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Studies on Prevalence of Helminth Parasites in Gallus domesticus from Chapra of Bihar, India

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Abstract

The present study was aimed to study the prevalence of helminth parasites in domestic fowl from chapra of Bihar. A total of 422 domestic fowl were examined for helminth parasites from June 2007 to June 2010. The collected parasites were identified according to description given by Soulsby (1982) & Yamaguti (1958). Out of total 422 hosts examined, 77 (18.24 %) were found infected with trematodes but when the %age was taken from the infected lot, it came to 30.92 %. In case of cestodes, the %age of infection from examined hosts and the infected hosts were 15.4 % and 26.1%, respectively. Similarly, In case of nematodes, the results were 42.18% from examined 71.48 % from infected, respectively. In case of examined 196 females, 40 (20.4%) were found infected with trematodes, 27(13.7 %) with cestodes and 91(46.4 %) were found infected with nematodes. In case of examined 226 males, 37(16.3%) were found infected with trematodes 38 (16.8%) with cestodes and 87(38.4%) were found infected with nematodes.

Keywords: Gallus domesticus: Prevalence, Cestode, Trematode, Nematodes. Introduction

Geographically Chhapra, a city and headquarters of the Saran district in Bihar, is located at 25.7848°N Latitude and 84.7274°E Longitude. With an elevation of 36 metres (118ft) it is situated near the confluence of rivers Ganges and Ghaghara. Patna, the capital of Bihar is located 70kms from Chhapra. Due to the presence of naturally fertile soil, the land is largely arable. Chhapra witnesses tropical climate. In winter there is much more rainfall in Chhapra than in summer. The average annual temperature in Chhapra is 24.9 °C. The average annual rainfall is 1059 mm. The driest month is February with 2 mm. Most precipitation falls in July, with an average of 328 mm. The warmest month of the year is May with an average temperature of 33.1 °C. In January, the average temperature is 18.5 °C. It is the lowest average temperature of the whole year. The average temperatures vary during the year by 14.6 °C.

Poultry is of great importance in rural production system in this area. Chicken was the only poultry bird being reared for meat and egg production. The domestic fowl and eggs provide an important source of protein for human consumption. The increased mortality and decreased productivity in chickens is mainly due to mismanagement, lack of nutritional feeding, diseases and predation.

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There are numerous species of helianthus that cause significant damage to the organs in which they live. Cestodes are more commonly found in warm weather when intermediate hosts are abundant. Helminthiasis was considered to be important problems in chickens. Chicken cestodiasis not only cause loss of body weight of the raised chickens but also may cause several problems in affected flocks such as enteritis, loss of blood, loss of production, nervous manifestations and death. The free ranging management system and climatic conditions, such as temperature and humidity alter the population dynamics of parasites resulting in dramatic change in prevalence and intensity of helminth infections.

Aim of Study

The study is aimed at obtaining the following quantitative data on the helminth parasites of the selected vertebrate host, i.e. *Gallus domesticus*.

Materials and Methods

During the present study from June 2007 to June 2010, the domestic fowl were purchased from the local professional suppliers in and around chapra town. The hosts were then taken alive to the temporary laboratory maintained at Rajendra college Department of Zoology Chapra or were brought alive to Department of Zoology, Jai Prakash University Chapra for parasitic examination.

Collection of parasites

Helminth parasites were collected from infected fowl. Common fowl (Gallus domesticus) were collected from local professional suppliers in and around Chhapra town. A total of 422 fowls of both sexes were examined during a period of 3 years (June 2007 to June 2010) and were brought to laboratory and killed. Average 30 to 40 fowl were dissected per month after recording of the sex of the host, the animals were autopsied and their Guts were carefully examined. Helminth parasites recovered from each fowl were collected and counted.

After 24 hours the fixed worms were preserved in 70% alcohol in separate vials. Nematode parasites were fixed in a hot and steaming 70% alcohol to which glycerine was added to give a level of approximately 10%.

Composition of AF A solution:

Formalin (Commercial)-10 ml Glacial, Acetic acid 2ml and Distilled water 40ml.

Gower's Carmine stain:

10gms of carmine powder was boiled in 100ml of 45% glacial acetic acid.

The solution was cooled and filtered .After that filtered powder was carefully removed and dried for the preparation of the stain. A detail like record the sex of the host, location, number, species of the parasites and month of collection, was noted.

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Fixation and preservation:

Samples were examined in living condition and the helminth parasites collected were washed in physiological salt solution. The cleaned parasites were preserved and fixed quickly by using suitable

Reagents depending on the type of parasites .Trematodes were fixed under pressure of cover glass in A F A solution. Cestodes were fixed in A F A in between two slides or glass plates tied together at the ends by rubber bands and placed for two hours in a jar or petri dish containing the fixative. Specimens of trematodes and cestodes were then transferred to separate vials contain the fixative. Carmine was mixed with potash alum and distilled water was added in following composition:

Acidified Carmine 1gm, Potash alum 10gms and Distilled water 200ml.

