

## OCCURRENCE OF PARASITES IN DOMESTIC DUCKS FROM RURAL AREAS OF NARAYANGANJ

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**Abstract:** Thirty six domestic ducks (*Anas platyrhynchos*) were examined to observe the occurrence of ecto and endoparasites. Altogether seven species of ectoparasites namely *Anaticola crassicornis*, *Lipeurus caponis*, *Goniocotes hologaster*, *Menopon gallinae*, *Menacanthus stramineus*, *Holomenopon leucpxanthum* and *Dermanyssus gallinae* were observed and identified. *L. caponis* showed the highest prevalence both in male and female (100%). Mean intensity of *A. crassicornis* in female ducks was the highest ( $14.5 \pm 2.36$ ) followed by *L. caponis* ( $12.5 \pm 3.21$ ). The lowest mean intensity was of *G. hologaster* ( $2.5 \pm 1.41$ ) in male ducks. Prevalence of *D. gallinae* was higher in male (62.5%) than in female (40%). The maximum percentage of ectoparasites was recovered from wing feather (38.62) followed by trunk (23.85) and skin (23.44). Among the endoparasites, the occurrence of cestodes (77.78%) was the highest with the topmost intensity ( $51.43 \pm 4.88$ ). The highest prevalence was of *Hymenolepis columbae* and *Hymenolepis diminuta* (60%). *Echinoparyphium recurvatum*, *Echinostoma revolutum* and *Tracheohilus sisowi* showed the similar prevalence (30%) in male ducks. *Patagifer bilobus* showed the peak mean intensity in both the male and female ducks. Only one species of nematode, *Ascaridia galli* was recovered. The maximum endo-helminths were found in the small intestine (48.30%) followed by duodenum (31.36%) and rectum (15.32%).

**Key words:** *Anas platyrhynchos*, lice, mite, prevalence, intensity

### INTRODUCTION

Chickens, turkeys and ducks are economically the main domestic birds in rural areas. Nowadays, ducks are mostly reared for high quality protein, meat and eggs (Hai *et al.* 2008). Ducks are inclined to a wide variety of disease caused by microbes, protozoa, helminths and arthropods (Abdu 2014). In Bangladesh, Ahmed (1969), Islam (1988), Farjana *et al.* (2004), Yousuf *et al.* (2009), Musa *et al.* (2012) have worked on duck parasites. The significance of helminthiasis in ducks has been emphasized by several authors working in different parts of the world (Adang *et al.* 2014). Ectoparasites are regarded as the basic causes of retardation in growth, lowered vitality and poor conditions of the birds (Ruff 1999). Ducks are highly susceptible to gastrointestinal helminth parasites due to their habitation of wet environments and scavenging behaviors. Alike chicken, they are fed on a range of substrates such as grains, fruits, insects, crustaceans,

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small amphibians and garbage (Mantur *et al.* 2010). A number of these arthropods have been identified as intermediate hosts of helminth parasites of poultry (Shah-Fischer and Say 1989). The present study was designed to identify various ecto- and endoparasites of domestic ducks occurring in rural areas of Narayanganj. Effect of hosts' sex on the prevalence and percentage of parasites in different parts of the body were also investigated.

### MATERIAL AND METHODS

A total of 36 *Anas platyrhynchos domesticus* (20 males and 16 females); were collected from Sonargaon Upazila, Narayanganj, Dhaka during July, 2017 to March, 2018. The ducks were collected from eight households. All the ducks were adults (>6 months). The ducks were brought and examined at the parasitology laboratory, Department of Zoology, University of Dhaka. Prevalence and intensity of parasites were calculated following Margolis *et al.* (1982).

*Ectoparasite collection and observation:* Insecticide mist (aerosol) was sprayed over the feathers of the body and left for five minutes. Ectoparasites were collected by shaking the bird on a white paper. Then the ectoparasites were taken in to a vial containing 70% alcohol. Lice were cleared with lactophenol and stained in borax carmine. Mites were observed without applying staining agents. Clearing the debris, the parasite was placed on a slide and covered with a coverslip. Then the slide was examined under the microscope and identified on the basis of external morphology (Soulsby 1982).

