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PARASITE DIVERSITY IN DOMESTIC DUCK ON *ANAS PLATYRHYNCHOS DOMESTICUS* FROM MUNSHIGANJ, DHAKA

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Abstract: Among the 60 *Anas platyrhynchos domesticus* (32 males and 38 females), all the mallards were infested with *Anaticola cassicornis* and *Lipeurus caponis*. *A. cassicornis* displayed the peak intensity (15.5 ± 3.64) in female ducks. The lowest prevalence was of *Colpocephalum turbinatum* (25%) and found in male but the intensity was high (15 ± 2.23). Among the endoparasites, the highest prevalence was of *Ascaridia galli* (85.71%) found in female ducks and the lowest was in *Echinostoma trivolvus* (12.5%) found in male. The peak intensity was of *Sobolevicanthus* sp. (17.8 ± 2.34) in female following *Echinostoma revolutum* (17.33 ± 0.97). Ectoparasites were seen to infest all the seasons. But endoparasites were more prevalent in summer than the autumn and winter.

Key words: *Anas platyrhynchos domesticus,* ectoparasites, endoparasites, prevalence, intensity

INTRODUCTION

Ducks are exclusively kept as free range in most rural and urban areas, domesticated and reared in the household. It condenses poverty as serves as a source of family food and income source (Pym *et al*. 2002). Despite ducks being birds' resistant to infection, the favorable habitat of ducks such as subtropical climate or stagnant water is a perfect place for survival of the parasites. However, this scavenger bird can be considered as final or intermediate host of many helminths or protozoan parasites, the eggs of gastrointestinal parasites are mostly passed through the feces and shed into the environment of birds and can distribute infection to human and other animals (Larki *et al.* 2018).

The parasites might cause injuries, leading to severe disease, damage and even causing death of the host (Begum and Sehrin 2011) and affect the growth and production performance of ducks in Bangladesh (Anisuzzaman *et al.* 2005). Wherever part of the birds' body ectoparasites infest, they initiate irritations by their biting and sucking activities which may distract the birds from its regular activities such as feeding, incubation of eggs. Common endoparasites such as *Raillietina cesticillus* and *A. galli* infection caused decreased weight gain in poultry (Bhowmik and Sinha 1982). The management method or maintenance,

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ecology of the parasites, nutritional status and the host-parasite interface employ major influence on the occurrence of the parasites in ducks. The present study was designed with a view to finding out the effect of the sex and seasons on the prevalence and intensity of arthropod and helminth parasites in ducks. This study was therefore conducted to provide a baseline information on the common parasites of ducks.

MATERIAL AND METHODS

A total of 60 *Anas p. domesticus* (32 males and 28 females); were collected randomly from Munshiganj, Dhaka during July, 2016 to June, 2017. Twenty mallards were captured, in each season (summer, autumn and winter). Male and female mallards were visibly distinct. The male mallard had glossy green head and grey colored wings and belly, while the females had mainly brown-speckled plumage. The mallards were transported to the parasitology laboratory, Department of Zoology, University of Dhaka using poultry plastic transport cage and were examined externally and internally in the laboratory.

Examination of outer body for ectoparasites: The captured ducks were dusted with silica aerosol powder for five minutes. Each region of the ducks was checked carefully and it was continued till all of the body was completed. With the help of the brush the parasites were collected and were placed on a white paper. Then the parasites were preserved in 70% ethanol. The parasites were transferred into lacto-phenol for clearing it from debris and was placed on a slide and covered with a coverslip. Then a temporary slide was prepared. The slide was placed under the microscope and identified on the basis of external morphology (Sen and Fletcher 1962, Soulsby 1982).

Post-mortem and parasitological examination: Post-mortem examination was performed according to Fowler (1996). Each gastrointestinal tract was spread on a dissecting board and separated into its different regions. The gizzard was cut by fine scalpel and the inner yellow layer was removed. The lumen of each section was opened longitudinally and the content was scrapped into a Petri dish containing 0.9 physiological saline. Each section was observed under light microscope carefully. The parasites were observed with naked eyes in the sediment and then picked up with a dropper or a brush. Observed helminths were isolated, counted and were preserved in labelled vials containing 70% alcohol. A suggestive method was applied for the fixing, clearing and staining the helminth worms (Cable 1957). Alcohol, formalin and acetic acid (AFA) and glacial acetic acid solution were used for the fixation of helminths. Before preparing permanent slides the helminths were removed from alcohol and cleaned in lactophenol. The helminths were identified as described by Yamaguti (1958), Yamaguti (1959), Yamaguti (1961), Soulsby (1982) and Ruprah *et al.*

(1986). Prevalence and intensity of parasites were expressed according to Margolis *et al.* (1982).

RESULTS AND DISCUSSION

Among the 60 ducks, all were infested with *Anaticola cassicornis* and *Lipeurus caponis* (Table 1). Altogether eight species of ectoparasites were found and identified in the present study. Among those, mean intensity of *A. cassicornis* in female ducks was found to be the highest (15.5 ± 3.64). Waruiru *et al.* (2017) also found that females had a significantly higher prevalence (58.8%) of ectoparasites compared to male ducks (41.2%). The stationary state of female wild ducks during the incubation of their eggs makes them more susceptible to ectoparasites which was described in chicken by Mirzaei *et al.* (2016).

