

Study of the Prevalence and Distribution of *Ascaridia galli* and *Heterakis gallinarum* in Common Fowl *Gallus Gallus* in Bareilly District

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ABSTRACT

A study was conducted to observe the prevalence of gastrointestinal parasites of fowl in four different regions of Bareilly district for about a period of one year. Laboratory study of total 850 samples of the gastrointestinal tracts of freshly slaughtered fowl at local poultry shops and samples from postmortem examinations was done at Department of Zoology, Bareilly College, Bareilly. It revealed about 80-85% of gastrointestinal parasites. Parasites were transferred to phosphate buffered saline with 1gm of glucose. Adult worms were identified after routine processing and mounting. Data revealed high prevalence of *Ascaridia galli* in rainy season 64.29% followed by summer 42% and winter 28%. The prevalence percentage of *Heterakis gallinarum* in rainy season is 60% followed by summer 39.20% and 23.20% in winter. Results obtained also indicated Mohanpur and Maheshpura village show more or less similar prevalence percentage of the parasites followed by Bhojipura and Thiriya.

Keywords: Gastrointestinal parasites, Prevalence, Seasons, Sites.

INTRODUCTION

In India, one of the most significant and rapidly expanding sectors of the livestock business is the poultry sector. In terms of food safety and nutrition, the chicken industry is crucial. Developments in this sector support the market's growing trend, with chicken holding the largest share. Poultry is a commonly produced meat that is high in proteins and vitamins, making it a crucial part of a balanced diet.

According to the global poultry production index, India is ranked seventeenth. One of the difficult factors influencing the poultry industry is the health and immunity of the birds. One of the biggest concerns facing the chicken business is the removal and eradication of zoonotic diseases. Because it penetrates the food chain, eating poultry meat that contains antibiotic residues poses a serious risk to one's health. Frequent disease outbreaks have an impact on the growth and profitability of the poultry industry, which in turn affects the expansion of poultry farming. The chicken business suffers significant losses and damage as a result of parasite illnesses. Young birds eventually die as a result of reduced feed conversion, weight loss, starved stock, and decreased egg production.

An animal that lives inside or on top of another species, known as a host, is referred to as a parasite. Worms are a popular term used to describe intestinal parasites of poultry. They may result in flock mortality. Helminths and protozoa are two types of parasites that frequently infiltrate the avian G.I. tract. Cestodes, nematodes, and trematodes are the three main parasites of poultry; of these, nematodes are thought to be the most significant group given the number of species and the damage they inflict. The most prevalent intestinal parasites are nematodes, sometimes known as roundworms or ascarids. These nematodes have a cosmopolitan distribution with potential of transmission between domesticated and wildlife poultry. (Pathak et al., 2026). There is minimal possibility of cross-infections among the poultry because they are species specific. *Ascaridia galli* and *Heterakis*

gallinarum are the two main intestinal parasites that affect chickens.

LITERATURE REVIEW

Poultry farming is an important animal husbandry activity that forms the most prevalent enterprise in recent years. The poultry industry is fast growing at an annual pace of 8% -10% in India (Ara et al., 2021). Modern day practices, a more scientific approach and effective bio-security measures are bringing a revolution in the poultry industry.

Parasitism is a challenge in intensive production as more birds per unit area leads to greater risk of contamination. (Hoglund et al., 2023). The birds which were on deep litter system or backyard free range are still susceptible to parasitic infection due to contaminated litter and other environmental contaminants (Sreedevi et al., 2016). Domestic chickens often consume a variety of food grains, fruits and insects containing the larval stages of some helminth parasites.

The environment plays a pivotal role for the occurrence of infective stages of parasites (Islam et al., 2020). The nematodes of *A. galli* and *Heterakis gallinarum* are more frequent parasites causing heavy economic losses to the poultry industry due to decrease in feed conversion ratio, weight loss, lowered production of eggs and mortality of the young birds. *A. galli* is a soil transmitted gastrointestinal nematode which affects the chickens. The prevalence of *A. galli* ranges between 70%-80%. The life cycle of *A. galli* is direct. Eggs passed with faeces embryonate within 2-3 weeks in the environment with appropriate humidity and temperature. Chickens become infected by ingesting the infective eggs containing third larval stage. (Ritu et al., 2024). *A. galli* affected birds become anemic and suffer from diarrhea (Saumya et al., 2024).

