



E-ISSN 2347-2677

P-ISSN 2394-0522

<https://www.faunajournal.com>

IJFBS 2024; 11(2): 23-26

Received: 23-01-2024

Accepted: 22-02-2024

Debalika Dalal

School of Bio Science, Seacom
Skills University, Santiniketan,
Bolpur, Birbhum-731236, West
Bengal, India

Subham Saha

School of Bio Science, Seacom
Skills University, Santiniketan,
Bolpur, Birbhum-731236, West
Bengal, India

Dip Das Dalal

School of Bio Science, Seacom
Skills University, Santiniketan,
Bolpur, Birbhum-731236, West
Bengal, India

Abhishek Roy

School of Bio Science, Seacom
Skills University, Santiniketan,
Bolpur, Birbhum-731236, West
Bengal, India

Soumendra Nath Talapatra

School of Bio Science, Seacom
Skills University, Santiniketan,
Bolpur, Birbhum-731236, West
Bengal, India

Pranabesh Ghosh

School of Bio Science, Seacom
Skills University, Santiniketan,
Bolpur, Birbhum-731236, West
Bengal, India

Corresponding Author:

Pranabesh Ghosh

School of Bio Science, Seacom
Skills University, Santiniketan,
Bolpur, Birbhum-731236, West
Bengal, India

Comparative study on the outbreak of helminth parasites in domestic duck and chicken

Debalika Dalal, Subham Saha, Dip Das Dalal, Abhishek Roy, Soumendra Nath Talapatra and Pranabesh Ghosh

DOI: <https://doi.org/10.22271/23940522.2024.v11.i2a.1015>

Abstract

Domestic birds have a significant role in social and national economic conditions all over the world. In domestic birds, parasitic infections are essential due to their adaptability to various environmental situations and their relationship with the human community. This study was conducted to determine the prevalence of gastrointestinal helminths endoparasites in domestic Duck (*Anas platyrhynchos domesticus*), and two sub-species of Chicken (*Gallus gallus domesticus*), which are local domestic chicken and farmed chicken, mainly broilers. Among ten pigeons, six were found positive for cestode parasites, and no nematode parasites were found. Among ten ducks, two were found to be positive for cestode and one for nematode parasites. Among twenty chickens (tens layers chickens, tens broilers chickens), nine out of ten-layer chickens were found positive for cestode parasites, and five out of ten were found positive for nematode parasites. Meanwhile, farmed broiler chickens had no parasites, and neither cestode nor nematode was found during examination. However, a comparative study on the parasitic infestation of ducks and chickens reveals that local domestic chickens were more severely infected than broiler chickens and ducks.

Keywords: Gastrointestinal parasites, Cestode, nematode, endo parasites, helminthes, *Anas platyrhynchos domesticus*, *Gallus gallus domesticus*

Introduction

India (latitude 20.5937° N and longitude 78.9629° E) is a livestock-dependent country, including the animal husbandry sector, agriculture and fisheries contributing to 5.26% of total Gross domestic product (GDP) (2009). Among all the diversified animal husbandry practices, poultry farming is cheaper than fish rearing in the animal husbandry sector [1]. India has one of the most significant and fastest-growing poultry industries, where hen egg and broiler meat production ranks third and sixth, respectively [2]. In Tripura (latitude 23.9408°N and longitude 91.9882° E), poultry farming of *Gallus gallus domesticus* has now become a great source of income for the people of rural life. Poultry farming has increased in recent years due to the high demand for eggs and flesh for meat.

Poor poultry management is affecting its economy due to the frequent disease outbreaks [1]. Though the effect of parasitic diseases in farm birds reared in cage systems has reduced due to rejuvenation in poultry farming and biosecurity measures, farm birds nourish on deep litter systems and backyard free-ranging birds remain susceptible to parasitic contamination via litter droppings and scavenging habits [3].