Table 1. Occurrence of ectoparasites in *Anas p. domesticus* (Female = 28, Male = 32)

Name of parasites	No. of ducks infested		Prevalence (%)		Total no. of endoparasites recovered		Mean intensity (± SD)	
	M	F	M	F	M	F	M	F
A. cassicornis	32	28	100	100	406	434	12.69 ± 3.93	15.5 ± 3.64
L. caponis	32	28	100	100	322	320	10.06 ± 3.1	11.43 ± 3.01
G. hologaster	24	28	75	100	156	130	6.5 ± 2.01	5.91 ± 2.34
M. gallinae	30	28	93.75	100	290	314	9.67 ± 3.21	11.21 ± 2.34
M. stramineus	20	20	62.5	71.43	196	186	9.8 ± 2.02	9.3 ± 2.99
H. leucoxanthum	18	18	56.25	64.28	154	144	8.56 ± 2.07	8 ± 2.97
G. gigas	12	10	37.5	35.71	70	54	5.83 ± 1.97	5.4 ± 1.85
C. turbinatum	8	14	25	50	120	124	15 ± 2.23	8.86 ± 2.58

In male ducks, mean intensity was the maximum of *C. turbinatum* (15 ± 2.23). All the ducks were found to be infected with *A. cassicornis* and *L. caponis*. All the female ducks were infected with *Goniocotes hologaster* (Table 1). Musa *et al.* (2012) recorded the four species of ectoparasites of ducks in Dhaka city where the highest prevalence was of *Lipeurus squalidus* and *G. hologaster.*

In the present study, *E. revolutum* showed 18.75% prevalence in male and 21.43% in female ducks. The highest prevalence was of *Echinoparyphium recurvatum* and *Psilochasmus longicirratus* (35.71%) and both found in female. *E. recurvatum* showed similar intensity in male and female ducks but *Echinoparyphium elegans* showed a little higher intensity in female (17.25 ± 2.55) (Table 2). Borah *et al.* (2018) recorded the similar data with where *E. revolutum* was 24.07% prevalent. Yousuf *et al.* (2009) also found that the prevalence of gastrointestinal helminth was significantly ($p < 0.05$) higher in

female ducks (82.7%) than male ducks (77.6%). In male, *E. recurvatum* displayed the maximum prevalence (25%). But peak mean intensity was of *E. trivolvus*, both in male (22.5 ± 2.5) and female (22 ± 2.7). *Hymenolepis columbae* was found to be prevalent among female ducks (85.71%) (Table 2). The finding is similar to that of Musa *et al.* (2012). Farjana *et al.* (2008) found higher mean density of all parasites in female ducks (31.35 ± 4.72) than males (27.52 ± 3.32). Among the *Raillietina* spp., *Raillietina echinobothrida* was equally prevalent in male and female (50%). *Raillietina bonini* displayed the highest prevalence (64.28%) in female ducks. Amolng all the endoparasites, *Hymenolepis lanceolate* showed the maximum intensity in female ducks (18 ± 4.21) (Table 2). Female ducks may be more susceptible to parasitic infection due to egg laying and also lack of balanced nutrition, which affect their immune system and ability to combat the parasitic infection. Moreover, some hormonal influence may be associated with this.

Table 2. Occurrence of endoparasites in *Anas p. domesticus* (Female = 28, male = 32)

Name of parasites	No. of ducks infested		Prevalence (%)		Total no. of endoparasites recovered		Mean intensity (± SD)	
	M	F	M	F	M	F	M	F
Trematodes								
E. recurvatum	8	10	25	35.71	110	136	13.75 ± 1.48	13.6 ± 2.4
E. elegans	6	8	18.75	28.57	90	138	15 ± 1.79	17.25 ± 2.55
E. trivolvus	4	4	12.5	14.28	90	88	22.5 ± 2.5	22 ± 2.7
E. revolutum	6	6	18.75	21.43	108	104	18 ± 0.82	17.33 ± 0.97
P. longicirratus	6	10	18.75	35.71	54	142	9 ± 1.22	14.2 ± 2.67
Cestodes								
H. lanceolata	14	22	43.75	78.57	204	396	14.57 ± 3.1	18 ± 4.21
H. columbae	20	24	62.5	85.71	338	410	16.9 ± 3.32	17.08 ± 4.67
R. bonini	20	18	62.5	64.28	160	154	8 ± 2.3	8.56 ± 3.03
R. cesticillus	18	16	56.25	57.14	190	124	10.56 ± 2.1	7.75 ± 1.98
R. echinobothrida	16	14	50	50	196	164	12.25 ± 3.12	11.71 ± 3.88
C. digonopora	10	14	31.25	50	98	180	9.8 ± 1.54	12.86 ± 2.78
Sobolevicanthus sp.	8	10	25	35.71	108	178	13.5 ± 1.89	17.8 ± 2.34
Nematode								
A. galli	14	24	43.75	85.71	166	374	11.86±3.56	15.58±4.00