Heterakis gallinarum, the common caecal worm belonging to the family heterakidae is highly prevalent poultry parasite (Iqbal et al., 2023). The infection caused by it may be mild but it may function as a vector for the protozoan parasites *Histomonas meleagridis*, the causative agent of histomoniasis. Histomoniasis causes severe pathological lesions in guts leading to high mortality rates in the susceptible hosts. (Collins et al., 2025).

Parasite burdens vary seasonally and rainfall is the measure aspect of it linked to parasitism in wide range of systems. Rainfall can have immediate effects on parasitism rates, or it can have delayed effects (Shearer et al., 2020).

MATERIALS AND METHODS

A cross-sectional study was carried out from March 2023 to February 2024. Samples were collected and examined to study temporal distribution. The year was divided into three seasons:

- (a) Summer (March- June)
- (b) Rainy (July-October)
- (c) Winter (November – February)

Sample Collection

The fowls were slaughtered at local poultry farm of four major areas:

- (a) Bhojipura block of Bareilly district
- (b) Maheshpura village in Bareilly
- (c) Thiriya village in Bareilly
- (d) Mohanpur village in Bareilly

The alimentary canals were removed from the slaughtered fowls and collected and brought to the laboratory. Further study was conducted in Pest and Parasite Research Laboratory of Department of Zoology, Bareilly College, Bareilly. Here in the lab, the alimentary canals were dissected and *Ascaridia galli* were removed from the intestinal contents and transferred to a Petri dish containing normal saline. *Heterakis gallinarum* were gently brushed off the internal surface of the caecum. The parasites were transferred to a phosphate buffered saline (pH

7.2) to which 1gm of glucose/100ml was added. The parasites remained active for over 4 hours in the medium.

During the period of collection from March, 2023 to Feb, 2024, a completer record was maintained regarding incidence, total worm load and intensity of *Ascaridia galli* and *Heterakis gallinarum*. The parasites were identified after fixation in 70% ethanol and cleaning in lactophenol.

RESULTS AND DISCUSSION

The species wise occurrence of helminths infection according to (Alam et al., 2014) was 45% of *Ascaridia galli* and 30% of *Heterakis gallinarum*. The present study provides the insight into the prevalence of the helminth infection. Out of 850 alimentary canals of the fowl examined, there was high prevalence of *Heterakis gallinarum* (78.2%) and *Ascaridia galli* (87.6%). But this percentage varied with the season with the highest recorded in the rainy season from July to October.

Season	No. of birds examined (n)	<i>A. galli</i> positive (n)	Prevalence (%)	<i>H. gallinarum</i> positive (n)	Prevalence (%)
Summer	250	105	42	98	39.2
Rainy	350	225	64.29	210	60
Winter	250	70	28	58	23.2
Total	850	400	47.06	366	43.06

Table-1: Season wise prevalence of gastrointestinal nematodes in *Gallus gallus*

The graphical representation of the seasonal distribution of the parasites *Ascaridia galli* and *Heterakis gallinarum* in the fowl *Gallus gallus* is shown in figure1.