Trematode and Cestode:

With Gower's Stain

The preserved material (in 70% alcohol) was downgraded to water to stain in Gower's stain, again washed in one or two changes of water and then dehydrated through graded series of alcohol, cleared in Methyl Salicylate and Benzene and mounted in DPX.

With Semichon's Carmine:

The freshly fixed and reserved material was first treated with stain latitude 10 times with 70% alcohol to remove acid from the material. The flukes then were dehydrated, cleared in methyl salicylate then treated with Benzene and mounted in DPX.

Nematode:-

Nematode parasites were fixed in a hot and steaming 70% alcohol to which glycerin was added to give a level of 10%.

Results & Observations

Sex-wise prevalence of Helminth parasites

During the study of infestation of helminth parasites in *Gallus domesticus*, between 2007 to 2009 gut of 422 hosts were examined, out of which 226 were males and 196 were females.

Among the total of 422 examined hosts, 249 (59%) were found infected, with one or more types of helminth parasites.

Sex-wise: Sex-wise, female hosts had higher (59.7 %) rate of infection than the male hosts (58.4 %).

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Sex	Examined	Infected	%age of infection
Male	226	132	58.4
Female	196	117	59.7
Total	422	249	59

Table-1: Sex-wise prevalence of helminth parasites of Gallus domesticus (Fowl)

Different Helminth Parasite-wise Rate of Infection

Out of total 422 hosts examined, 77 (18.24 %) were found infected with trematodes but when the %age was taken from the infected lot, it came to 30.92 %. In case of cestodes, the %age of infection from examined hosts and the infected hosts were 15.4 % and 26.1%, respectively. Similarly, In case of nematodes, the results were 42.18% from examined 71.48 % from infected, respectively.

Sex-wise

In case of examined 196 females, 40 (20.4%) were found infected with trematodes, 27(13.7%) with cestodes and 91(46.4%) were found infected with nematodes.

In case of examined 226 males, 37(16.3%) were found infected with trematodes 38 (16.8%) with cestodes and 87(38.4%) were found infected with nematodes (Table-2).

Table-2: Infection	of	different	helminth	parasites	in	Gallus	domesticus	(Fow	l)
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Host	Examined	Trematode	Cestode	Nematode
		%age	%age	%age
Male	226	37(16.3)	38(16.8)	87(38.4)
Female	196	40(20.4)	27(13.7)	91(46.4)
Total	422	77(18.2)	65(15.4)	178(42.1)

 Table-2 Parasite-wise infection in Gallus domesticus

Month-wise infection

When the month-wise infection was taken into consideration in the present study, on an average 35 hosts were examined every month as per the data given in (Table-3), 31 guts were examined in the month of January, in the month of February -25, March – 62, April-53 ,May-35, June - 35, July-25, August-24, September-36, October-28, November-46 and in December month 22 gut of fowls were examined. Before examining the gut of the fowl, the sex of the fowl was also taken

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Month-wise Examined Males Were

In the month of January-16, February-11, March-32, April-20, May-15, June-24, July-14, August-8, September-25, October-19, November-32 and December-10.

Month-wise, Examined Females were: Similarly, the female fowls examined in different months were; January – 15, February- 14, March-30, April-33, May-20, June-11, July-11, August-16, September -11, October-9, November-14 and December-12.

Month-wise Infection in Males:

In the present study, the maximum (87.5%) rate of infection in male was observed. In the month of August, followed by June (83.33%), July (78.57%), May (66.66%), September (64%), October (57.89%), March (56.25%), November and December (50% each), February (45.45%), April (45%), while the minimum (25%) rate of infection was observed in the month of January.

Month-wise Infection in females:

In the present study, the maximum (90.9%), rate of infection in female was observed in the month of July, followed by May (80%), August (68.75%),November (64.28 %),April (63.63%), December (58.33%), October (55.55%), June (54.54 %), February (50%), March (46.66 %), September (45.45%) while the minimum (40%) rate of infection was observed in the month of January.

Month	Male	Female	Total	Male (%))	Female (%)	Total (%)
January	16	15	31	4(25)	6(40)	10(32.25)
February	11	14	25	5(45.45)	7(50)	12(48)
March	32	30	62	18(56.25)	14(46.66)	32(51.61)
April	20	33	53	9(45)	21(63.63)	30(56.6)
May	15	20	35	10(66.66)	16(80)	26(74.28)
June	24	11	35	20(83.33)	6(54.54)	26(74.28)
July	14	11	25	11(78.57)	10(90.9)	21(84)
August	8	16	24	7(87.5)	11(68.75)	18(75)

Table-3 Month-wise prevalence rate in both sexes

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September	25	11	36	16(64)	5(45.45)	21(58.33)
October	19	9	28	11(57.89)	5(55.55)	16(57.14)
November	32	14	46	16(50)	9(64.28)	25(54.34)
December	10	12	22	5(50)	7(58.33)	12(54.54)
Total	226	196	422	132(58.4)	117(59.7)	249(59)

Prevalence Rate of Infection In Different Helminth Parasites

In the present study, following three types of parasites were considered, Trematodes, Cestodes and Nematodes.

