Indian Journal of Animal Sciences **92** (2): 179–182, February 2022/Short communication
https://doi.org/10.56093/ijans.v92i2.122077

Gastrointestinal parasites in backyard chickens of mid hill region of Meghalaya

M DAS[1]✉, R LAHA[1] and S DOLEY[1]

ICAR Research Complex for NEH Region, Umiam, Meghalaya 793 103 India

Received: 27 July 2020; Accepted: 29 October 2021

Keywords: Backyard chicken, Gastrointestinal, Parasites, Meghalaya

Gastrointestinal (GI) parasites are most prevalent and devastating parasites affecting the productivity of poultry birds. They are a concern for the poultry industry worldwide as they can affect the health, welfare and production performance (Shifaw *et al.* 2021). Poultry birds get infection by ingestion of contaminated feed, water, litter, intermediate host, etc. Severe infections with GI parasites may decrease the production performance as well as cause high morbidity and mortality (Luka and Ndams 2007, Van *et al.* 2019). Bhowmik *et al*. (1982) observed that parasitism results in up to 17% reduction of weight gain in growing chicks and 12.5% reduction in egg production. They cause catarrh, diarrhoea, intestinal obstruction, loss of appetite, anemia, weakness, paralysis and poor feathering in birds (Jegede *et al.* 2015, Afolabi *et al.* 2016). Though there are reports on the prevalence of GI parasitic infections in the poultry from different states of India like Punjab (Singh *et al.* 2021), Tamil Nadu (Vijayasarathi *et al*. 2020), Andhra Pradesh (Bandi *et al*. 2020), Chhattisgarh (Kumari *et al.* 2018), Assam (Kalita *et al.* 2018), Uttar Pradesh and Uttarakhand (Kumar *et al*. 2015), Maharashtra (Naphade and Chaudhari 2013) but limited information is available from Meghalaya. Thus, the present study was undertaken to explore the prevalence of GI parasites in the backyard chickens of mid hill region of Meghalaya.

Fecal samples (2,290) of poultry were collected from different locations, i.e. Umiam, Umsawkhwan, Sarikuchi, Umthan, Mawphrew, Nalapara, Borkhatsari and Lalumpam of Ri Bhoi district, Meghalaya from 2018–2020. All the birds were categorized according to age, viz. < 8 weeks (694), 8–28 weeks (772) and >28 weeks (824). Fecal samples were examined by direct flotation technique using saturated salt (sp. gr. 1.20) and sucrose (sp. gr. 1.27) solution (Soulsby 1982). Intensity of infection, i.e. egg per gram (EPG) of feces was quantified by using modified McMaster technique. Sporulation of the coccidia oocyst and morphological characterization was done (MAFF 1986) by using an Olympus BX51 light microscope at 200× and 400× magnifications. Samples not being examined on the same day were preserved at refrigerated temperature (4°C) for next day examination.

The overall prevalence of GI parasitic infections in the backyard chicken of mid hill region of Meghalaya was 37.20% (Table 1). Eight species of GI parasites were recorded, viz. *Eimeria* sp. (30.16%), *Heterakis gallinarum* (14.08%), *Ascaridia galli* (21.36%), *Capillaria* sp. (7.51%), *Syngamus trachea* (3.52%), *Raillietina* sp. (8.56%), *Choanotaenia infundibulum* (2.34%) and *Strongyloides avium* (12.44%). The intensity of infection, i.e. egg per gram (EPG) of faeces ranged from 50–550. In congruence to the present findings, Kumari *et al.* (2018), Hembram *et al*. (2015), Katoch *et al.* (2012) and Naphade and Chaudhari (2013) reported 25%, 58.75%, 72% and 84.05% parasitic infections from Chattishgarh, Odisha, Jammu and Madhya Pradesh, respectively. Similarly, Nguyen *et al.* (2020), Wamboi *et al.* (2020), Islam *et al.* (2020) and Berhe *et al*. (2019) reported 54.2%, 86.6%, 19.4% and 90.97% infections from Vietnam, Kenya, Bangladesh and Ethiopia, respectively. Variation in the per cent prevalence from the current study may be due to difference in the geographical location, climatic conditions, infective stages of larvae or eggs or intermediate host in the environment and management practices adopted by the farmers.