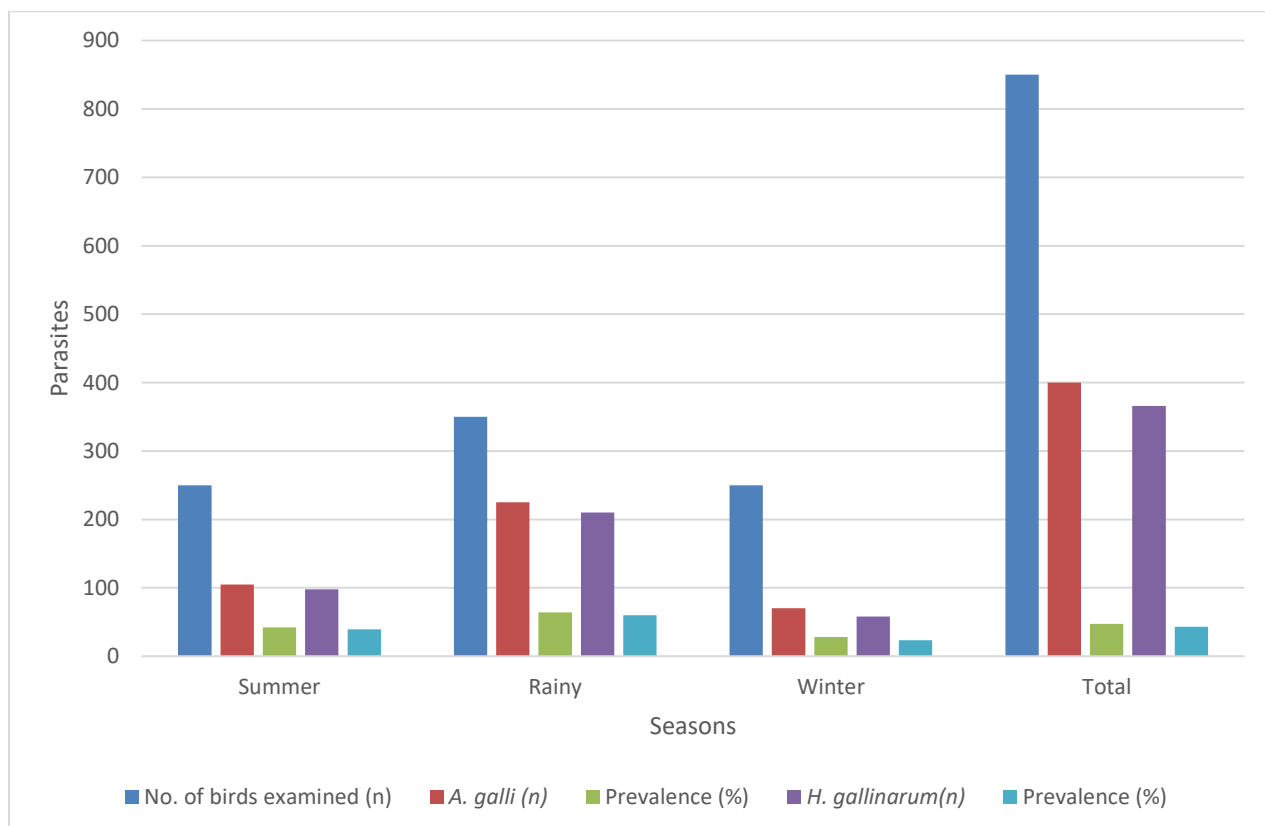


Fig-1: Season wise prevalence of gastrointestinal nematodes in *Gallus gallus*

When the comparison of different sites in the rainy season was done, it was observed that the prevalence of both the parasites was more or less same in the four sites of Bareilly district.

Site	No. of birds examined	<i>A. galli</i> Cases	<i>H. gallinarum</i> Cases	Co-infected
Bhojipura	212	85	78	30
Maheshpura	215	92	87	40
Thiriya	213	75	68	25
Mohanpur	210	90	82	35
Total	850	342	315	130

