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Prevalence of gastro intestinal parasites of backyard poultry in Telangana state

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Abstract

A study was undertaken to record the prevalence of gastro intestinal parasites of backyard poultry in Telangana state. The gastro intestinal parasites collected from the desi chicken slaughtered in poultry shops in selected districts of Telangana state were morphologically identified. Out of 480 gastro intestinal tracts examined, 432 harbored the parasites indicating 90% of prevalence in Telangana state. Mixed infection was identified in 408 samples (85%) and single infection in 24 samples (5%). The species identified were *Ascaridia galli* (70%), *Capillaria obsignata* (60%), *Dispharynx spiralis* (30%), *Echinostoma revolutum* (7.5%), *Eimeria* spp. (42.5%), *Heterakis gallinarum* (72.5%), *Prosthogonimus* spp. (5%), *Raillietina* spp. (75%), *Subulura brumpti* (27.5%) and *Tetrameres* spp. (52.5%). The present study was designed to study the zone, season, age and sex wise prevalence of gastro intestinal parasites in desi chicken. The zone wise prevalence of gastro intestinal parasites was higher in North zone (100%) followed by Central zone (88.23%) and South zone (77.78%). Age wise Prevalence studies of gastro intestinal parasites in Telangana state showed higher prevalence in chicks (100%) and growers (100%) than adults (80%). The incidence of parasites was higher in male birds (96.2%) than female birds (92.9%). *Eimeria* spp. and *Tetrameres* spp. were more prevalent in female and male birds, respectively. Season wise prevalence studies of gastro intestinal parasites in Telangana state showed higher prevalence during summer (95.83%) followed by rainy (100%) and least in winter (70%) seasons. *Prosthogonimus* spp. was the least prevalent parasite in all seasons. *Dispharynx spiralis*, *Echinostoma revolutum* and *Prosthogonimus* spp. infections were prevalent only in summer season.

Keywords: Chicken, gastro intestinal parasites, Telangana, prevalence

Introduction

Desi poultry are commonly reared under free range system in rural areas of Telangana. The backyard system of rearing makes the desi fowl prone to infection with gastro intestinal parasites leading to poor feed conversion ratio, retarded growth, reduced weight gain, decreased egg production, diarrhea, intestinal obstruction, morbidity and mortality. The climate of Telangana also favours the perpetuation of gastro intestinal parasites and their intermediate hosts in the environment. Gastrointestinal parasites involving nematodes, trematodes, cestodes and coccidia affecting free range chickens have been widely reported, with mixed infection being very common. Prevalence of gastrointestinal parasites in desi fowl has been reported by various workers from different parts of the world (Permin *et al.*, 2002)^[12] including India (Devada and Sathianesan, 1989; Hange *et al.*, 2007 and Katoch *et al.*, 2012)^[4, 6, 10]. Although several reports on prevalence of parasites in desi fowl have been reported from different parts of the world, there is a paucity of information regarding the prevalence of gastro intestinal parasites of backyard poultry in the Telangana state. Therefore, the present study was undertaken to find out the prevalence of gastro intestinal parasites and their population dynamics in order to formulate timely strategic treatment and control measures.

Materials and Methods

A total of 480 gastro intestinal tracts, starting from oesophagus to rectum were collected from six districts of Telangana that comes under 3 agroclimatic zones. At the time of sample collection, data on sex, age and geographic location were also recorded. The alimentary tracts collected from freshly slaughtered birds from local poultry shops were transported on ice directly to the laboratory for onward parasitological processing. In order to avoid transfer of the parasites from one site of alimentary canal to the other, the tracts were ligated using nylon ligatures, thus dividing the tract into sections containing organs namely- Oesophagus, crop, proventriculus, gizzard, duodenum, small intestine, caeca and rectum.

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Each part was incised longitudinally and was immersed in lukewarm normal saline for the release of worms that were embedded in intestinal mucosa. Intestinal scrapings were also taken for the presence of any parasitic infestation like tapeworm scolices, small tapeworms and developmental stages of coccidian parasites.