Infection was recorded highest during monsoon season (44.72%) followed by autumn (38.63%), winter (27.27%) and spring (36.81%) seasons (Table 1). In agreement with the present findings, Islam *et al.* (2020), Sreedevi *et al*. (2016), Hembram *et al*. (2015) and Salam *et al.* (2010) from Bangladesh, Andhra Pradesh, Odisha and Kashmir reported 26.5%, 43.41%, 68.88% and 33.62% infections during rainy/monsoon seasons, respectively. Environment, management practices, level of bio-security, availability of intermediate hosts and reservoirs are also key factors for the high prevalence of parasitic infections in poultry (Catelli *et al.* 1999, Permin *et al.* 1999). Taylor *et al.* (2016) observed that optimum temperature and relative humidity for development and hatching of eggs or oocyst are 26–29°C and >80%, respectively. The development is decreased below 10°C and low relative humidity. This shows that monsoon season is very conducive for the development and propagation of parasites in the backyard chickens of Meghalaya. Different species of G.I. parasites are prevalent throughout the year in mid hill region of Meghalaya which

Present address: [1]ICAR Research Complex for NEH Region, Umiam, Meghalaya. ✉Corresponding author email: meenad3@gmail.com

Table 1. Prevalence of GI parasites in backyard chicken of Ri Bhoi, Meghalaya

Season	Sample examined	Sample positive	*Eimeria* sp.	*H. gallinarum*	*A. galli*	*Capillaria* sp.	*S. trachea*	*Raillietina* sp.	*Choano-taenia* sp.	*S. avium*
Winter	649	177	54	19	44	12	7	2		39
		(27.27)	(30.51)	(10.73)	(24.85)	(6.77)	(3.95)	(1.13)	–	(22.03)
Spring	440	162	21	37	28	20	2	23	5	26
		(36.81)	(12.96)	(22.83)	(17.28)	(12.34)	(1.23)	(14.19)	(3.08)	(16.04)
Monsoon	805	360	154	38	60	28	10	31	7	32
		(44.72)	(42.77)	(10.55)	(16.67)	(7.77)	(2.77)	(8.61)	(1.94)	(8.88)
Autumn	396	153	28	26	50	4	11	17	8	9
		(38.63)	(18.30)	(16.99)	(32.67)	(2.61)	(7.18)	(11.11)	(5.22)	(5.88)
Total	2290	852	257	120	182	64	30	73	20	106
		(37.20)	(30.16)	(14.08)	(21.36)	(7.51)	(3.52)	(8.56)	(2.34)	(12.44)

Figures in parentheses indicates per cent positivity.

may be due to sufficient moisture in the litter, humidity and ambient temperature for growth and development of parasitic egg/ova throughout the year.

Age wise, GI parasitic infections were recorded in all age groups of chickens, viz. < 8 weeks (25.64%), 8–28 weeks (48.18%) and > 28 weeks (38.71%) (Table 2). Age wise variation in the prevalence of G.I. parasitic infection in poultry was also reported by Islam *et al.* (2020), Bandi *et al*. (2020), Wokem and Obiyor (2018), Sheikh *et al.* (2016) and Hembram *et al.* (2015).

High rate of infection in young birds may be due to decreased immunity as well as continuous exposure to infections from the contaminated litter. In the present study, *Eimeria* sp. was recorded in all age groups and highest in birds of < 8 weeks (68.18%) which is responsible for causing coccidiosis. It is characterized by dysentery, bloody diarrhoea, enteritis, poor growth, drooping wings, emaciation and decreased production (Gerhold 2015). According to Bera *et al*. (2010), approximately US$ 20 million/annum coccidiosis associated economic losses were recorded in India. Sharma *et al*. (2015) and Debbou-Iouknane *et al*. (2018) from Jammu and Algeria reported 58.86% and 54.28% *Eimeria* sp. infection in young poultry birds, respectively. However, Badran and Lukesouna (2006) reported *Eimeria* sp. infection in all ages. In the present study, *A. galli* infection was recorded highest in >28 weeks (27.38%) birds in comparison to 8–28 weeks (25.52%) old birds, which may be due to frequent contact with the intermediate host and external environment. Earlier Rashid *et al*. (2019), Fatima *et al.* (2015) and Zada *et al*. (2015) also observed *A. galli* infection more in adults, than young birds which corroborates with the present findings. The present study has significance because eight species of GI parasites were recorded for the first time in the different age groups of backyard chickens in the hilly region of Meghalaya. Usually birds pick up infection from contaminated litter having parasitic eggs/ova or intermediate host (Janquera 2017) and heavy infection in birds will decrease egg production, weight gain and haemoglobin depression (Nair and Nadakal 1981).

