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Occurrence of Gastro-Intestinal Helminth Parasites in Local Scavenging Chickens (*Gallus gallus domesticus*) in Lucknow, Uttar Pradesh, India

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Abstract: Domestic chicken farming is negatively affected by endoparasite, which decrease immunity, egg production, and body weight. Although these impacts are well documented in large-scale chicken farms, here we aimed to understand endoparasite diversity and prevalence in the context of local-scale domestic scavenging chickens in Lucknow district, Uttar Pradesh, India. Chickens were sampled from five different regions in Lucknow - Daliganj (North), Rajnikhand (South), Arjunganj (East), Rajajipuram (West) and Husainganj (Middle) of Lucknow, to check the infection. A total of 360 local scavenger chickens, both male and female, were randomly chosen to check for helminths; each bird's gastrointestinal tract and trachea were thoroughly inspected. Species of cestodes and nematodes were recovered. Trematodes were not observed.

Keywords: Nematode, Cestode, Helminths, Local Chickens, Prevalence

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Introduction

Domestic birds are raised in most parts of the world, whether in their own households or on commercial farms. Domestic chicken (*Gallus gallus domesticus*) is one of the most common and widely used domestic animals, providing meat, eggs, feathers, and nutrient-rich organic manure. Poultry products are a significant source of protein (Zalizar *et al.*, 2021). This natural resource plays an important role in earnings for many

different sectors of the human population. However, infestation with gastrointestinal parasites can have major adverse health effects on domestic scavenging chickens (*Gallus gallus domesticus*) and other domestic animals. Gastrointestinal tract (GIT) worms can lead to poor conversion and absorption of nutrients (Soulsby, 1982; Gordon and Jordan, 1982; Urquhart *et al.*, 1996). Primary endoparasites in

poultry include helminths such as nematodes, cestodes, and trematodes. Parasites can be discovered in the gut and feces, especially when discharged as a fresh specimen (Fakae *et al.*, 2003). Poultry infected with endoparasite exhibit slowed development, decreased egg output, reduced body weight, and severe hemoglobin depletion (Nair and Nadakal, 1981). Endoparasites are transferred when chickens consume parasite eggs directly in bodily waste, contaminated food and water, or parasite-infested grasshoppers, beetles, or earthworms (Javaregowda *et al.*, 2016). During the warmer months, these parasites are more common when there are several intermediate hosts like grasshoppers, beetles, or earthworms (Baba *et al.*, 2004). Endoparasite outbreaks can cause significant losses in large-scale chicken farms, yet for traditional rural producers with more than ten birds, infections might remain undetected (Setyowati *et al.*, 2022). Therefore, a study that focuses on the most effective means of supporting regional poultry production has to be conducted. In this study we determined the incidence of gastrointestinal helminth parasites and infestations in free-range poultry in Lucknow, Uttar Pradesh, India.

Materials and Methods

Study area

The investigation was conducted in and around Lucknow, at an elevation of approximately 123 meters (404 feet) above sea level. The district of Lucknow has a total size of 2,528 square kilometres (976 square miles) located on the northwest bank of the Gomti River. Lucknow shares borders with Barabanki on the east, Unnao on the west, Raebareli on the south, and Sitapur on the north. Chickens were sampled from five different regions of Lucknow; Daliganj (North), Rajnikhand (South), Arjunganj (East), Rajajipuram (West) and the Husainganj (Middle) of Lucknow.

Study Population

The research population includes domestic chickens that were housed in backyard settings and were free to scavenge nearby. The age of the

chicken were documented and ascertained as provided by the owners.

Study period

The study was conducted in the vicinity of Lucknow, Uttar Pradesh, from July 2023 to June 2024 in order to ascertain the specifics of domestic poultry intestinal cestode, nematode and trematode infections.

Parasitological examination

Over the course of the investigation, 360 domestic poultry gastrointestinal tracts (GI) were collected from five research sites. To stop internal material from leaking, each GI tract was knotted at the rectum and esophageal ends before being put in sterile bags with labels. In accordance with the protocol outlined by Cable *et al.* (1958), the GI tracts were brought to the Parasitology Laboratory of the Department of Zoology at Babasaheb Bhimrao Ambedkar University in Lucknow for a parasitological examination and a comprehensive dissection to search for parasites.