*Necropsy and endoparasite observation:* After decapitation, the trachea and gastrointestinal tract of each duck were collected in labeled specimen bottles containing 10% formalin as preservative. Each gastrointestinal tract was spread out on a dissecting board and separated into various segments (esophagus, crop, proventriculus, gizzard, small intestine and caecum). For regional recovery and identification of helminth parasites, each segment was dissected with a scalpel blade to expose the lumen and the mucosa was scraped into a Petri dish containing physiological saline solution and examined under a stereo microscope for the presence of adult worms. Similarly, the trachea was longitudinally dissected to expose the epithelium which was carefully examined and adult worms were extracted with the aid of needle. The preparation of the collected trematodes and cestodes for examination was done according to the technique of Carleton (1957) and Pritchard and Kruse (1982). The collected nematodes were preserved in an alcohol glycerol mixture (70% ethyl alcohol containing 5% glycerol). The worms were transferred to a lacto-phenol mixture (Watson 1960) and kept under observation till became clear. Then, the samples were mounted in glycerol jelly and observed under optical microscope at low

magnifications of 10 and 40x (Pritchard and Kruse 1982). The collected trematodes were identified according to Yamaguti (1958). The species of tapeworms were identified according to Khalil *et al.* (1994). Nematodes were identified according to Yamaguti (1961).

## RESULTS AND DISCUSSION

Altogether seven species of ectoparasites, namely *Anaticola crassicornis*, *Lipeurus caponis*, *Goniocotes hologaster*, *Menopon gallinae*, *Menacanthus stramineus*, *Holomenopon leucpxanthum* and *Dermanyssus gallinae* were observed and identified. Mean intensity of *A. crassicornis* in female ducks was the highest ( $14.5 \pm 2.36$ ) followed by *L. caponis* ( $12.5 \pm 3.21$ ) (Table 2). *H. leucpxanthum* showed higher prevalence in male (80%) than in female (37.5%) which contradicted the findings of Senlik *et al.* (2005). They reported no significant difference in overall prevalence of parasites between male and female pigeons. Inadequate self-cleaning process and lack of nutrition may distress hosts' immune system and ability to combat the parasitic infection. Prevalence (100%) and intensity ( $22.28 \pm 3.21$ ) of ectoparasites of Philoptera family was the maximum followed by Menoponidae and Dermanyssidae families (Table 1). Soto-Patino *et al.* (2018) examined 210 birds and found that 119 birds were infected with the lice of Philoptera family and 131 birds with the lice of Menoponidae family.

Prevalence of *L. caponis* (100%) was the same in both the male and female ducks (Table 2). Musa *et al.* (2012) also found the highest prevalence in *Lipeurus* sp. *D. gallinae* showed the lowest prevalence (40%) in male followed by *M. stramineus* (50%) in female. Cencek *et al.* (2002) reported *D. gallinae* infection in ducks from Poland. *D. gallinae* is reported either to infest man or cause annoyance especially in rural areas (Sabuni *et al.* 2010) where there is close association between man and domestic fowls. Mean intensity of *G. hologaster* ( $2.5 \pm 1.41$ ) was the lowest in the male ducks in the present study. Mean intensity of *H. leucpxanthum* and *M. stramineus* was also low (Table 2). Intensity of ectoparasites in birds may be interrelated with many factors, such as home range, behaviour, size, roosting and preening habit of the host.

Altogether 13 species of endoparasites were recovered in the present study. Six species of trematodes namely *Echinoparyphium recurvatum*, *Echinoparyphium anceps*, *Echinostoma revolutum*, *Echinostoma trivolvis*, *Patagifer bilobus* and *Tracheophilus sisowi*; six species of cestodes namely *Hymenolepis*