SUMMARY

The aim of the present study was to determine the prevalence of gastrointestinal (GI) parasites in the backyard chickens of mid hill region of Meghalaya. Fecal samples (2,290) were collected from different age groups, viz. < 8 weeks (694), 8–28 weeks (772) and > 28 weeks (824) and examined by flotation, sedimentation and modified McMaster techniques. Overall prevalence of GI parasitic infections was 37.20%. Eight species, viz. *Eimeria* sp. (30.16%), *Heterakis gallinarum* (14.08%), *Ascaridia galli* (21.36%), *Strongyloides avium* (12.44%), *Capillaria* sp. (7.51%), *Raillietina* sp. (8.56%), *Syngamus trachea* (3.52%) and *Choanotaenia infundibulum* (2.34%) were recorded. Age wise variations in infections were observed and trend was < 8 (25.64%), 8–28 (48.18%) and > 28 (38.71%) weeks old birds. *Eimeria* sp. was observed highest in both < 8 (67.97%) weeks and 8–28 (25.80%) weeks birds.

Table 2. Age wise prevalence of GI parasites in backyard chicken of Meghalaya

Age (weeks)	Sample examined	Sample positive	*Eimeria* sp.	*H. gallinarum*	*A. galli*	*Capillaria* sp.	*S. trachea*	*Raillietina* sp.	*Choano-taenia* sp.	*S. avium*
< 8	694	178	121	32	–	25	–	–	–	–
		(25.64)	(67.97)	(17.98)		(14.04)				
8–28	772	372	96	53	94	26	12	26	13	52
		(48.18)	(25.80)	(14.24)	(25.26)	(6.98)	(3.22)	(6.98)	(3.49)	(13.97)
> 28	824	319	44	37	90	14	18	48	8	60
		(38.71)	(13.79)	(11.59)	(28.21)	(4.38)	(5.64)	(15.04)	(2.5)	(18.80)

Figures in parentheses indicates per cent positivity.

A. galli (28.21%) was recorded highest in > 28 weeks old birds. The present study revealed that different species of GI parasites are prevalent throughout the year in the backyard chicken of mid hill region of Meghalaya, thus regular screening and deworming of bird is suggested for profitable backyard poultry farming.

ACKNOWLEDGEMENTS

We are thankful to the Director, ICAR Research Complex for NEH Region, Umiam, Meghalaya for providing financial assistance and other facilities to carry out this research work under the Institute project (IXX15052).

REFERENCES

Afolabi O J, Simon-Oke I A and Olasunkanmi A O. 2016. Intestinal parasites of domestic chicken (*Gallus gallus domesticus*) in Akure, Nigeria. *Journal of Biomedicine* **1**(4): 1–4.

Bhowmik M K, Sasmal N K and Chakraborty A K. 1982. Effect of *Raillietina cesticellus* infection on the meat and egg production of fowl. *Indian Veterinary and Medicine Journal* **6**(2): 100–102.

Badran I and Lukesova D. 2006. Control of coccidiosis and different coccidia of chicken in selected technologies used in tropics and subtropics. *Agricultura Tropica et Subtropica* **39**(1): 39–43.

Bera A K, Bhattacharya D, Pan D, Dhara A, Kumar S and Das S. 2010. Evaluation of economic losses due to coccidiosis in poultry industry in India. *Agricultural Economics Research Review* **23**: 91–96.

Berhe M, Mekibib B, Bsrat A and Atsbaha G. 2019. Gastrointestinal helminth parasites of chicken under different management system in Mekelle town, Tigray Region, Ethiopia. *Journal of Veterinary Medicine*. https://doi.org/10.1155/2019/1307582.

