

## **A FAUNISTIC SURVEY ON THE GASTROINTESTINAL PARASITES OF SOME MARKETABLE BIRDS IN MEIKTILA TOWNSHIP, MANDALAY REGION**

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### **Abstract**

Local resident around Meiktila environs enjoy selling wild birds as protein sources at Pauk Chaung markets of Meiktila Township, Mandalay Region. In the present study, some specimens of birds were purchased from Pauk Chaung market, Meiktila Township and freshly dead specimens were transported to laboratory of Zoology Department, Meiktila University. The goal of research investigated helminth species that harboured in the gastrointestinal tracts of five marketable bird species. Helminths collected as alive or dead and lactophenol was used as cleaning agent. Parasites were identified by using morphometric measurements and morphological descriptions. During the study period fifty gastrointestinal tracts from five species of birds were examined. Thirty-two birds out of 50 examined birds, showed infestation with eight species of cestodes, four species of nematodes and one species of acanthocephalans. The highest infected rate was observed in cestodes (51.16%), followed by nematodes (46.88%), and acanthocephalans (1.96%). The prevalence of helminths was (50.09%) in small intestine, however single helminths was incidence in the oesophagus plus crop and proventriculus plus gizzard. Not a single trematode was encountered throughout the study period. A high percentage of heiminthiasis was observed in the studied birds.

**Keywords:** bird helminth, Gastrointestinal parasites, prevalence, Meiktila

### **Introduction**

Poultry acts as an important source of animal protein (meat and egg) for man (Ola-Fadunsin *et al.*, 2019). Helminth parasites appear in many birds, usually without causing much damage. There were often heavy intestinal infestations in birds which died of disease or which died of starvation during hard weather (Clapham, 2009). Presence of gastrointestinal parasites in birds causes severe economic losses in terms of reduced body weight gain, decreased egg production, sometime even mortality and affects the quality and quantity of meat production also (Sivakumar *et al.*, 2017).

Vertebrates are parasitized by four major groups of helminths (worms). Two of the groups, trematodes, or flukes, and cestodes, or tapeworms, fall within the Phylum Platyhelminthes. The other two groups are the nematodes, or roundworms, (Nematoda) and the acanthocephalans, or thorny-headed worms (Acanthocephala) (Sepulveda and Kinsella, 2013).

Helminthiasis was considered to be important problems in chickens. Avian cestodiasis constitutes one of the most common endoparasitism causing serious troubles in chicken production (Shahin *et al.*, 2011). Multiple gastrointestinal tract (GI tract) parasitic infection is a common phenomenon in poultry, affecting their normal activities which is manifested mainly by severe pains (Ola-Fadunsin *et al.*, 2019). This study was undertaken to determine the prevalence and incidence of different helminth parasites that occurred in gastrointestinal tract of the bird species.

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## Materials and Methods

### Host and collection of the parasitic specimens

A total of 50 birds which included four terrestrial bird species *Gallus domesticus*, *Turnix tanki*, *Streptopelia chinensis*, *Ploceus manyar* and a single water bird species of *Gallinula chloropus* were purchased from Pauk Chaung market in Meiktila during study period from December 2018 to August 2019. Ten gastrointestinal tracts including caecum from each species of birds were examined. The dead specimens were placed in wooden tray and dissected with a pair of scissors along midventral line. And then the entire tract was excised and divided into four parts that is (1) the oesophagus plus crop, (2) the proventriculus plus gizzard, (3) the small intestine and (4) the caeca plus the rectum and cloaca. Each part was cut opened longitudinally with a pair of scissors in a wax tray containing tap water. The contents were poured into petri-dish and processed by method of sedimentation and decantation to find parasites.

### Preparation for identification of parasite

The freshly collected worms were cleaned in normal saline and then in distilled water to remove mucous and undesirable particles that attached to the body. Lactophenol was also used as cleaning agent to give better result in observing the specimen. After which the specimens were photographed and examined under microscope. Worms were then preserved and stored in five percent formalin with five percent glycerine added.

### Data analysis

Prevalence is defined as the percentage of hosts infected with one or more individuals of a particular parasite species out of the total number of hosts examined for that parasite species.