Table-2: Site wise prevalence of gastrointestinal nematodes in *Gallus gallus*

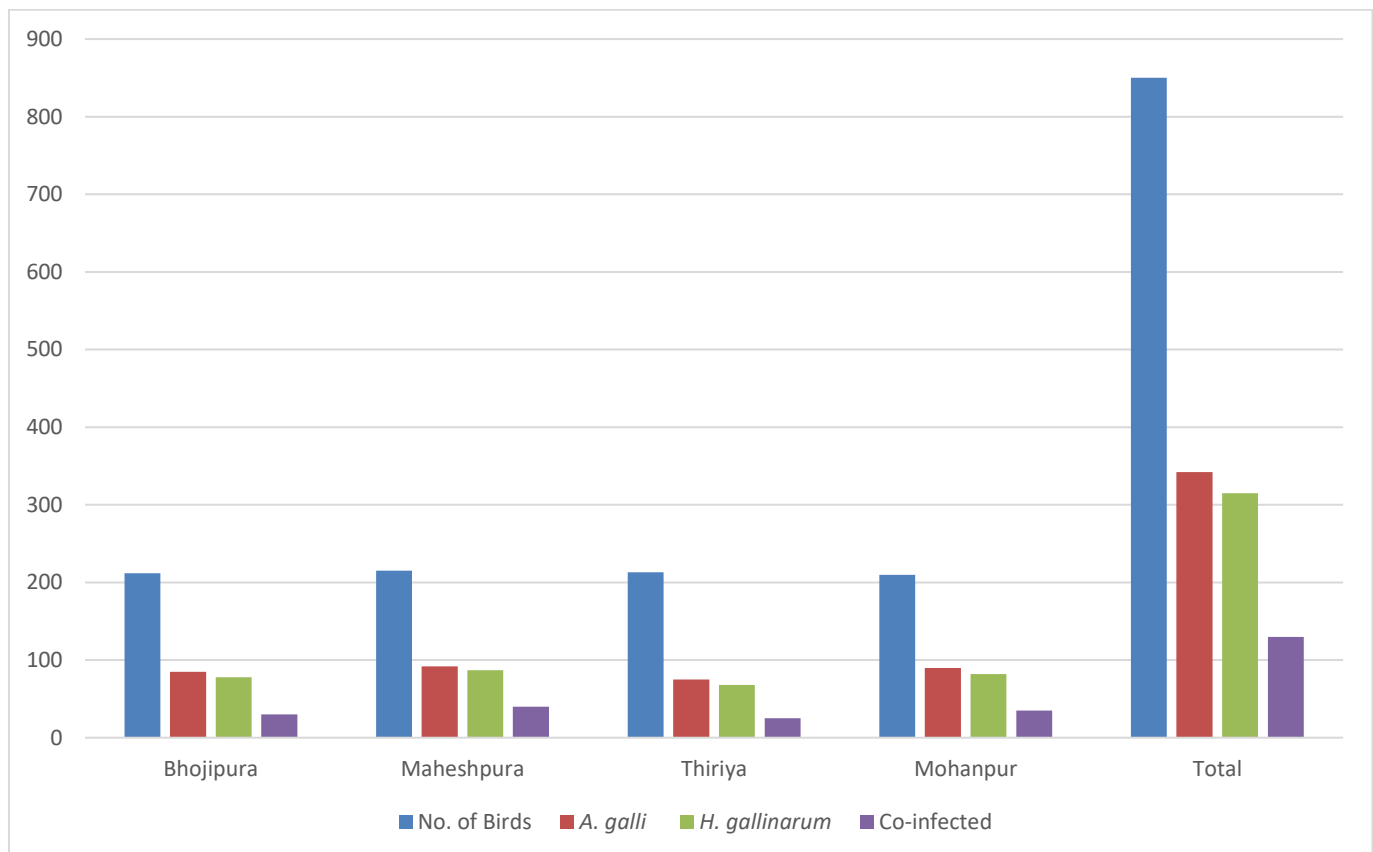


Fig-2: Site wise prevalence of gastrointestinal nematodes in *Gallus gallus*

To find the prevalence percent of individual parasite according to their site we will use the following formula;

$$\text{Prevalence (\%)} = [(\text{Number of Infected Birds}) / (\text{Total Birds Examined at Site})] \times 100$$

A total of 850 birds of *Gallus gallus* were examined across four study sites in Bareilly district. Both *Ascaridia galli* and *Heterakis gallinarum* were recorded at all four sites. The overall mean prevalence of *A. galli* was 40.25%, while *H. gallinarum* showed an overall prevalence of 37.05%. Co-infection with both parasites simultaneously was observed in 15.3% of birds on average across all sites (Table 3).

Site	n	<i>A. galli</i> (%)	95% CI	<i>H. gallinarum</i> (%)	95% CI	Co-infection (%)
Bhojipura	212	40.1	33.7–46.8	36.8	30.6–43.5	14.2
Maheshpura	215	42.8	36.4–49.5	40.5	34.2–47.2	18.6
Thiriya	213	35.2	29.1–41.8	31.9	26–38.4	11.7

Mohanpur	210	42.9	36.4–49.7	39	32.7–45.7	16.7
Overall mean	850	40.3	—	37	—	15.3

Table 3. Prevalence (%) and 95% Confidence Intervals of *A. galli*, *H. gallinarum*, and Co-infection across four sites in Bareilly district.