Representatives from the collected trematodes and cestodes were processed and stained with borax caramine and nematodes were cleared in lactophenol. The identification of eggs and adult parasites was carried out as per the description of Soulsby (1982) [13].

Results and Discussion

The overall prevalence of gastro intestinal parasites in desi fowl was found to be 90% in Telangana state. The similar findings were recorded by Eshetu *et al.* (2001) [5] and Ilyes and Ahmed (2013) [8] and on contrary, reported a lower prevalence. The variation in the prevalence of parasitic infestation could be due to the difference in climatic condition in the study area, availability of intermediate hosts or adoptability of managerial practices (Magwisha *et al.*, 2002) [11]. Mixed infection was identified as 85%. Similarly, Hembram *et al.* (2015) [14] in Odhisa, India reported 80.85% prevalence of mixed infection reported a higher per cent of mixed infection in backyard poultry in Ethiopia. The parasites identified in study area were *Ascaridia galli* (70%) (Fig.1 and 2), *Capillaria obsignata* (60%) (Fig.3), *Dispharynx spiralis* (30%) (Fig.4 and 5), *Echinostoma revolutum* (7.5%) (Fig.13), *Eimeria* spp. (42.5%) (Fig.8 and 9), *Heterakis gallinarum* (72.5%) (Fig.6), *Prosthogonimus* spp. (5%) (Fig.14), *Raillietina* spp. (75%) (Fig.11 and 12), *Subulura brumpti* (27.5%) (Fig.7) and *Tetrameres* spp. (52.5%) (Fig.10).



Fig 3: Egg of *Capillaria* spp..

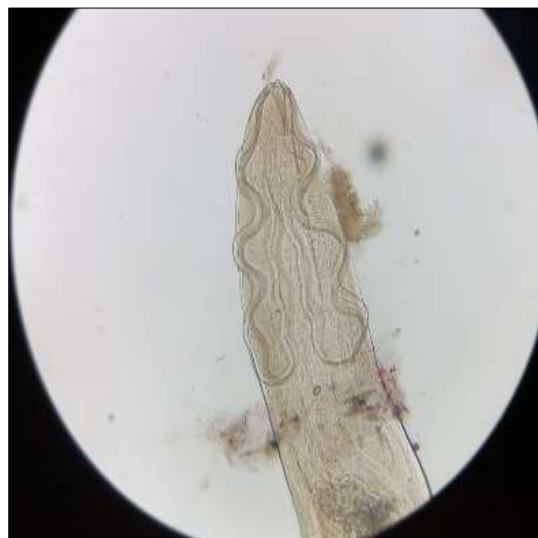


Fig 4: Anterior end of *Dispharynx spiralis*



Fig 1: Egg of *Ascaridia galli*



Fig 2: Adult *Ascaridia galli* worms in a petri dish



Fig 5: Egg of *Dispharynx spiralis*



Fig 6: Egg of *Heterakis gallinarum*



Fig 7: Egg of *Subulura brumpti*

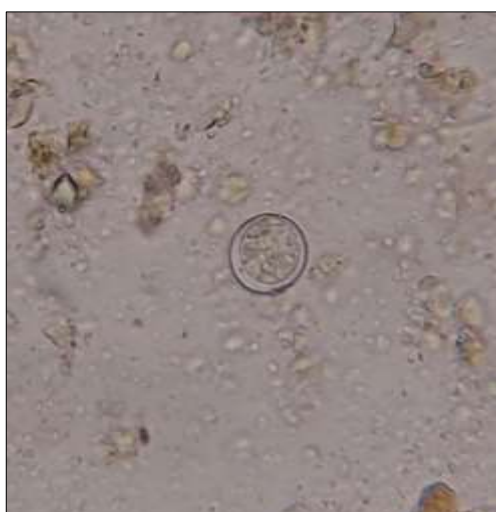


Fig 8: Unsporulated oocyst of *Eimeria* spp..