The percentage of parasites and prevalence of infestation were calculated using the following formula (Thrusfield, 2007).

$$\text{Percentage of parasites} = \frac{\text{Number of specific parasites}}{\text{Total number of parasites}} \times 100$$

$$\text{Estimated prevalence of infestation} = \frac{\text{No. of animals infested with parasites species}}{\text{Number of examined animals}} \times 100$$



Location map of the study area (Google Earth, 2019)

## Results

### Occurrence of helminth parasites

A total of 50 gastrointestinal tracts from five species of birds were examined for endoparasitic helminthes. Among the studied specimens, 64 % (32/50) prevalence found gastrointestinal helminthic infection in Paukchaung market. Helminth parasites included eight species of cestodes, four species of nematodes and only one species of acanthocephalans were recorded in the study.

The identified cestodes were *Raillietina echinobothrida*, *R. tetragona*, *R. cesticillus*, *R. georgiensis*, *Davainea spiralis*, *Choanotaenia infundibulum*, *Hymenolepis nana* and *Cloacotaenia megalops*. Birds infected with cestodes were 51.16 %. In spite of the eight species of cestodes recovered, the largest number of total parasites count was found in cestodes especially in *Hymenolepis nana*. In this study birds infected with nematodes were 46.88 %. The recorded nematodes were *Gongylonema ingluvicola*, *Heterakis gallinarum*, *Ascaridia galli* and *Subulura brumpti*. *Moniliformis moniliformis*, an acanthocephalan, with the infection of 1.96 % was found in this study (Table 1, Fig. 2)

### The prevalence of parasites

In this study, *Raillietina echinobothrida* infection was (12%), *R. tetragona* (18%), *R. cesticillus* (6%), *R. georgiensis* (4%), *Davainea spiralis* (10%), *Choanotaenia infundibulum* (4%), *Hymenolepis nana* (30%) and *Cloacotaenia megalops* (12%) were recorded.

In nematodes, *Gongylonema ingluvicola* revealed (8%), *Heterakis gallinarum* (4%), *Ascaridia galli* (12%) and *Subulura brumpti* (10%). Acanthocephalan, *Moniliformis moniliformis* showed (6%). However, the incidence of *R. georgiensis*, *C. infundibulum* and *H. gallinarum* were rare.

The most prevalent helminth was *H. nana*, a cestode (30%) and the least percentage of (4%) was those of *R. georgiensis* and *C. infundibulum*, and *H. gallinarum*, a nematode (4%) (Table 1, Fig 1).