Collection and processing of helminth parasites

Cestodes were removed by brush and fine forceps and washed in normal saline (Figs. 1, 2). Cestodes were fixed in Cornoy's fixative for 24 h, removed the fixative by washing or rehydration with descending grades of alcohol, stained in Borax carmine, dehydrated with ascending grades of alcohol, transferred to xylene for clearing before mounting them in DPX (Dextrine Plasticized Xylene). Nematodes were collected from the host using forceps, washed with salted water, neutralize in hot 70% alcohol, stored in the glycerine alcohol solution and thick parasites kept in lectophenol, for clearing, mounted them in DPX. Parasites were examined under light bright field microscope. Parasites were identified according to the keys and description given by Soulsby *et al.* (1982).

Data analysis

All worms detectable to the naked eye were extracted with forceps. All mature worms were identified immediately under a microscope using



Fig. 1: (A) Fowl intestine; (B) Dissection of intestine; (C) Cestode parasites attached with duodenum region of intestine; and (D) Isolation of entangled cestode parasites.

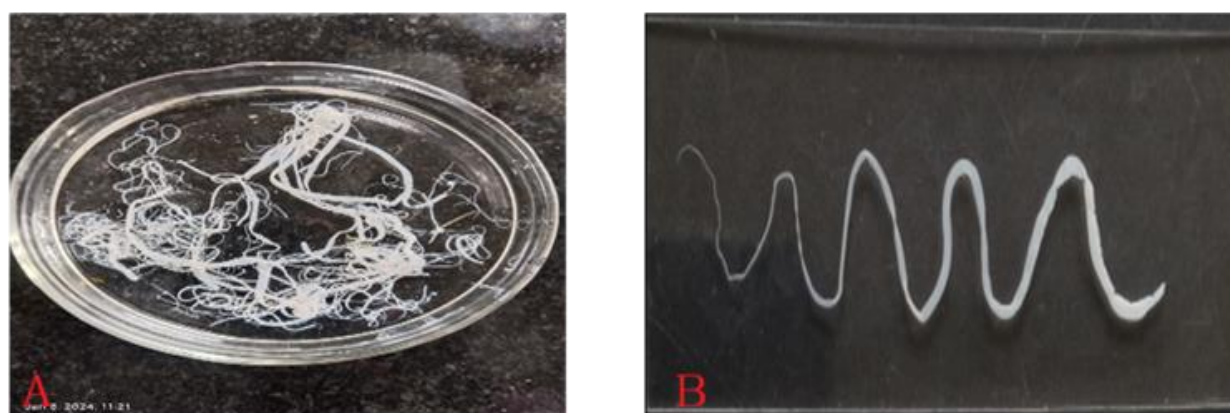


Fig. 2: (A) Fresh cestodes isolated from chicken intestines; and (B) Single Cestode parasite with scolex and segments.

specific characteristics described by Soulsby (1965). Variations in the occurrence of gastrointestinal helminths were analyzed. In this study, the occurrence was estimated by Thrusfield *et al.* (1995) equation:

Prevalence = $100 \times \frac{\text{Number of infected chicken}}{\text{Total number of observed chicken}}$

Mean Intensity = $\frac{\text{Number of parasite species isolated}}{\text{Total number of infected chicken}}$

Abundance = $\frac{\text{Number of parasite species isolated}}{\text{Total number of observed chicken}}$

Results

Gender and age wise prevalence

Total 360 free-range domestic backyard chickens were examined during this study, 177 were males and 183 were females. Occurrence of helminth

parasites were 83.05% (147/177) in males and 92.89% (170/183) in females (Table 1). Different age group of free-range domestic backyard chickens were examined to check helminth occurrence. Among 360 chicken GI tracts, 289 were of adult age (32-35 weeks) chickens, and 253 (87.54%) infected with helminth parasites. Similarly 71 were of growing age (12-14 weeks) chickens, and 61(85.91%) infected with helminth parasites (Table 1).