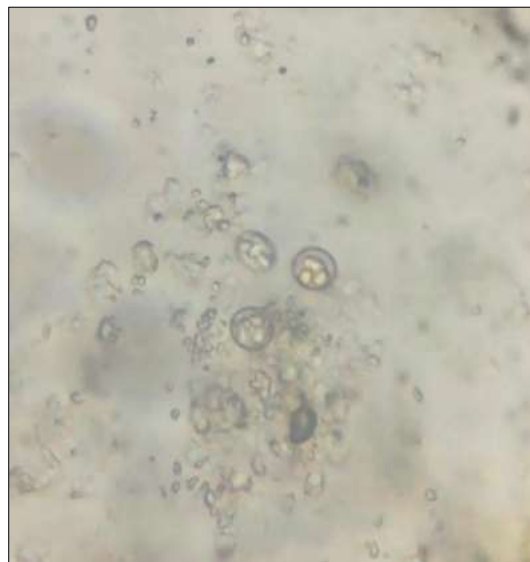


Fig 9: Sporulated oocyst of *Eimeria* spp..



Fig 10: *Tetrameres* spp.. under 10X



Fig 11: Stained specimen of *Raillietina echinobothrida*



Fig 12: Stained specimen of *Raillietina tetragona*



Fig 13: Unstained specimen of *Echinostomum revolutum* under 10X



Fig 14: Stained specimen of *Prosthogonimus* spp.

intestinal parasites in country chicken were significantly ($p \leq 0.05$) higher in North zone (100%) followed by Central zone (88.23%) and South zone (77.78%) (Table.1). In different zones, the infection was significantly ($p \leq 0.05$) higher in districts of Karimnagar (100%), Jagtial (100%) and Siddipet (100%) followed by Rangareddy (80%), Nalgonda (75%) and Warangal districts (60%). These variation in the prevalence of gastro intestinal parasites in different zones could be due to variation in the climatic conditions and variation in population dynamics of the intermediate hosts and infective stages of the parasites.

The age wise prevalence was significantly ($p \leq 0.05$) higher in chicks (100%) and growers (100%) followed by adults (80%) (Table.2). This was in agreement with, whereas Ilyes and Ahmed (2013)^[8], Kamal Jaiswal *et al.* (2020)^[9] in Lucknow and Anupama *et al.* (2021)^[2] in Andhra Pradesh reported higher prevalence in adults. High prevalence of gastro intestinal parasites in chicks might be due to weaker immunity of chicks to infection and as well as continuous exposure to infections from the contaminated litter. High prevalence of gastro intestinal parasites in growers might be due to their gregariousness, therefore, exposing them to more intermediate hosts. Similarly, Dar and Tanveer (2013)^[3] and Hembram *et al.* (2015)^[14] observed more prevalence in chicks and observed more prevalence in growers than that of adult birds. *Dispharynx spiralis* was found in all age groups which was contrary to the reports of Alam *et al.* (2006)^[7] and Anupama *et al.* (2021)^[2] who observed *Dispharynx spiralis* infection exclusively in chicks.

The overall incidence of gastro intestinal parasites was significantly ($p \leq 0.05$) higher in male birds (96.2%) followed by female birds (92.9%) (Table.3). similarly, statistical difference was reported by Kamal Jaiswal *et al.* (2020)^[9]. Similarly, Dar and Tanveer *et al.* (2013)^[3] reported more prevalence of parasitic infections in males than female birds, this could be due to male birds go far in search of food and mate, thus increasing their chances of picking up of infection. Seasonal prevalence of gastrointestinal parasites showed that, the prevalence was significantly ($p \leq 0.05$) higher in summer (95.83%) followed by Rainy (100%) and winter (70%) seasons (Table.4). High prevalence of parasites was observed during the rainy season. Similarly, Sreedevi *et al.* (2020)^[2] reported that there was significant relationship between the seasonality and prevalence of gastrointestinal parasites and observed that rainy season being more favourable for the prevalence of parasites. The present findings are also in agreement with, Alam *et al.* (2006)^[7], Hembrem *et al.* (2015)^[14] and Anupama *et al.* (2021)^[2] who reported higher prevalence of infection during the rainy season. The environmental conditions of the study area are hot and humid which favoured the development and survival of pre parasitic stages and for insects, which in turn act as vectors for helminths leading to increased availability of infective stages for backyard poultry especially during the process of scratching the feed. Magwisha *et al.* (2002)^[11] reported that climatic conditions particularly temperature and humidity may alter the population dynamics of the parasites resulting in variations in the prevalence and intensity of helminth infections. The infection of *Ascaridia galli* was higher in summer season. The high prevalence of parasites in desi fowl in the study area may be due to the fact that backyard poultry were free ranging and had free access to infective stages in the environment and to their respective intermediate hosts like beetles, earthworms, ants *etc.* in search of feed.