Some common gastrointestinal parasites of chicken are nematodes, cestodes and trematodes. These parasitic worms causes considerable damage in the poultry chicken industry by causing malnutrition, weight loss, lowered egg production, decreased feed conversion ratio, and even death in young chicken birds. For Improvement, poultry management practices are responsible for reducing the incidence of parasitic infections [4]. However, due to the abundance of intermediate hosts, they visit the poultry pens for carrying food materials or for feeding like in beetles, ants, and houseflies, which are abundant in poultry litter droppings and are responsible for the transmission of various helminths [3]. Since the feeding habits of local chickens are not controlled, they are susceptible to more infection by parasites. Some indigenous chicken species in India are Chittagong, Aseel, Karaknath, Ghagu etc.

In Tripura, ducks (*Anas platyrhynchos domesticus*) fulfil a significant proportion of animal

protein, like any other developing country, in the form of meat and eggs. They are aquatic and can thrive best in areas with plenty of water. Although ducks are reared everywhere, they are primarily found in India's Eastern, North-Eastern, and Southern states^[5]. Duck farming is traditionally prevalent in Tripura because of religious points of view, social structure, abundance of surface water, and marshy and water-logged areas throughout the state, which provide a congenial environment.

Poultry farming of ducks (*Anas platyrhynchos domesticus*) is exclusively used as an economic source of income in rural India because its meat and eggs are a high source of protein. It reduces poverty, maintains economic conditions, and provides food for families. However, the duck industry still could not meet the increasing demands of consumers concerning eggs and meat in the state.

One of the major factors responsible for this is the various parasitic infections, which cause heavy economic loss to the farmers due to poor growth rate, poor feed conversion rate, and reduced egg and meat production, leading to death^[6]. The subtropical climate and stagnant water are favourable habitats for ducks and also suitable for the growth of parasites^[7]. Despite ducks being resistant to infection, ducks can be the final or intermediate host of several helminths parasites, which can contaminate the environment when the eggs of gastrointestinal parasites are shed into the environment through the feces of ducks in this way, humans and animals get infected^[8]. Cestode and nematode parasites are commonly found in the *Anas platyrhynchos domesticus*. Moreover, ducks feed on various aquatic organisms like snails, fishes, earthworms, water cyclops etc., which act as intermediate hosts and get infected with parasitic diseases. Some indigenous duck species in India are the Indian runner, Khaki Campbell, Sylhet-mete, Nageswari etc.

All birds, Duck (*Anas platyrhynchos domesticus*) and Chicken (*Gallus gallus domesticus*) have similar food habits and the same types of gastrointestinal helminth parasites and related parasitic diseases or infections. This study was therefore conducted to provide baseline information about the helminth infection in these birds as gut parasites. A comparative study was made to account for the outbreak of cestode and nematode infection in the three birds in consideration.

Materials and Methods

a. Study area: The study was undertaken for nearly one month. Aim of the study was to observe the prevalence of domestic Duck and Chicken parasites in their guts. During the study period, regular visits were made to some selected poultry stalls of Golbazar market, Agartala, Tripura, North-Eastern India, for the collection of intestinal materials of all three bird fowls – duck and chicken for parasitological study.

The study was conducted in Golbazar market, one of the main markets of the capital town Agartala of state Tripura. It is situated within latitude of 23.8315 and a longitude of 91.2868. The state has a humid and warm tropical climate with five distinct seasons, namely, spring (mid-Feb-mid Mar), summer

(mid-Mar-May), monsoon (May/Jun-Sep), autumn, and winter (Nov-Jan). The recorded maximum temperature is 35.60°C, and the recorded winter was 4°C in 1995. Humidity is generally high throughout the year. In the summer season, the relative humidity varies from 50% to 74%, whereas in the rainy season, it is over 85%.

b. Sample population: The sample population comprised healthy ducks (*Anas platyrhynchos domesticus*), and chickens (*Gallus gallus domesticus*) domesticated in various wards within the Metropolis and those sold in markets. Forty fresh intestinal samples were collected randomly, containing ten ducks and twenty chickens, among which ten were, layer domesticated chickens and ten were farmed broiler chickens. They were purchased directly from their owners within the selected market based on availability.

c. Collection of parasites from gastrointestinal tract (GIT): Alimentary canals of ducks and chickens were obtained directly from slaughter house. The fecal matters were collected from rectum and kept in sterilized zip locked plastic packets. The samples were brought to the laboratory and kept in a refrigerator at 4°C for further examination.