Prevalence and intensity of helminth parasites

During this investigation total 360 free-range backyard chickens were examined for helminthic parasites prevalence. There were 252 chickens that were infected with *R. echinobothrida* with a 70% prevalence, abundance of 1.1, and mean intensity of 1.67. *Raillietina* species of helminth

Table 1: Prevalence of helminths infections in different age and sex groups in free-range backyard chickens

Age group	No. of chickens examined		Total no. of chickens examined	No. of infected chickens (%)		Infection (%)
	Male	Female		Male	Female	
Adults	142	147	289	116(81.69)	137(96.47)	253(87.54)
Growers	35	36	71	29(82.85)	32(88.88)	61(85.91)
Total	177	183	360	147(83.05)	170(92.89)	317(88.05)

Table 2: Prevalence and intensity of helminth parasites in 360 free-range backyard chickens

Helminth species	No. of infected Chicken	No. of Helminth Parasites	Mean Intensity	Abundance	Prevalence (%)
<i>R. echinobothrida</i>	252	421	1.67	1.1	70.00
<i>Raillietina tetragona</i>	240	335	1.39	0.93	66.66
<i>R. cesticillus</i>	194	304	1.56	0.84	53.88
<i>R. tunetensis</i>	184	368	2	1.02	51.11
<i>Cotugnia jadhvi</i>	150	394	2.6	1.09	41.66
<i>Cotugnia spp</i>	140	360	2.5	1.0	38.88
<i>Heterakis gallinarum</i>	132	208	1.5	0.57	36.66
<i>Ascaridia galli</i>	102	194	1.9	0.53	28.33

parasites were most abundant species found in this study. Total helminth species which were found in current investigation - *Raillietina echinobothrida* followed by *Raillietina tetragona*, *R. cesticillus*, *R. tunetensis*, *Cotugnia jadhvi*, *Heterakis gallinarum* and *Ascaridia galli* (Table 2).

Discussion

The total incidence of several gastrointestinal helminths parasites in free-range backyard poultry was significantly high. During the current investigation, *R. echinobothrida* was the most abundant cestode parasites. There were 252 infected chickens with *R. echinobothrida* with 70% prevalence, abundance of 1.1 and mean intensity of 1.67 (Table 2) out of 360 chickens. The most common helminth was *Raillietina echinobothrida* followed by *Raillietina tetragona*, *R. cesticillus*, *R. tunetensis*, *Cotugnia jadhvi*, *Heterakis gallinarum* and *Ascaridia galli*. The recorded mean intensity of worms in the gastrointestinal tract of infected birds might have been due to the consumption of

infected droppings or infected intermediate hosts of parasites. The significant incidence of cestodes in nestlings indicates that infections commonly occurred at relatively young ages (Radfar *et al.*, 2012). The most common helminth species *Raillietina* was ascribed to the ease of access of intermediate hosts (dung beetles, grasshopper and ants) to free-range backyard chickens in the subject of study. *R. echinobothrida* induced nodule development which resemble with avian tuberculosis lesions (Ahenafi and Eshetu, 2004). *R. echinobothrida* frequency was marginally more than the 25.8% recorded by Eshetu *et al.* (2001). For this helminth parasite prevalence range between 34% – 81% has been reported by other investigators (Permin *et al.*, 1997, 2002; Poulsen *et al.*, 2000; Irungu *et al.*, 2004). *R. echinobothrida* can cause enteritis, haemorrhages, and hypovitaminosis B. The scavenging behavior of chickens may be the cause of the high prevalence rate of cestode parasites. *Ascaridia galli* exhibited

28.33% frequency of the intestinal nematodes found in the examined local scavenging chickens. In other African countries, the prevalence of *A. galli* was comparable to the current estimate ranging between 24% and 36% (Poulsen *et al.*, 2000 Eshetu *et al.*, 2001; Magwisha *et al.*, 2002; Permin *et al.*, 2002). Rains enhanced the incidence of *A. galli*, which is consistent with observations from Tanzania (Permin *et al.*, 1997). Infection with *Ascaridia galli* can cause intestinal mucosa injury, leading to decreased development rates and weight loss (Gordon and Jordan, 1982; Soulsby, 1982; Permin *et al.*, 1997). Acute *A. galli* infestation obstructs the intestinal lumen, resulting in intestine rupture and death due to hemorrhage/shock (Soulsby, 1982; Urquhart, 1996; Permin *et al.*, 1997). However, severe infestations can lead to death in young chicks and loss of egg production in laying hens (Gordon and Jordan, 1982; Soulsby, 1982). The survival of chickens gets adversely influenced by helminth worm infection. According to the present study, free-range local scavenging chickens are potential cestode infection reservoirs, putting commercial poultry farms at danger of contamination by transmission of infections. Consequently, further research is required to determine the economic and sanitary effects of parasite illnesses in general, and cestode infections in particular, on free-range backyard/scavenging poultry birds. This research also shows that nestlings should not be maintained in close proximity to older chickens, as their droppings frequently serve as a reservoir of infection for the younger chickens. The precise reason behind parasite interactions is a subject that needs to be researched further.