Zone wise studies indicated that, the prevalence of gastro

Table 1: Zone wise prevalence of endoparasites in desi birds in Telangana state

S.N O.	Zone	District	No. of examined	No. of infected (%)	Cestodes		Nematodes					Trematodes		Protozoa
					<i>Raillietina</i> spp.	<i>Dispharynx spiralis</i>	<i>Capillaria obsignata</i>	<i>Ascaridia galli</i>	<i>Heterakis gallinarum</i>	<i>Subulura brumpti</i>	<i>Tetrameres</i> spp.	<i>Echinostoma revolutum</i>	<i>Prosthogonimus</i> spp.	
1	North	Karimnagar	120	120 (100)	120 (100)	0 (0)	100 (83.3)	120 (100)	120 (100)	0 (0)	120 (100)	0 (0)	0 (0)	120 (100)
		Jagtial	48	48 (100)	24 (50)	0 (0)	20 (41.7)	12 (25)	36 (75)	12 (25)	24 (50)	0 (0)	0 (0)	12 (25)
		Total	168	168 (100)	144 ^a (85.5)	0 ^b (0)	120 ^a (71.4)	132 ^a (78.57)	156 ^a (92.85)	12 ^a (7.14)	144 ^a (85.71)	0 ^b (0)	0 ^b (0)	132 ^a (78.57)
2	Central	Siddipet	144	144 (100)	144 (100)	144 (100)	100 (69.4)	144 (100)	120 (83.33)	60 (41.7)	60 (41.67)	36 (25)	12 (8.33)	0 (0)
		Warangal	60	36 (60)	24 (40)	0 (0)	30 (50)	24 (40)	24 (40)	24 (40)	24 (40)	0 (0)	12 (20)	24 (40)
		Total	204	180 (88.23)	168 ^a (82.35)	144 ^a (70.59)	130 ^a (63.7)	168 ^a (82.35)	144 ^b (70.59)	84 ^b (41.2)	84 ^b (41.2)	36 ^a (17.64)	24 ^a (11.77)	24 ^c (11.77)
3	South	Rangareddy	60	48 (80)	24 (40)	0 (0)	18 (30)	24 (40)	36 (60)	24 (40)	12 (20)	0 (0)	0 (0)	36 (60)
		Nalgonda	48	36 (75)	24 (50)	0 (0)	20 (41.7)	12 (25)	12 (25)	12 (25)	12 (25)	0 (0)	0 (0)	12 (25)
		Total	108	84 (77.78)	48 ^b (44.44)	0 ^b (0)	38 ^b (35.2)	36 ^b (33.33)	48 ^c (44.44)	36 ^b (33.33)	24 ^c (22.22)	0 ^b (0)	0 ^b (0)	48 ^b (44.44)
Grand Total			852	780	672	288	538	636	648	228	480	72	48	360

Values super scripted with the similar alphabets are nonsignificant at ($p \geq 0.05$)

Values super scripted with the dissimilar alphabets are significant at ($p \leq 0.05$)