d. Collection of Helminth parasites: The esophagus, crop, pro-ventriculus, gizzard, duodenum, jejunum, ileum, caeca, cloaca, and rectum of selected specimens were opened longitudinally with a pair of scissors and needles on the dissecting tray for visual examination of helminths parasites. After opening each gut, 0.9% NaCl was added to the dissecting tray. The opened parts were then washed by agitating in saline to separate the helminths worms from the contents with the help of needles and brushes. The parasites (cestodes and nematodes) were later transferred to another Petri dish containing standard saline solution and washed thoroughly to remove the dirt and mucus from them. Then, parasites were again transferred to another Petri dish containing Bouin's fluid.

e. Identification of parasites: Parasites are then taken out on glass slides and examined under a light microscope at 10X magnifications for identification. Later, those specimens were removed and preserved separately in properly labeled glass vials containing 10% formalin. Separate vials are labeled for duck and chicken parasites. The identified specimens are cestode and nematode endoparasites.

Results and Discussions

In the total course of examination, cestode and nematode parasites are found in the *Anas platyrhynchos domesticus*, where the maximum number of cestode are observed whereas, in *Gallus gallus domesticus*, we did not get any parasites in farmed broiler chickens except some outgrowths. However, in layer chickens, we get a huge number of cestodes as well as a huge number of nematode parasitic worms.

Table 1: Prevalence and intensity of helminthes in domestic birds

Name of host	Name of Parasites	Total No. of Host Examined (n)	No. of Host Found Infected (a)	Sites of Recovery	Total No. of Parasites Collected (b)	Prevalence (%) (a/n x100)	Intensity (b/a)
Farmed Layer Chicken species	Cestode	10	9	Caeca & Small intestine-e	292	90	32.44
	Nematode	10	5	Small intestine	45	50	9
Farmed Broiler Chicken species	Cestode	10	0	Nil	0	0	0
	Nematode	10	0	Nil	0	0	0
Duck	Cestode	10	2	Small intestine	13	20	6.5
	Nematode	10	1	Small intestine	2	10	2

1. Prevalence and intensity of helminthes in *Gallus gallus domesticus* (Chicken)

Two sub species of *Gallus gallus domesticus* were taken for helminthiasis examination. One is local domesticated chicken, and another one is farmed broiler chicken. The main purpose of taking both is to compare the prevalence of gastrointestinal endoparasites in their guts.

Among 10 Farmed layer chickens, nine were found positive or infected with *Raillietina* sp. (cestode), and five were found positive or infected with *Ascaridia* sp. During the full course of examination, the prevalence of helminths is found to be higher for cestodes (90%) than nematode parasites (50%). The intensity of helminths is also found to be higher for cestodes (32.44) than nematodes (Table No.1 and Fig no. 1 and 2). *Raillietina* sp., were commonly found at the sites of caeca and small intestines, and *Ascaridia* sp., were found from the sites of small intestines only.



Fig 1: Nematode and cestode endoparasites in the intestinal gut of layer chicken



Fig 2: Nematode (left side) and cestode (right side) parasites found in the gut of layer chickens

Among 10 Farmed broiler chickens, 0 were found positive or infected for any cestode or nematode parasitic species. Hence, the prevalence and intensity of the cestode and nematode parasite in the entire examination course remain 0 (Table No. 1). No cestode or any other nematode worms were found from any site of the gut.

2. Prevalence and intensity of Helminths in domestic *Anas platyrhynchos domesticus* (Duck)

Among ten ducks, three were found positive for helminths. Among three, two were found positive or infected with *Raillietina* sp., and one with *Ascaridia* sp., Hence, during the full course of examination, the prevalence of helminths was found to be higher in cestodes (20%) than in nematodes (10%). Similarly, helminth parasites intensity is found to be higher in the cestode (6.5) than in the nematode (2). *Raillietina* sp., and *Ascaridia* sp., are found only in the small intestine sites (Table-1 and Fig no- 3 and 4).