Site-wise analysis revealed notable variation in helminth prevalence. Mohanpur recorded the highest prevalence of *A. galli* (42.9%), followed by Maheshpura (42.8%), Bhojipura (40.1%), and Thiriya (35.2%). Thiriya consistently recorded the lowest prevalence across all three infection categories, including *H. gallinarum* (31.9%) and co-infection (11.7%). Maheshpura exhibited the highest rate of co-infection at 18.6%, suggesting a greater likelihood of simultaneous exposure to both parasite species at this site.

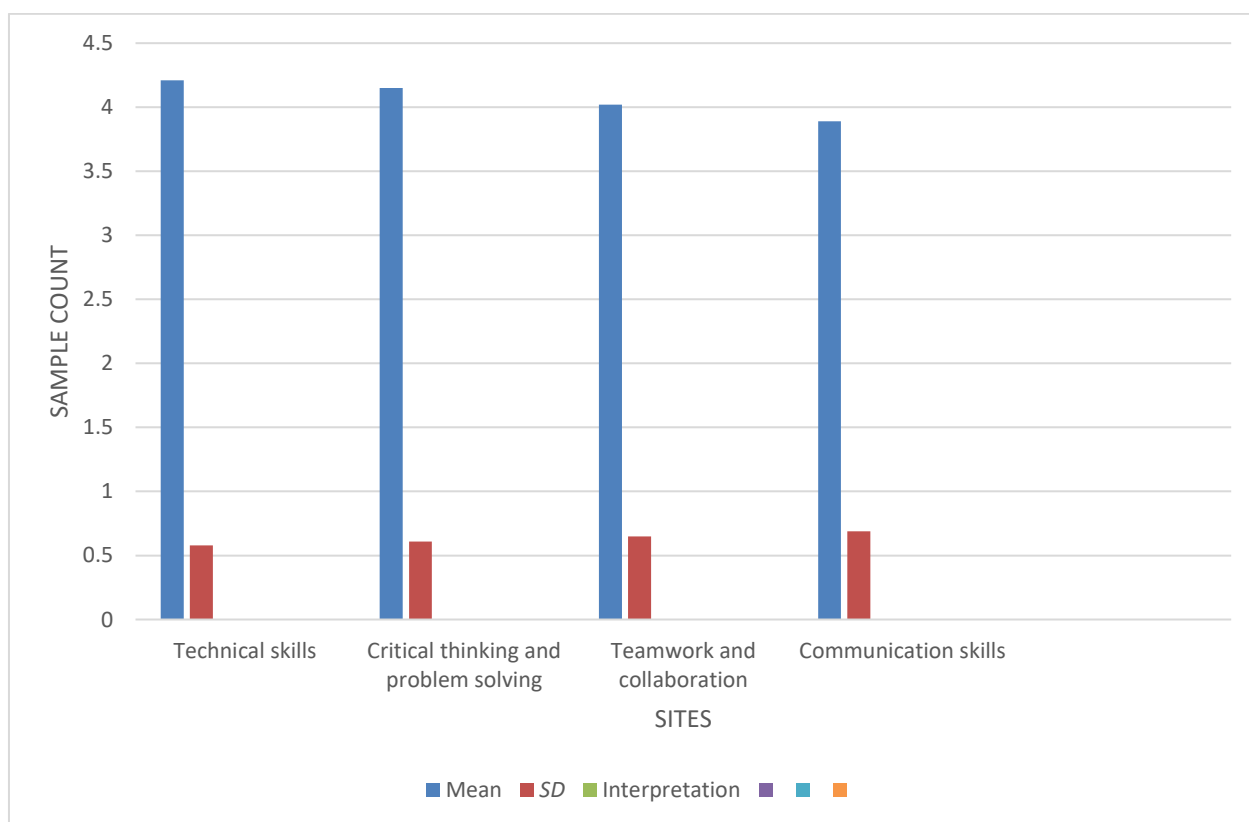


Fig-3: Prevalence (%) and 95% Confidence Intervals of *A. galli*, *H. gallinarum*, and Co-infection across four sites in Bareilly district

A chi-square test of independence was conducted to determine whether the distribution of *Ascaridia galli* and *Heterakis gallinarum* infections varied significantly across four different sites (Bhojipura, Maheshpura, Thiriya, and Mohanpur) in Bareilly district. The results indicated no statistically significant association between site and parasite type ($\chi^2 = 0.046$, $df = 3$, $p = 0.997$). This suggests that the variation in parasite prevalence across the sites is likely due to random distribution rather than site-specific factors.