*lanceolata*, *Hymenolepis columbae*, *Hymenolepis diminuta*, *Raillietina bonini*, *Raillietina cesticillus* and *Raillietina echinobothrida*; one species of nematodes, named *Ascaridia galli* were observed and identified (Table 2). Earlier Qadir (1979) recorded 13 species of helminths from domestic ducks of Bangladesh. Among the three groups of endoparasites, cestodes displayed the highest prevalence (77.78%) and intensity ( $51.43 \pm 4.88$ ) (Table 1). Among the hymenolepids, the topmost prevalence was of *H. columbae* (75%) in female ducks. Mean intensity of *H. columbae* ( $23.33 \pm 0.99$ ) and *H. diminuta* ( $20 \pm 0.78$ ) was also quite high in female ducks and *H. lanceolata* ( $20 \pm 2.31$ ) in male ducks (Table 2). Soulsby (1982) found thousands of hymenolepids per bird. Among all the endoparasites found in the present study, mean intensity of *R. echinobothrida* was the maximum both in male ( $30 \pm 0.89$ ) and female ( $28 \pm 0$ ). Betlejewska and Kalisinska (2001) did not find any difference in the prevalence of helminths in the two sex groups. *R. bonini* and *R. cesticillus* showed similar prevalence and mean intensity. Among the trematodes, *E. revolutum*, *E. recurvatum* and *T. sisowi* showed the maximum prevalence (30%) in male. *Patagifer bilobus* showed the highest mean intensity both in the male ( $27 \pm 0$ ) and female ducks ( $21 \pm 0$ ) (Table 2). But overall prevalence of trematodes was lower in the present study compared to the findings of Ahmed (1969), Islam et al. (1988), Farjana et al. (2004) and Anisuzzaman et al. (2005). This disparity may be due to differences in the method of study, unavailability of intermediate hosts, geo-climatic condition and hygiene practices by the duck owners.

All the ducks were adults and showed high prevalence of cestodes which argues against the findings of Paul et al. (2015). Muhairwa et al. (2007) also stated that the prevalence of cestodes was higher in ducklings than in adult ducks in their study. This high prevalence may be associated with the free range system of management under which village ducks are kept as well as the amphibious habits of ducks which expose them to greater risk of parasitism (Shah-Fischer and Say 1989).

Only one type of nematode, *A. galli* was recovered in the present study, with a medium prevalence, 50% in male and 25% in female which contradicted the findings of Bachaya et al. (2015). They found high prevalence and intensity of *A. galli* in female ducks and described that the high prevalence in female birds may be due to hormonal differences, stress during egg production and feeding habit. Female birds are known to be more voracious in their feeding habits especially during egg production than the males that remain largely selective (Sonaiya

1990). Mean intensity of *A. galli* was similar in both the male ( $15.2 \pm 2.98$ ) and female ( $16 \pm 0.87$ ). Paul *et al.* (2015) found the highest prevalence of *A. galli* (85.6%), followed by *Heterakis gallinarum* (79.50%). Temperature and rainfall were important factors for the development, hatching and survival of pre-parasitic stages of nematodes (Abdul-Basit *et al.* 2010).

**Table 1. Prevalence and intensity of parasites in *Anas platyrhynchos* on the basis of different families**

Type	Name of the groups	Host infected	Prevalence (%)	Collected parasites	Intensity ( $\pm$ Sd)
Ectoparasite	Philopteridae	36	100	802	$22.28 \pm 3.21$
	Menoponidae	30	83.33	608	$20.27 \pm 3.74$
	Dermanyssidae	10	27.78	66	$6.6 \pm 1.49$
Endoparasite	Trematoda	20	55.55	576	$28.8 \pm 2.52$
	Cestoda	28	77.78	1440	$51.43 \pm 4.88$
	Nematoda	14	38.89	216	$15.42 \pm 1.79$

**Table 2. Occurrence of ectoparasites in male and female *Anas platyrhynchos***

Name of parasites	No. of ducks infested		Prevalence (%)		Total no. of endoparasites recovered		Mean intensity ( $\pm$ Sd)	
	M	F	M	F	M	F	M	F
<i>Anaticola cassicornis</i>	18	12	90	75	218	174	$12.11 \pm 3.35$	$14.5 \pm 2.36$
<i>Lipeurus caponis</i>	20	16	100	100	138	200	$6.9 \pm 1.96$	$12.5 \pm 3.21$
<i>Goniocotes hologaster</i>	16	10	80	62.5	40	32	$2.5 \pm 1.41$	$3.2 \pm 1.38$
<i>Menopon gallinae</i>	18	14	90	87.5	198	160	$11 \pm 2.03$	$11.43 \pm 3.04$
<i>Menacanthus stramineus</i>	12	8	60	50	94	64	$7.83 \pm 1.97$	$8 \pm 1.95$
<i>Holomenopon leucoxanthum</i>	14	6	70	37.5	70	22	$5 \pm 1.88$	$3.67 \pm 1.25$
<i>Dermanyssus gallinae</i>	8	10	40	62.5	24	42	$3 \pm 1.37$	$4.2 \pm 1.89$

The maximum percentage of ectoparasites was recovered from wing feather (38.62) followed by trunk (23.85) and skin (23.44). No ectoparasite was observed in nape, breast and limb (Table 4). The finding agrees with Sabuni *et al.* (2010). Morishita *et al.* (2001) found that the trunk of birds was the preferred predilection site for lice followed by the head region. Most ectoparasites possess thick cuticle that protects them from being crushed by the hosts bill.