Table 2: Age wise prevalence of GI parasites in desi birds in Telangana state

S. No	Age Group	No. of examined	No. of infected (%)	Cestodes		Nematodes					Trematodes		Protozoa
				<i>Raillietina</i> spp.	<i>Dispharynx spiralis</i>	<i>Capillaria obsignata</i>	<i>Ascaridia galli</i>	<i>Heterakis gallinarum</i>	<i>Subulura brumpti</i>	<i>Tetrameres</i> spp.	<i>Echinostoma revolutum</i>	<i>Prosthogonimus</i> spp.	
1	Chicks	108	108	72 ^b (66.67)	48 ^b (44.44)	60 ^b (55.56)	84 ^c (77.78)	84 ^a (77.78)	48 ^a (44.44)	36 ^b (33.33)	0 ^b (0)	0 ^b (0)	36 ^b (33.33)
2	Growers	192	192	168 ^a (87.5)	48 ^a (25)	168 ^a (87.5)	180 ^a (93.75)	144 ^a (75)	36 ^c (18.75)	132 ^a (68.75)	12 ^a (6.25)	12 ^a (6.25)	120 ^a (62.5)
3	Adults	180	144	120 ^b (66.67)	48 ^a (26.67)	60 ^c (33.33)	72 ^b (40)	120 ^a (66.67)	48 ^{bc} (26.67)	84 ^b (46.67)	24 ^a (13.33)	12 ^a (6.67)	48 ^b (26.67)
Total		480	444	360	144	288	336	348	132	252	36	24	204

Values super scripted with the similar alphabets are nonsignificant at ($P \geq 0.05$)

Values super scripted with the dissimilar alphabets are significant at ($p \leq 0.05$)

Table 3: Sex wise prevalence of GI parasites in desi birds in Telangana state

S. No	Gender	No. of examined	No. of infected (%)	Cestodes		Nematodes					Trematodes		Protozoa
				<i>Raillietina</i> spp.	<i>Dispharynx spiralis</i>	<i>Capillaria obsignata</i>	<i>Ascaridia galli</i>	<i>Heterakis gallinarum</i>	<i>Subulura brumpti</i>	<i>Tetrameres</i> spp.	<i>Echinostoma revolutum</i>	<i>Prosthogonimus</i> spp.	
1	Male	312	300 (96.2)	204 ^b (65.4)	96 (30.77)	168 ^b (53.85)	216 (69.23)	204 ^b (65.38)	60 ^b (19.23)	168 (53.85)	12 ^b (3.85)	0 ^b (0)	108 ^b (34.62)
2	Female	168	156 (92.9)	156 ^a (92.9)	48 (28.57)	120 ^a (71.43)	120 (71.43)	144 ^a (85.71)	72 ^a (42.86)	84 (50)	24 ^a (14.3)	24 ^a (14.3)	96 ^a (57.14)
Total		480	456	360	144	288	336	348	132	252	36	24	204

Values super scripted with the similar alphabets are nonsignificant at ($P \geq 0.05$)

Values super scripted with the dissimilar alphabets are significant at ($p \leq 0.05$)

Table 4: Season wise prevalence of GI parasites in desi birds in Telangana state

S. No	Season	No. of examined	No. of infected (%)	Cestodes		Nematodes					Trematodes		Protozoa
				<i>Raillietina</i> spp.	<i>Dispharynx spiralis</i>	<i>Capillaria obsignata</i>	<i>Ascaridia galli</i>	<i>Heterakis gallinarum</i>	<i>Subulura brumpti</i>	<i>Tetrameres</i> spp.	<i>Echinostoma revolutum</i>	<i>Prosthogonimus</i> spp.	
1	Summer	288	276 (95.83)	276 ^a (95.83)	144 ^a (50)	180 ^b (62.5)	276 ^a (95.83)	252 ^a (87.5)	72 ^b (25)	192 ^a (66.7)	36 ^a (12.5)	24 ^a (8.33)	108 ^{ab} (45.833)
2	Rainy	72	72 (100)	36 ^b (50)	0 ^b (0)	60 ^a (83.33)	36 ^b (50)	48 ^a (66.67)	48 ^a (66.67)	36 ^b (50)	0 ^b (0)	0 ^b (0)	24 ^b (33.333)
3	Winter	120	84 (70)	48 ^b (40)	0 ^b (0)	48 ^c (40)	24 ^c (20)	48 ^b (40)	12 ^c (10)	24 ^c (20)	0 ^b (0)	0 ^b (0)	72 ^a (60)
Total		480	0	360	144	288	336	348	132	252	36	24	204

Values super scripted with the similar alphabets are nonsignificant at ($P \geq 0.05$)

Values super scripted with the dissimilar alphabets are significant at ($p \leq 0.05$)

Conflict of interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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