Infected with Cestodes

Infected with cestodes the maximum (62.5 %) rate of infection was observed in the month of October, followed by September (52.38 %),August (33.33 %),January(30 %),June (26.92 %),April (26.66 %), December (25 %), March (21.78 %),February(16.66 %), May (15.38 %)and July(9.52 %).The lowest (8 %)rate of infection was observed in the month of November (Table-3)

Examined			Infe	ected		Cestode			
Month	Male	Female	Total	Male	Female	Total (%)	Male	Female	Total (%)
January	16	15	31	4	6	10(32.25)	1(25)	2(33.33)	3(30)
February	11	14	25	5	7	12(48)	2(40)	0(0)	2(16.66)
March	32	30	62	18	14	32(51.6)	2(11.11)	5(35.71)	7(21.87)
April	20	33	53	9	21	30(56.6)	1(11.11)	7((33.33)	8(26.66)
May	15	20	35	10	16	26(74.28)	2(20)	2(12.5)	4(15.38)
June	24	11	35	20	6	26(74.28)	6(30)	1(16.66)	7(26.92)
July	14	11	25	11	10	21(84)	2(18.18)	0(0)	2(9.52)
August	8	16	24	7	11	18(75)	3(42.85)	3(27.27)	6(33.33)
September	25	11	36	16	5	21(58.33)	8(50)	3(60)	11(52.38)
October	19	9	28	11	5	16(57.14)	8(72.72)	2(40)	10(62.5)
November	32	14	46	16	9	25(54.34)	1(6.25)	1(11.11)	2(8)
December	10	12	22	5	7	12(54.54)	2(40)	1(14.28)	3(25)
Total	226	196	422	132	117	249(59)	38(28.78)	27(23.07)	65(26.1)

Table:-4 Infected with Cestode/Total Infected

Table:-4 Infected with Cestode/Total Infected

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Sex-Wise Male

In male, the maximum (72.72 %) rate of infection was observed in the month of October, followed by September (50%), August (42.85 %), February and December (40 % each), June (30%), January (25 %), May (20 %), July (18.18 %), March and April (11.11 %). The lowest (6.25 %) rate of infection was observed in the month of November.

Female

In female, the maximum (60%) rate of infection was observed in the month September, followed by October (40%), March (35.71 %), January and April (33.33 % each), August (27.27 %), June (16.66 %), December (14.28 %) and May (12.5 %).The lowest (11.11 %) rate of infection was observed in the month of November.

Infected with Trematode

The maximum (48%) rate of infection was observed in the month of November, followed by August (44.44), June (38.46%), October (37.5%), February and September (33.33%), May (30.76%), April (23.33%), March (21.87%), January (20%) and July (19%). The lowest (16.66%) rate of infection was observed in the month of December.

Examined			Infe	Infected			Trematodes		
Month	Male	Female	Total	Male	Female	Total (%)	Male	Female	Total (%)
January	16	15	31	4	6	10(32.25)	1(25)	1(16.16)	2(20)
February	11	14	25	5	7	12(48)	1(20)	3(42.85)	4(33.33)
March	32	30	62	18	14	32(51.6)	3(16.16)	4(28.57)	7(21.87)
April	20	33	53	9	21	30(56.6)	1(11.11)	6(28.57)	7(23.33)
May	15	20	35	10	16	26(74.28)	4(40)	4(25)	8(30.76)
June	24	11	35	20	6	26(74.28)	8(40)	2(33.33)	10(38.46)
July	14	11	25	11	10	21(84)	1(9.09)	3(30)	4(19)
August	8	16	24	7	11	18(75)	3(42.85)	5(45.45)	8(44.44)
September	25	11	36	16	5	21(58.33)	3(18.75)	4(80)	7(33.33)
October	19	9	28	11	5	16(57.14)	5(45.45)	1(20)	6(37.5)
November	32	14	46	16	9	25(54.34)	6(37.5)	6(66.66)	12(48)
December	10	12	22	5	7	12(54.54)	1(20)	1(14.28)	2(16.66)
Total	226	196	422	132	117	249(59)	37(28.03)	40(34.18)	77(30.92)

Table:-5 Infected with Trematode/Total Infected

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Discussion

The Cestodes found to have higher rate of prevalence in the month of October i.e. 62.5%, followed by 8% the lowest was recorded in the month of November. Their preference for a particular month may possibly the abundance of intermediate host and how the intermediate hosts vary in different month. The Cestode infection in males is highest 87.5% in the month of August and lowest 25% in January. In case of females, The Cestode infection in females is highest 90.9% in the month of July and lowest 40% in January.