In the present study, *A. cassicornis* was prevalent in the three seasons. *L. caponis* and *Menopon gallinae* were prevalent in autumn. *Goniocotes gigas* was comparatively less prevalent (70% in summer, 60% in autumn and 20% in winter). *Menacanthus stramineus* showed equal prevalence in summer and autumn (80%). *Holomenopon leucoxanthum* was the least prevalent in autumn among all the ectoparasites (50%) (Table 3). Ectoparasites are associated with poor hygiene maintenance. The poor hygiene conditions, including the fact that

all ages of birds are housed together, thus, facilitate the spread of ectoparasites like lice, mites and ticks. Irregular cleaning the poultry houses whose litter harbor eggs of some ecto-parasites like fleas and lice.

Table 3. Seasonal prevalence of ectoparasites in *Anas p. domesticus*

Parasite	Summer (March to June)		Autumn (July to October)		Winter (November to February)	
	Host infected	Prevalence (%)	Host infected	Prevalence (%)	Host infected	Prevalence (%)
A. cassicornis	20	100	20	100	20	100
L. caponis	18	90	20	100	12	60
G. hologaster	16	80	18	90	16	80
M. gallinae	18	90	20	100	16	80
M. stramineus	16	80	16	80	14	70
H. leucoxanthum	18	90	10	50	8	40
G. gigas	14	70	12	60	4	20
C. turbinatum	10	50	16	80	14	70

Among the endoparasites, *H. columbae* was found in all the duck samples in summer. *R. cesticillus* also showed peak prevalence (90%) in summer (Table 4). Musa *et al.* (2012) found this parasite *H. columbae* (40%) with a high intensity (28.63 ± 7.5) in her study. In the present study, though the sample size was not large, some arrays of seasonal aspects in the intestinal helminth fauna could be observed. The topmost intensity was of *Sobolevicanthus* sp. (17.8 ± 2.34) in female. This parasite is found to have its scolex deeply embedded in the intestinal mucosa of host. *A. galli* was found to be present in all the ducks sampled in summer. Similar result was found by Adejinmi and Oke (2011). They stated *A. galli* (46.8%) was the most frequently observed followed by *Heterakis gallinarum* (23.4%). *Cotugnia digonopora* was prevalent in summer (70%) following autumn (50%) but totally absent in winter (Table 4). The maximum parasitic load of all cestodes and nematodes in summer may also be influenced by the scarcity of feeds of ducks in late winter and early summer, thus, underfed individuals harboured comparatively higher parasitic burden (Permin and Hensen 1998).

In the present study, *E. recurvatum* and *P. longicirratus* were highly prevalent (40%) in summer which may be due to availability of snail intermediate hosts. Usually snails are available in monsoon when ducks are feed on snails, get infected with metacercaria of trematodes, but usually trematodes take some time to become adult in final host (Farjana *et al.* 2008). Parasite prevalence was comparatively low in winter for all the parasite species found (Table 4). This may be related with the annual rainfall in the collection area, categorized by cool, dry winter and warm, wet summer which facilitate survival of the infective stage.

Anisuzzaman *et al.* (2005) publicized in his study that seasonal dynamics of helminth parasites in ducks were almost similar throughout the year. According to his study, higher infection rate with helminth parasites was observed in rainy season (100%) followed by summer (98.10%) and winter (97.99%).

Table 4. Seasonal prevalence of endoparasites in *Anas p. domesticus*

Parasite	Summer (March - June)		Autumn (July - October)		Winter (November - February)	
	Host infected	Prevalence (%)	Host infected	Prevalence (%)	Host infected	Prevalence (%)
Trematodes						
E. recurvatum	8	40	6	30	4	20
E. revolutum	6	30	4	20	2	10
E. trivolvus	6	30	2	10	0	0
E. elegans	6	30	4	20	4	20
P. longicirratus	8	40	4	20	4	20
Cestodes						
H. lanceolata	16	80	12	60	8	40
H. columbae	20	100	14	70	10	50
R. bonini	16	80	12	60	10	50
R. cesticillus	18	90	10	50	4	20
R. echinobothrida	16	80	8	40	6	30
C. digonopora	14	70	10	50	0	0
Sobolevicanthus sp.	10	50	6	30	2	10
Nematode						
A. galli	20	100	14	70	4	20

Poultry such as chickens and ducks are kept in backyards or commercial production systems in most areas of rural Bangladesh. As ducks are scavenger animals ingest a wide environmental contaminated food, so are easily involved various species of parasites. It is one of the most important sources of animal protein and farm manure. Intestinal parasitism is a major problem in poultry, especially those reared under the extensive and semi extensive systems. The relevant data obtained in this study formed a baseline for further research in diagnosis and control of parasites in domestic duck. This study has also set a strong message on creating consciousness among duck farm owners/breeder about the different parasites infesting ducks.

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