	M	F	M	F	M	F	M	F
Echinostoma revolutum	3	6	12	17.14	8	13	2.66 ± 0.097	2.16 ± 0.052
E. trivolvus	1	2	4	5.71	3	5	3.00 ± 0.025	2.50 ± 0.082
Patagifer bilobus	3	0	12	0	11	0	3.66 ± 0.048	0
Ehinoparyphium recurvatum	0	5	0	14.29	0	17	0.00 ± 0.00	3.40 ± 0.036
Hymenolepis columbae	18	24	72	68.57	78	107	4.33 ± 0.097	4.46 ± 0.099
Raillietina echinobothrida	25	35	100	100	93	151	3.72 ± 0.052	4.31 ± 0.071
R. bonini	11	17	44	48.57	52	69	4.73 ± 0.094	4.06 ± 0.062
R. cesticillus	25	35	100	100	56	83	2.24 ± 0.067	2.37 ± 0.076
Cotugnia celebesensis	13	28	52	80	75	102	5.77 ± 0.008	3.64 ± 0.046
C. cuneata	25	35	100	100	90	123	3.96 ± 0.052	3.51 ± 0.045
Ascaridia columbae	7	11	28	31.43	16	33	2.29 ± 0.068	3.00 ± 0.027

Table 4. Seasonal infestation of helminth parasites in *C. livia.* (n=60)

Name of the Parasites	Autumn (n=15)				Winter (n=16)				Spring (n=17)				Summer (n=12)			
	No. of host infected	prevalence (%)	Total no. of parasites collected	Mean intensity	No. of host infected	prevalence (%)	Total no. of parasites collected	Mean intensity	No. of host infected	prevalence (%)	Total no. of parasites collected	Mean intensity	No. of host infected	prevalence (%)	Total no. of parasites collected	Mean intensity
Echinostoma revolutum	2	13.33	3	1.5 ± 0.230	2	12.5	5	2.5 ±0.039	3	17.65	8	2.67 ± 0.043	2	16.67	5	2.5 ± 0.039
E. trivolvus	0	0	0	0 ±0.00	2	12.5	5	2.5 ±0.039	1	5.88	3	3 ± 0.024	0	0	0	0 ± 0.00
Patagifer bilobus	0	0	0	0 ±0.00	0	0	0	0 ±0.00	2	11.76	7	3.5 ± 0.039	1	8.33	4	4 ± 0.113
Ehinoparyphium ecurvatum	1	6.66	4	4 ± 0.113	2	12.5	8	4 ±0.113	0	0	0	0 ± 0.00	2	16.67	5	2.5 ± 0.039
Hymenolepis columbae	10	66.66	35	3.5 ±0.039	15	93.75	81	5.4 ±0..077	13	76.47	69	5.31 ± 0.108	0	0	0	0 ± 0.00
Raillietina echinobothrida	15	100	98	6.53 ±0.073	15	93.75	74	4.93 ±0.082	15	88.23	28	1.87 ± 0.233	12	100	44	3.67 ± 0.087
R. bonini	0	0	0	0 ±0.00	0	0	0	0 ±0.00	15	88.23	76	5.07 ± 0.089	11	91.66	45	4.09 ± 0.071
R. cesticillus	15	100	52	3.47 ± 0.037	15	93.75	39	2.6 ±0.047	15	88.23	27	1.8 ± 0.199	12	100	21	1.75 ± 0.043
Cotugnia celebesensis	15	100	79	5.27 ±0.079	15	93.75	61	4.06 ±0.126	0	0	0	0 ± 0.00	11	91.66	37	3.36 ± 0.029
C. cuneata	15	100	82	5.46 ±0.075	15	93.75	57	3.8 ±0.052	15	88.23	43	2.87 ± 0.030	12	100	31	2.58 ± 0.046
Ascaridia columbae	10	66.66	32	3.2 ±0.025	7	43.75	17	2.43 ±0.103	0	0	0	0 ± 0.00	0	0	0	0 ± 0.00

R. echinobothrida, *R. cesticillus* and *C. cuneata* have 100% prevalence in autumn. *P. bilobus* and *R. bonini* showed the lowest prevalence, it was absent in autumn and winter but the prevalence of *R. bonini* in summer was 91.66% and in spring it was 88.23% (Table 4). *A. columbae* was absent in spring and summer. In previous studies (Senlik *et al*. 2005) helminth infections were more commonly observed during the autumn and winter and abundant rain along with a mild winter create a suitable environment for infestation and the development of helminth eggs. Maximum infection rate in pigeons was seen in October (Sari *et al.* 2008). In the present study, infections in autumn were highest supporting the finding of Sari *et al.* (2008) from domestic and mild pigeons of Turkey.

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