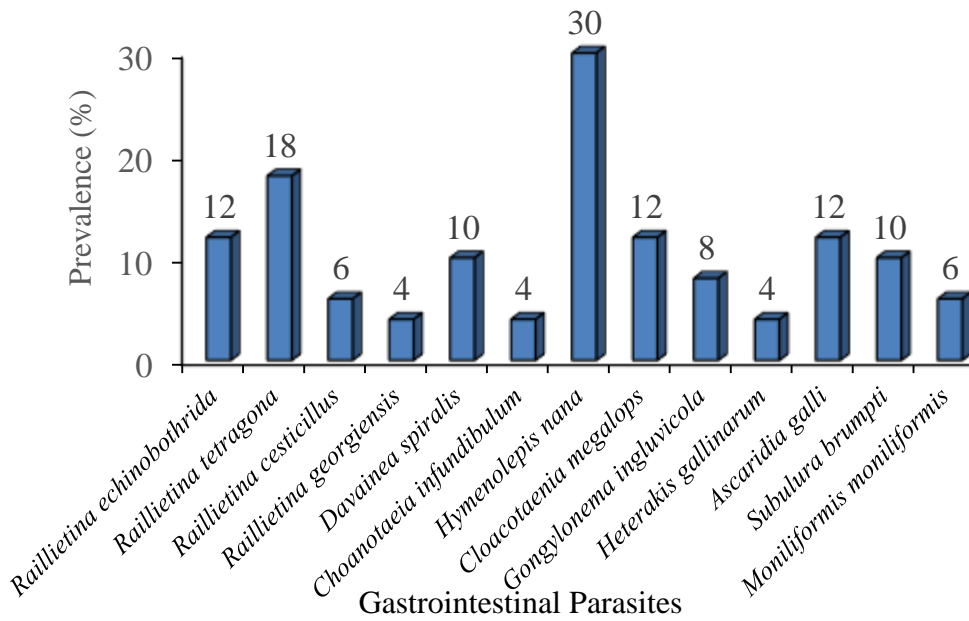
### Organ-wise infection of parasites

Four parts of gastrointestinal tract in each specimen, i.e. oesophagus plus crop (first part), proventriculus plus gizzard (second part), small intestine (third part), and the caeca plus rectum and cloaca (fourth part) were examined for the detection of helminth parasites. *Gongylonema ingluvicola* was encountered in first part (oesophagus plus crop) was 5.17% (29 individuals) and *Heterakis gallinarum* in second part (proventriculus plus gizzard) was 0.53% (three individuals). Most of the cestode, *Raillietina echinobothrida*, *R. tetragona*, *R. cesticillus*, *R. georgiensis*, *Davainea spiralis*, *Choanotaenia infundibulum*, *Hymenolepis nana*, *Cloacotaenia megalops* and one of the nematodes the *Ascaridia galli*, and an acanthocephalan species *Moniliformis moniliformis*, (altogether 10 species and 281 in number) were found in third part (small intestine) was 50.09%. In fourth part (caeca plus rectum and cloaca) the cestodes encountered were *Raillietina echinobothrida*, *R. tetragona*, *Davainea spiralis*, *H. nana*, *C. megalops* and the nematode were *H. gallinarum* and *Subulura brumpti* contributed to 44.21% (seven species and 248 in number) (Table 2).

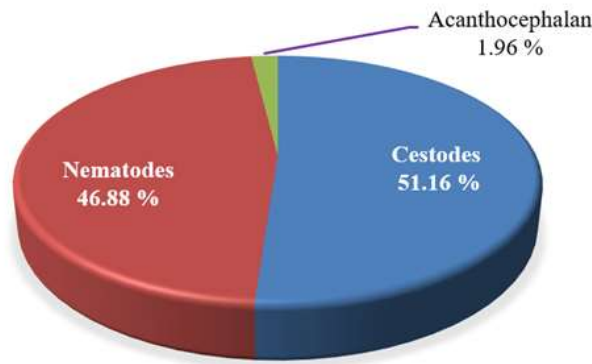
### Number of helminth in specimens recorded

With regard to the host specimens examined, twelve species of parasites were encountered in *Gallus domesticus* (Domestic chicken), three species in *Turnix tanki* (Yellow-legged Buttonquail), four species in *Streptopelia chinensis* (Spotted dove) only one species each in

*Ploceus manyar* (Streaked weaver) and *Gallinula chloropus* (Common moorhen) respectively (Table 3).



**Figure 1** Prevalence of helminth infection



**Figure 2** Occurrence of cestodes, nematodes and acanthocephalan

**Table 1 Overall prevalence percentage of helminths and regions of incidence in birds examined (N = 50)**

Types of helminths	Species	Regions of incidence	No. of birds infected	No. of Parasite count	Prevalence (%) N = 50	Percentage of parasites
Cestodes	<i>Raillietina echinobothrida</i>	small intestine / caeca, rectum & cloaca	6	27	12	51.16
	<i>Raillietina tetragona</i>	small intestine / caeca, rectum & cloaca	9	46	18	
	<i>Raillietina cesticillus</i>	small intestine	3	24	6	
	<i>Raillietina georgiensis</i>	small intestine	2	7	4	
	<i>Davainea spiralis</i>	small intestine / caeca, rectum & cloaca	5	21	10	
	<i>Choanotaeia infundibulum</i>	small intestine	2	7	4	
	<i>Hymenolepis nana</i>	small intestine / caeca, rectum & cloaca	15	108	30	
	<i>Cloacotaenia megalops</i>	small intestine / caeca, rectum & cloaca	6	47	12	
Nematodes	<i>Gongylonema ingluvicola</i>	Oesophagus / crop	4	29	8	46.88
	<i>Heterakis gallinarum</i>	Proventriculus / gizzard caeca, rectum & cloaca	2	5	4	
	<i>Ascaridia galli</i>	small intestine	6	15	12	
	<i>Subulura brumpti</i>	caeca, rectum & cloaca	5	214	10	
Acanthocephalan	<i>Moniliformis moniliformis</i>	small intestine	3	11	6	1.96