Parasites/Comparison	χ^2 Value	df	P-Value	Cramér's V	Effect Size
<i>A. galli</i> vs site	3.42	3	> 0.05	0.063	Negligible
<i>H. gallinarum</i> vs site	3.84	3	> 0.05	0.067	Negligible
Co-infection vs site	4.42	3	> 0.05	0.072	Negligible

Table 4. Chi-square values, p-values, and Cramér's V effect sizes for parasite prevalence across sites.

This table shows how close the observed values are to the expected frequencies under the assumption of no association.

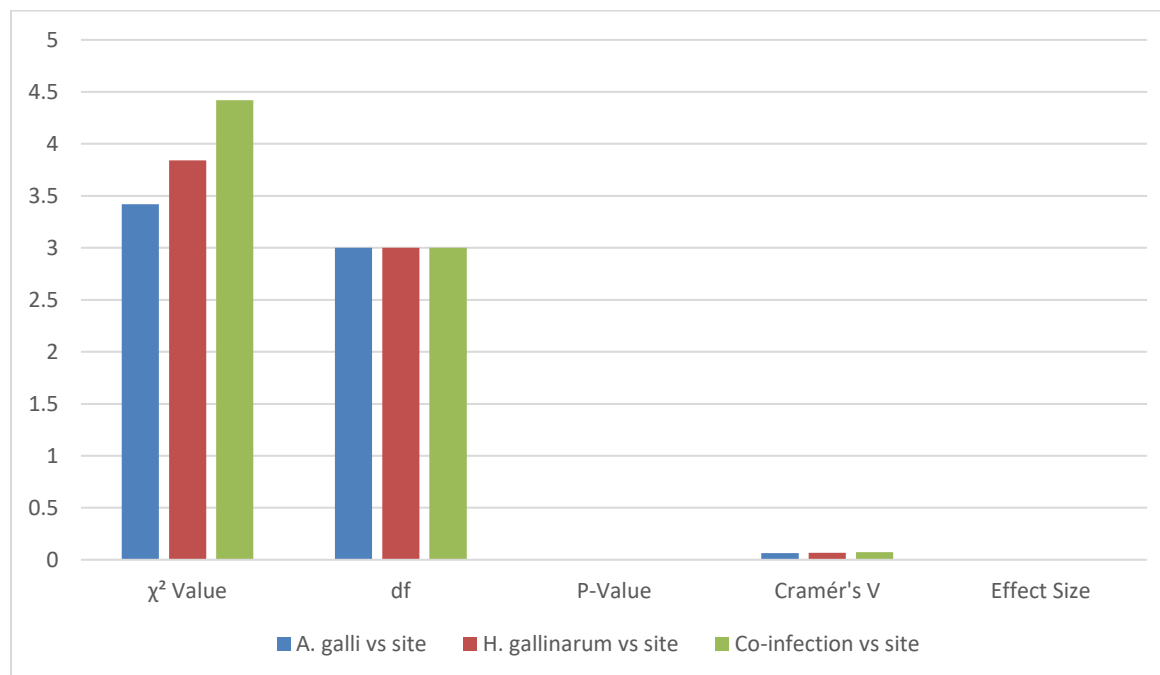


Fig-4: Chi-square values, p-values, and Cramér's V effect sizes for parasite prevalence across sites.

CONCLUSION

The present study revealed that helminth infection is commonly found in fowl in all the four different sites of Bareilly district during the period of study. The most common nematode species in fowl are *Ascaridias galli* and *Heterakis gallinarum*. The prevalence of helminth infection in relation to season was found highest in rainy season followed by summer and the lowest in winter. The Mohanpur and Maheshpura village of Bareilly district show the highest prevalence of the parasites. Therefore, improved poultry management practices for controlling the helminth infection and control measures need to be advised for obtaining better quality of poultry eggs and meat for human consumption.

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