Ectoparasites can also escape hosts' preening by hiding. Some feather lice (Insecta: Phthiraptera) hide between the barbs of flight feathers or they burrow into the velvety regions of abdominal contour feathers (Bush *et al.* 2006).

**Table 3. Occurrence of endoparasites in male and female *Anas platyrhynchos***

Name of parasites	No. of ducks infested		Prevalence (%)		Total no. of endoparasites recovered		Mean intensity ( $\pm$ Sd)	
	M	F	M	F	M	F	M	F
<b>Trematodes</b>								
<i>Echinoparyphium recurvatum</i>	6	2	30	12.5	90	50	15 $\pm$ 0.83	25 $\pm$ 0
<i>Echinoparyphium anceps</i>	0	2	0	12.5	0	14	0	7 $\pm$ 0
<i>Echinostoma revolutum</i>	6	4	30	25	96	60	16 $\pm$ 0.98	15 $\pm$ 0.78
<i>Echinostoma trivolvis</i>	2	4	10	25	20	38	10 $\pm$ 0	9.5 $\pm$ 0.67
<i>Patagifer bilobus</i>	2	2	10	12.5	54	42	27 $\pm$ 0	21 $\pm$ 0
<i>Tracheophilus sisowi</i>	6	4	30	25	70	42	11.67 $\pm$ 1.2	10.5 $\pm$ 0.67
<b>Cestodes</b>								
<i>Hymenolepis lanceolata</i>	8	6	40	37.5	160	100	20 $\pm$ 2.31	16.67 $\pm$ 1.2
<i>Hymenolepis columbae</i>	12	6	60	75	200	140	16.67 $\pm$ 3.02	23.33 $\pm$ 0.99
<i>Hymenolepis diminuta</i>	12	4	60	25	158	80	13.17 $\pm$ 3.44	20 $\pm$ 0.78
<i>Raillietina bonini</i>	8	6	40	37.5	112	84	14 $\pm$ 2.11	14 $\pm$ 1.32
<i>Raillietina cesticillus</i>	8	8	40	50	120	110	15 $\pm$ 2.87	13.75 $\pm$ 2.5
<i>Raillietina echinobothrida</i>	2	4	10	25	56	120	28 $\pm$ 0	30 $\pm$ 0.89
<b>Nematode</b>								
<i>Ascaridia galli</i>	10	4	50	25	152	64	15.2 $\pm$ 2.98	16 $\pm$ 0.87

The maximum helminths were located in the small intestine (48.30%) followed by duodenum (31.36%) and rectum (15.32%). It may be due to nutritional sufficiency in small intestine than the other parts. No parasite was found in liver, lungs and heart (Table 4). The findings agree with the work of Eom *et al.* (1984).

**Table 4. Percentage of parasites in different parts of body of *Anas platyhynchos***

Part of the body	Number of parasites recovered	Total number of parasites	Percentage
<b>Outer body</b>			
Skin	346	1476	23.44
Trunk	352		23.85
Nape and breast	0		0
Wing feather	570		38.62
Tail feather	208		14.09
Limb	0		0
<b>Alimentary canal and respiratory tract</b>			
Duodenum	700	2232	31.36
Intestine	1078		48.30
Rectum	342		15.32
Liver	0		0
Lungs	0		0
Heart	0		0
Respiratory tract	112		5.02

### CONCLUSION

Moderate prevalence of endoparasites and comparatively high prevalence of ectoparasites in domestic ducks have been observed. The study has set a strong message to create awareness among duck owners about various parasites of ducks and their pathogenic potential to protect them from future loss. In near future, study including transmissibility pattern of parasites with vector involvement is necessary for constructing an inclusive epidemiological mapping of parasitic infection in domestic ducks.

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