Bandi A, Pattipati M, Chennuru S, Pentela R and Kokila S. 2020. A cross-sectional study on gastrointestinal parasites in backyard poultry in Krishna district, Andhra Pradesh, India. *International Journal of Livestock Research* **10**(2): 46–60.

Catelli C T E, Poglayen G and Gadale A T O. 1999. Preliminary study of the helminthes of the chicken digestive tract in Somalia. *Pathologie Infectieuse* **52**:107–12.

Debbou-Iouknane N, Benbarek H and Ayad A. 2018. Prevalence and aetiology of coccidiosis in broiler chickens in Bejaia province, Algeria. *Onderstepoort Journal of Veterinary Research* **85**(1): 1–6.

Fatima T, Sajid M S, Saleemi M K, Iqbal Z and Siddique R M. 2015. Descriptive epidemiology of endo-parasitic fauna in layer birds (*Gallus domesticus*) of central Punjab. *Pakistan Journal of Agricultural Science* **52**: 815–20.

Gerhold R W. 2015. Overview of coccidiosis in poultry. *Merck Veterinary Manual*. 10th edn. Merck & Co., Inc., Kenilworth, NJ, USA.

Hembram A, Panda M R, Mohanty B N, Pradhan C R, Dehuri M, Sahu A and Behera M. 2015. Prevalence of gastrointestinal helminths in Banaraja fowls reared in semi-intensive system of management in Mayurbhanj district of Odisha. *Veterinary World* **8**(6): 723–26.

Islam M S, Dey A R, Parvin S, Farjana T and Alam M Z. 2020. Intestinal parasitic infection in commercial chickens in Sirajgonj. *Journal of Bangladesh Agricultural University* **18**(1): 111–16.

Jegede O C, Asadu I A, Opara M, Obeta S S and Olayemi D O. 2015. Gastrointestinal parasitism in local and exotic breeds of chickens reared in Gwagwalada Guinea Savannah zone of Nigeria. *Sokoto Journal of Veterinary Sciences* **13**(3): 25–30.

Janquera P. 2017. Parasites of dogs, cats, horses and livestock: Biology and control. *Parasitipedia. net*.

Kumari B, Pal S, Sanyal P K and Verma S K. 2018. Studies on prevalence of gastrointestinal helminthic infections in poultry of Durg (Chhattisgarh). *International Journal of Pure and Applied Bioscience* **6**(3): 570–74.

Kalita A, Sarmah P C, Borah M K, Hussain L and Bhattacharjee K. 2018. Magnitude of coccidia infection in small scale broiler chicken farms of rural Assam (India). *International Journal of Current Microbiology and Applied Science* **7**(10): 3399–3403.

Kumar S, Garg R, Ram H, Maurya P S and Banerjee P S. 2015. Gastrointestinal parasitic infections in chickens of upper Gangetic plains of India with special reference to poultry coccidiosis. *Journal of Parasitic Diseases* **39**(1): 22–26.

Katoch R, Yadav A, Godara R, Khajuria J K, Borkataki S and Sodhi S S. 2012. Prevalence and impact of gastrointestinal helminths on body weight gain in backyard chickens in subtropical and humid zone of Jammu, India. *Journal of Parasitic Diseases* **36**: 49–52.

Luka S A and Ndams I S. 2007. Gastrointestinal parasites of domestic chicken *Gallus gallus domesticus* Linn (1758) in Samaru, Zaria Nigeria. *Science World Journal* **2**(1): 27–29.

MAFF. 1986. Ministry of Agriculture, Fisheries and Food. *Manual of Veterinary Parasitological Techniques*. Her Majesty's Stationery Office, London.

Nair V K and Nadakal A M. 1981. Haematological changes in domestic fowl experimentally infected with the cestode (*Raillietina tetrogona* Molin, 1858). *Veterinary Parasitology* **81**: 49–58.

Naphade S T and Chaudhari K V. 2013. Studies on the seasonal prevalence of parasitic helminths in Gavran (*Desi*) chickens from Marathwada region of Maharashtra. *International Journal of Fauna and Biological Studies* **1**(2): 4–7.