**Table 2 Organ-wise infection rate of the recorded parasites**

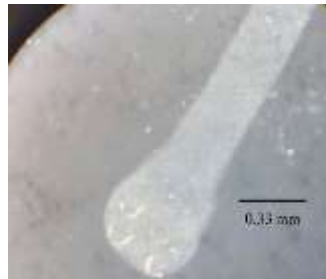
Organ	Parasites	Parasite count	Total	Percentage of infection (%)
Oesophagus & crop	<i>Gongylonema ingluvicola</i>	29	29	5.17
Proventriculus & gizzard	<i>Heterakis gallinarum</i>	3	3	0.53
Small intestine	<i>Raillietina echinobothrida</i>	20	281	50.09
	<i>Raillietina tetragona</i>	38		
	<i>Raillietina cesticillus</i>	24		
	<i>Raillietina georgiensis</i>	7		
	<i>Davainea spiralis</i>	12		
	<i>Choanotaeia infundibulum</i>	7		
	<i>Hymenolepis nana</i>	105		
	<i>Cloacotaenia megalops</i>	42		
	<i>Ascaridia galli</i>	15		
	<i>Moniliformis moniliformis</i>	11		
Caeca, rectum & cloaca	<i>Raillietina echinobothrida</i>	7	248	44.21
	<i>Raillietina tetragona</i>	8		
	<i>Davainea spiralis</i>	9		
	<i>Hymenolepis nana</i>	3		
	<i>Cloacotaenia megalops</i>	5		
	<i>Heterakis gallinarum</i>	2		
	<i>Subulura brumpti</i>	214		

**Table 3 Incidence of parasitic helminth species in the examined bird species**

Sr. No.	Species Examined	Cestodes							Nematodes			Acanthocephalan		
		<i>Raillietina echinobothrida</i>	<i>Raillietina tetragona</i>	<i>Raillietina cesticillus</i>	<i>Raillietina georgiensis</i>	<i>Davainea spiralis</i>	<i>Choanotaenia infundibulum</i>	<i>Hymenolepis nana</i>	<i>Cloacotaenia megalops</i>	<i>Gongylonema ingluvicola</i>	<i>Heterakis gallinarum</i>	<i>Ascaridia galli</i>	<i>Subulura brumpti</i>	<i>Moniliformis moniliformis</i>
1	<i>Gallus domesticus</i> Domestic chicken	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
2	<i>Turnix tanki</i> Yellow-legged Buttonquail										✓		✓	✓
3	<i>Streptopelia chinensis</i> Spotted dove	✓	✓					✓	✓					
4	<i>Ploceus manyar</i> Streaked weaver		✓											
5	<i>Gallinula chloropus</i> Common moorhen						✓							



*Raillietina echinobothrida*



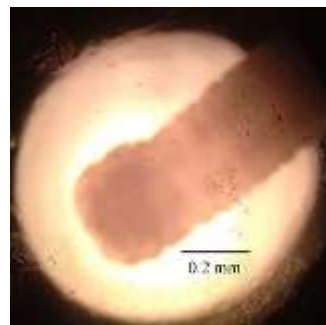
*Raillietina tetragona*



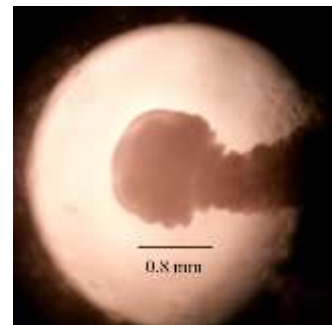
*Raillietina cesticillus*



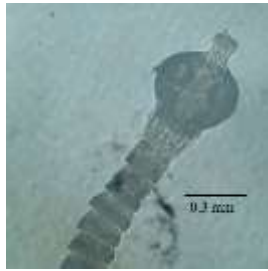
*Raillietina georgiensis*



*Davainea spiralis*



*Choanotaenia infundibulum*



*Hymenolepis nana*



*Cloacotaenia megalops*



Anterior end  
(*Gongylonema ingluvicola*)



Posterior end



Anterior end

(*Heterakis gallinarum*)



Posterior end



Anterior end

(*Ascaridia galli*)



Posterior end



Entire body (male)

*Subulura brumpti*



Entire body (female)

*Subulura brumpti*



*Moniliformis moniliformis*

**Plate 1** Parasitic helminths in the bird species examined

### Discussion

In the present study, 50 gastrointestinal tracts from five different species of birds, *Gallus domesticus*, *Turnix tanki*, *Streptopelia chinensis*, *Ploceus manyar* and *Gallinula chloropus* were examined for the endoparasitic helminths infection. GI tract was divided into four parts and then screenings for the parasites were carried out. The least infection was found in *Ploceus manyar*.