Fig 3: Cestode parasites in the gut of Duck



Fig 4: Nematode (left side) and Cestode (right side) parasites found in the gut of Duck.

Discussions

After observing and undergoing this project and other articles, it has been concluded that most of the endoparasites are the same in all bird types- Duck, Chicken because their food habits, reproduction process, and behavioural patterns in the ecosystem are very similar. Therefore, the mode of transmission of Helminth parasites inside their body is also similar. Most of all three types of fowls used to be infected by the same types of Helminth parasites for a long time.

In the case of ducks, females are more susceptible to parasites during the incubation of their eggs^[9] and also due to lack of balanced nutrition, which affects their immune system as they lose the ability to combat the parasitic infection^[10]. Parasites are associated with poor hygiene maintenance. The poor

hygiene conditions, including the fact that birds of all ages are housed together, facilitate the spread of parasites and irregular cleaning of poultry houses whose litter harbours eggs of some ectoparasites like fleas and lice. Parasite prevalence is low in winter for ducks. However, it may be related to the annual rainfall in the collection area, categorized by cool, dry, winter and warm, wet summer, which facilitate survival of the infective stage [4].

Our investigation found that a higher prevalence of gastrointestinal helminths is found in layered chickens. It may be because these birds are reared longer and allowed to scavenge for most days; thus, they are more frequently exposed to infective stages/infected intermediate hosts of the helminths. In contrast, we didn't get a single gastrointestinal parasite in broiler chickens. It may be because broilers are reared properly, hygienically, and maintained. Caretakers always clean their farms; they are treated with different types of medicines, antibiotics, and chemicals so as to avoid Helminth parasites and other types of infections.

Conclusions

The above investigation concluded that all Ducks and Chicken (Except broiler chicken) are endemically infected with Helminth parasites, which could be associated with poor management practice and inadequate veterinary care.

For improved health and productivity of poultry birds, proper hygienic measures, destruction of intermediate hosts, and regular de-worming of all birds are recommended in addition to the proper feeding of the birds.

Conflict of interest

The author declares no conflict of interest.

References

1. Kumar S, Garg R, Ram H, Maurya PS, Banerjee PS. Gastrointestinal parasitic infections in chickens of upper gangetic plains of India with special reference to poultry coccidiosis. *J Parasit Dis.* 2015;39(1):22–26.
2. USDA. India's poultry and egg industry. *Int Egg Poultry Rev*, 2011, 14(34).
3. Puttalakshamma GC, Ananda KJ, Prathiush PR, Mamatha GS, Rao SP. Prevalence of gastrointestinal parasites of poultry in and around Bangalore. *Vet World.* 2008;1(7):201-202.
4. Alim A, Rahman MH, Mondal MMH. Helminth parasites in indigenous ducks: seasonal and effects on production performance. *J Bangladesh Agril Univ.* 2005;3:283-290.
5. Borah N, Phukan SC, Islam S, Tamuli SM, Rajbonshi P. Prevalence of helminth parasites of domestic ducks in Upper Assam (India). *Int J Chem Stud.* 2018;6(4):1310-134.
6. Soulsby E JL. *Helminths, Arthropods and Protozoa of Domesticated Animals.* 7th ed. London: BaillereTindall and Cassell Ltd; c1982. p. 366-387.
7. Begum A, Sehrin S. Parasitic infections and heavy metal content in pigeon (*Columba livia*) [Master's thesis]. Dhaka: University of Dhaka; c2011.
8. Larki S, Alborzi A, Chegini R, Amiri R. A Preliminary Survey on Gastrointestinal Parasites of Domestic Ducks in Ahvaz, Southwest Iran. *Iran J Parasitol.* 2018;13(1):137–144.
9. Mirzaei M, Ghashghaei O, Yakhchali M. Prevalence of ectoparasites of indigenous chickens from Dalahu region,

Kermanshah Province, Iran. *Turkiye Parazitol Derg.* 2016;40:13-16.

10. Begum A, Mukutmoni M, Akter FP. Parasite diversity in domestic duck on *Anas platyrhynchos domesticus* from Munshiganj, Dhaka. *Bangladesh J Zool.* 2019;47(1):121-128.