Nguyen T B V, Nguyen V C, Nguyen T P Y, Nguyen T H N, Bach T K, Nguyen V H, Vo B H, Guy T, Juan J C and Alexis R. 2020. Characterisation of gastrointestinal helminths and their impact in commercial small-scale chicken flocks in the Mekong Delta of Vietnam. *Tropical Animal Health and Production* **52**: 53–62.

Permin A, Bisgaard M, Frandsen F, Pearma M, Kold J and Nansen P. 1999. Prevalence of gastrointestinal helminths in different poultry production systems. *British Poultry Science* **40**(4): 439–43.

Rashid M, Akbar H, Bakhsh A, Rashid M I, Hassan M A, Ullah R, Hussain T, Manzoor S and Yin H. 2019. Assessing the prevalence and economic significance of coccidiosis individually and in combination with concurrent infections in Pakistani commercial poultry farms. *Poultry Science* **98**: 1167–75.

Salam T S, Mir S and Khan M R. 2010. The prevalence and pathology of *Raillietina cesticillus* in indigenous chicken (*Gallus gallus domesticus*) in the temperate Himalayan region of Kashmir-short communication. *Veterinarski Arhiv* **80**: 323–28.

Sharma S, Iqbal A, Azmi S, Mushtag I, Wani A Z and Ahmad S. 2015. Prevalence of poultry coccidiosis in Jammu region of Jammu and Kashmir State. *Journal of Parasitic Diseases*

39(1): 85–89.

Sheikh B A, Ahmad F and Sofi T A. 2016. Morphology and prevalence of some helminth parasites in *Gallus domesticus* from Gurez valley of Jammu and Kashmir, India. *Journal of Fisheries and Livestock Production* **4**:159.

Sreedevi C, Jyothisree C, Rama Devi V, Annapurna P and Jeyabal L. 2016. Seasonal prevalence of gastrointestinal parasites in desi fowl (*Gallus gallus domesticus*) in and around Gannavaram, Andhra Pradesh. *Journal of Parasitic Disease* **40**(3): 656–61.

Shifaw A, Feyera T, Walkden-Brown S W, Sharpe B, Elliott T and Ruhnke I. 2021. Global and regional prevalence of helminth infection in chickens over time: A systematic review and meta-analysis. *Poultry Science* **100**: 101082.

Singh M, Kaur P, Singla L D, Kashyap N and Bal M S. 2021. Assessment of risk factors associated with prevalence of gastrointestinal parasites in poultry of central plain zone of Punjab, India. *Veterinary World* **14**(4): 972–77.

Soulsby E J L. 1982. *Helminths, Arthropod and Protozoa of Domestic Animals*. 7th edn. English Language Book Soc., Bailliere Tindal, London.

Taylor M, Coop R and Wall R. 2016. *Veterinary Parasitology*. 4th edn. Wiley Blackwell, UK.

Van N T, Cuong N V, Yen N T, Nhi N T, Kiet B T, Hoang N V, Hien V B, Thwaites G, Carrique-Mas J J and Ribas A. 2019. Characterisation of gastrointestinal helminths and their impact in commercial small-scale chicken flocks in the Mekong Delta of Vietnam. *Tropical Animal Health and Production* **52**: 53–62.

Vijayasarathi M K, Meenakshisundaram A, Dhivya B, Jeyathilakan N, Latchumikanthan A and Selvaraj J. 2020. Retrospective study on the prevalence of gastrointestinal helminthes in backyard chickens in Cauvery delta region. *Indian Journal of Poultry Science* **55**(2): 161–63.

Wamboi P, Waruiru R M, Mbuthia P G, Nguhiu J M and Bebora L C. 2020. Haemato-biochemical changes and prevalence of parasitic infections of indigenous chicken sold in markets of Kiambu County, Kenya. *International Journal of Veterinary Science and Medicine* **8**(1): 18–25.

Wokem G N and Obiyor E T. 2018. Assessment of intestinal parasites of commercial layers in selected local Government areas of Rivers State, Nigeria and their public health implications. *Current Trends in Biomedical Engineering and Bioscience* **11**(5): CTBEB.MS.ID.555822.

Zada L, Rehman T, Niaz S, Zeb M, Ruqia B, Salma K M and Khan A. 2015. Prevalence of *Ascaridia galli* in some poultry farms of district Mardan. *Journal of Advances in Parasitology* **2**: 75–79.