In this study, 64% (32/50) of birds examined were infected with species of parasites, which was lower than the result of Le' Le' Aye Hlaing (2011) she recorded 80% and 36% (18/50) were free of parasites.

The recorded parasitic helminths in the study were eight cestodes, four nematodes and a single acanthocephalan species. A feature of this survey was the complete absence of trematodes. The absence of these worms could be due to their complex life cycle requiring at least an intermediate host which is aquatic. Le' Le' Aye Hlaing (2011) also recorded no trematode infestations in Meiktila environs. So, the result were consistent with that observed by Le' Le' Aye Hlaing (2011).

The eight species of cestodes, included *Raillietina echinobothrida* (12%), *R. tetragona* (18%), *R. cesticillus* (6%), *R. georgiensis* (4%), *Davainea spiralis* (10%), *Choanotaenia infundibulum* (4%), *Hymenolepis nana* (30%) and *Cloacotaenia megalops* (12%) and four species of nematodes; *Gongylonema ingluvicola* (8%), *Heterakis gallinarum* (4%), *Ascaridia galli* (12%) and *Subulura brumpti* (10%) and only one species of acanthocephalans, *Moniliformis moniliformis* (6%) were recorded.

Although eight species of cestodes were recorded during this study, infection with this worms was 51.16% and followed by the nematodes 46.88% with four species identified. This incidence percentage disagreed with the result obtained by Le' Le' Aye Hlaing (2011) she investigated the highest nematode species. Among the helminthes, *Moniliformis moniliformis*, an acanthocephalan appeared as a rare parasite (1.96%), only one species of acanthocephalans was encountered during the present study.

The most prevalent cestode was *Hymenolepis nana* and the least were *Raillietina georgiensis*, *Choanotaenia infundibulum* and *Heterakis gallinarum*. Among the cestodes, the poultry tapeworm *Hymenolepis nana* was represented by the highest number of (108) individual parasites. They are small to medium-sized worms and inhabit the small intestine and caeca plus rectum and the cloaca.

The highest number of total parasite count among the nematode was that of *Subulura brumpti* with (214) individual *Gongylonema ingluvicola* (29), *Ascaridia galli* (15) and *Heterakis gallinarum* (5) individual.

The highest number of helminths amounting to (50.09%) was recorded from (small intestine), followed by those in the caeca plus rectum and cloaca (44.21%) and single helminth was encountered in the oesophagus plus crop and proventriculus plus gizzard (5.17% and 0.53%) during the present study

From these result it appeared that prevalence of different helminth parasites depend upon the physico-chemical nature of the region of the gastrointestinal tract in which they inhabit and the dimension of the different regions.

It was noted that, among the five host species studied, the highest incidence of 12 species of helminths parasites recorded in *Gallus domesticus*, followed by four species of parasites in *Streptopelia chinensis* and three species in *Turnix tanki* and a single species each in *Gallinula chloropus* and *Ploceus manyar*. From these results, it is alluded that, the more closer to human habitation, the more chance of getting infected by the parasites and vice-versa.

## Conclusion

GI parasites are endemic among different avian species with *Hymenolepis nana* been the most prevalent. Knowledge on the epidemiology of these parasites is important for achieving fruitful preventive and control measures against GI parasites. There is a need for an improved veterinary medical attention and education of poultry farmers on the need to regularly and periodically treat their flock against GI parasites, as this will improve the economic value of the poultry industry. Finally, more surveys are needed to be done on different birds of Meiktila environs to gain more informations on the parasitic infection. Lack of surveillance studies and health care for backyard birds is the major factor and hence periodical deworming of backyard birds for preventing occurrence of infections can reduce the economic losses for poor people and small farmers.



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