Conclusion

In conclusion, we described the prevalence of 8 helminth species in the local scavenging domestic chicken in several parts of Lucknow, India. Six genera of cestode species and two genera of nematode species were identified in this study; no trematode species were noted for their existence in poultry parasites. The overall prevalence of

helminth parasites was 88.05% and the most abundant species is *R. echinobothrida*. Higher cestode intensity in comparison with nematode species was discovered in the current study. In order to prevent endoparasite infections, in local scavenging chickens, it is recommended that poultry owners improve their cage system and perform better cleaning and maintenance.

Ethical Statement

The authors confirm that all ethical issues have been dealt with the research ethics guidelines provided by the Department of Zoology, Babasaheb Bhimrao Ambedkar University, Vidya Vihar, Raebareli Road, Lucknow, Uttar Pradesh, India.

Author Contributions

Each author has contributed equally to the study's planning, analysis, writing, and editing. All authors have read and agreed to the published version of the manuscript.

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Conflict of Interest

The authors declare no conflicts of interest.

References

- Abdu PA. (1987) Infectious bursal disease in pullet chicks. *Avian Dis.* 31: 204-205.
- Baba SS AND Oyeka CA. (2004) Prevalence of intestinal helminthes in poultry farms in Anambara State Nigeria. *Bull Anim Health Prod Africa* 37: 27-220.
- Fakae BB AND Paul-Abiade CU. (2003) Rainy season period prevalence of helminthes in the domestic fowl (*Gallusgallus*) in Nsukka, Eastern Nigeria. *Nig Vet J.* 24: 21-27.
- Gordon RF and Jordan FTW. (1982) *Poultry diseases*, 2nd edn., Bailliere Tindall, London, pp. 11-197.

- Javaregowda AK, Rani BK, Revanna SP and Udupa G. (2016) Prevalence of gastro-intestinal parasites of backyard chickens (*Gallus domesticus*) in and around Shimoga. J Parasit Dis. 40(3): 986-990.
- Nair KV and Nadakal AM. (1981) Hematological changes in domestic fowl infected with cestode *Raillietina tetragona* (Molin, 1958). Vet Parasitol 8: 49-58.
- Permin A, Magwisha H, Kassuku AA, Nansen P, Bisgaard M, Frandsen F and Gibbons L. (1997) A cross-sectional study of helminths in rural scavenging poultry in Tanzania in relation to season and climate. J Helminthol 71: 233-240.
- Permin A, Esmann JB, Hoj CH, Hove T and Mukaratirwa S. (2002) Ecto-, endo- and haemoparasites in free-range chickens in the Goromonzi District in Zimbabwe. Prevent Vet Med 54(3): 213-224.
- Radfar MH, Norouzi AE, Rezaei SH, Mirzaei DM and Fathi S. (2012) Biodiversity and prevalence of parasites of domestic pigeons (*Columba livia domestica*) in a selected semiarid zone of South Khorasan, Iran. Trop Anim Hlth Prod. 44: 225-229.
- Soulsby EJJ. (1982) Helminths, arthropods and protozoa of domesticated animals. Bailliere Tindall, London, UK.
- Setyowati EA, Santosho S, Rokhmani and Rochmatino (2022) Diversity and prevalence of endoparasites in domestic chickens across an elevation gradient. Biodiversitas 23(8): 3936-3942.
- Zalizar L, Winaya A, Malik A, Widodo W, Suyatno and Anggraini AD. (2021) Species identification and prevalence of gastrointestinal helminths in Indonesian native chickens, and its impact on egg production. Biodiversitas 22(10): 4363-4369.