Sex – wise: The rate of prevalence of different helminth parasites reflects following observations:

The female fowls show higher rate of infection of trematodes i.e.20.4 % than that of males i.e. 16.3%. Similarly, the females show higher rate of infection with nematodes too.i.e.46.4 % than that of males i.e. 38.4%. But, in case of Cestode infection males show higher rate of infection. The Trematodes found to have higher rate of prevalence in the month of November i.e. 48%, followed by 16.66% the lowest was recorded in the month of December. Their preference for a particular month may possibly the abundance of intermediate host and how the intermediate hosts vary in different month. The Trematode infection in males is highest 42.85% in the month of August and lowest 11.11% in April. In case of females, The Trematode infection in females is highest 80% in the month of September and lowest 14.28% in December.

Female fowls had insignificantly higher (59.7%) rate of infection than their male partners (58.4%). This observation is in conformity with the findings of Hassouni, T.B. (2006), Mungube, E.O., Bauni, S.M., Tenhagen, B.A., Wamae, L.W., Nzioko, S.M., Muhammed, L. and Nginyi, J.M.(2008), Maur, B.M., Dawam, N.N. and Malann, Y.D.(2010), Bin, A.A., Rabo, J.S., Dawurung, J.S., Lagu, A.A.(2012).

In the present work, besides investigation on local fowls, study was also carried out on the broiler fowls and after examining the guts of 112 fowls, in different months, no helminth parasites were observed .this clearly indicates that the local fowls are more prone to helminth infection than the poultry or broiler fowls. This result is in conformity with the work of Rabbi, A.K.M.A., Islam, A., Mazumdar, Anisuzzaman and Rahman, M.H.(2006); Puttalakshmamma, G.C., Ananda, P.K.J., Mamatha., P.R and Rao Sugna, G.S.(2008); Mustafa, K., Feride, K., Esma, S., Kozan, K., Hattice, S.C.(2009), Shahin, A.M., Lebdah, M.A., Abu-Elkheir, S.A. and Elmeligy, M.M.(2011) however, contradicts the work of Maria, Z.(2009).

Sex-wise in the present study, female fowls had insignificantly higher (59.7 %) rate of infection than their male partners (58.4 %).this observation is in conformity with the findings of

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Hassouni, T.B.(2006), Mungube, E.O., Bauni, S.M., Tenhagen, B.A., Wamae, L.W., Nzioko, J.M. (2008), Maur, B.M., Dawam, N.N. and Malann, Y.D.(2010), Bin, A.A., Rabo, J.S., Dawurung, J.S., Lagu, A.A.(2012).

Parasite-wise, in the present study, 71.48 % hosts were found infected with nematodes, 30.2 % with trematodes and 15.4 % hosts were found infected with cestodes. The highest rate of infection with nematodes than others is in conformity with the reporting of Mukuratirwa, Hove, Esman, Floj, permin, Nansen (2001), Magalhaes, cestode Caldas, Coartea (2004), Rabbi, Islam, Majumder, Anisuzzaman, Rahman (2006) ,Mungube, E.O., Bauni, S.M., Tenhagen, B.A., Wamae, L. W., Nzioko S.M., Muhammed L.and nginyi J.M.(2008), Maria, Z.(2009). However, the reporting of Yadav A.K., Tandon, V. (1991) is to the present observation. According to Pfukeny, Willingham, Mukaratirwa & Manrod (2007), Sheikh, Masood, Mir & Abdul (2010) the prevalence of Cestode is highest among the three groups of helminthes. Suhardono & Adwineta (2002) found the infection of Trematode parasites the highest.

Observations:

The rate of prevalence of different helminth parasites reflects following observations: The female fowls show higher rate of infection of trematodes i.e. (20.4%) and males i.e. (16.3%). Similarly, the females show higher rate of infection with nematodes too. i.e.(46.4%) and males i.e. (38.4%). But, in the case of Cestode infection males show higher rate of infection.

Female fowls had insignificantly higher (59.7 percent) rate of infection than their male partners (58.4 percent). This observation is in conformity with the findings of Hassouni, T.B. (2006), Mungube, E.O., Bauni, S.M., Tenhagen, B.A., Wamae, L.W., Nzioko, S.M., Muhammed, L. and Nginyi, J.M. (2008), Maur, B.M., Dawam, N.N. and Malann, Y.D. (2010), Bin, A.A., Rabo, J.S., Dawurung, J.S., Lagu, A.A.(2012).

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