

PREVALENCE OF GASTROINTESTINAL AND PULMONARY HELMINTHIC PARASITES OF NATIVE CHICKENS IN PIRANSHAHR CITY, IRAN

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ABSTRACT

A survey of intestinal and pulmonary helminthes parasites of domestic chickens was carried out in piranshahr city, Iran during 2014. One hundred (100) gastrointestinal and pulmonary samples were examined in necropsies chickens microscopically using the lactophenole and carmine-acid staining technique. The result showed a high prevalence of intestinal parasitic infection. Out of a total of 100 domestic chicken studied 63 (63%) were infected by parasite. Nematodes had the highest prevalence 47 (47%), followed by the cestodes with prevalence of 16 (16%). Nematodes especially *Ascaridia galli* 21 (21 %) and *Heterakis galinarum* 12(12 %) were most prevalent in the birds. *Railletina tetragona* 8 (8 %) was found to be the highest in occurrence among the cestodes encountered. No trematode was encountered among the birds. The average parasite burden per chicken was found to be 9.8 and majority of the species were restricted to small intestine and trachea. Fifteen (15 %) cases of mixed infections were encountered. The study reveals that there was a high prevalence of intestinal parasites of domestic chicken in the study area. This calls for improved management and disease control to enhance their potential.

Keywords: Helminthic Parasites, Native Chickens, Piranshahr City, Iran

INTRODUCTION

The domestic chicken (*Gallus gallus domesticus*) is widely reared traditionally in the tropics (Hodasi, 1979; Permin and Hansen, 1998). These chickens are the most important protein sources of human population in some developed and developing countries of the world and also serve as means of generating income. The local family poultry is an integrated component of nearly all rural and some urban households in Iran. The main advantage of indigenous breeds is that their production is not labour intensive. They can thrive under adverse conditions (e.g. poor mismanagement, diseases, lack of feeding and predators), which may cause low productivity and high mortality (Akinwumi *et al.*, 1979). Since these domestic chickens are sources of ready cash and meat to the local communities, their potential could be enhanced through improved management and disease control. Parasitic diseases are problems wherever poultry are raised whether in large commercial operations or in small backyard flocks and economic losses can be significant (Fatihu *et al.*, 1991). These parasites constitute a major factor limiting fruitful production in poultry industry by affecting the growth rate of the flock resulting in organ malfunctioning and finally death (Soulsby, 1982). Effective control measures however can be realistic if based on a thorough knowledge of the epidemiology of the endemic infectious agents. Limited studies undertaken on commercial farms which raise mainly exotic birds indicated that helminthes infection is a threat to the Iran poultry industry (Oyeka, 1989). There is a definite paucity of information on infections of indigenous chicken especially in piranshahr city of Iran. However some studies have been carried out in Northern and Southern Iran (Eslami *et al.*, 2009). Poor management systems and most importantly diseases are the major cause of financial loss in poultry production (Oluyemi and Robert, 1979). Ajayi and Ajayi (1983) found that the major constraint to profitable livestock and poultry production in several countries including Iran could be traced to helminthiasis. The domestic chicken has a wide range of

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feeding habits including feeding on faces which may be carrying stages of parasites, thus predisposing them to parasitic infections (Adang, 1999). Heavy gastrointestinal helminthiasis is characterized by retarded growth, emaciation, decreased egg production, mucoid diarrhea, catarrh, loss of appetite, anemia, weakness, paralysis and death (Nair and Nadakal, 1981; Fatihu *et al.*, 1991). These are causes of great economic losses. Scavenging, backyard and free-range poultry production systems have by definition a much greater degree of contact with potential disease causing organisms and diseases prophylaxis is uncommon (Damerow, 1994).

The objective of this study is to investigate the helminth parasites found in domestic chickens in parts of Piranshahr city, Iran. This investigation is aimed at providing information on their prevalence, species composition, preferred site of infection and parasite burden.

MATERIALS AND METHODS

Study Area

The study was conducted in Piranshahr city, Iran. The study vicinity has a subtropical weather, the raining season is usually from April to October while the dry season begins in November and ends in March.

Collection of Samples

The study area was visited twice in a month and maximum of 20 samples were collected every month from different domestic chickens from August to October, 2014. A total of 100 gastrointestinal and pulmonary tract samples of local breed chicken slaughtered at the local markets and shops located in Piranshahr city, Iran were collected. The gastrointestinal and pulmonary tracts were collected into plastic bags and taken to the diagnostic and examination laboratory of the veterinary medicine, Islamic Azad University, Tabriz branch for examination and identification. Samples that could not be immediately analyzed were stored in the refrigerator.

Examination of Samples

The gastrointestinal tracts were separated into gizzard, crop, small intestine, large intestine and caecum after which each region was cut open by longitudinal incision also pulmonary tracts especially Trachea was cut open by longitudinal incision. Intestinal and tracheal scrapping was done and any parasite seen was removed with forceps, washed in saline and identified. Examination of samples for helminthes was based on lactophenole and carmine-acid staining technique (Soulsby, 1982). The preparations were then examined under the microscope using x10 and x40 magnification.

Data Analysis

The results obtained were analyzed using descriptive statistics. Level of significance was set at $p < 0.05$.

RESULTS AND DISCUSSION

Results

The overall prevalence of the parasitic infection is shown in Table 1. Out of a total of 100 domestic chickens studied 63 (63%) were infected by parasites. Nematodes had the highest prevalence 47 (47%), followed by the cestodes with prevalence of 16 (16%).

Table 1: Overall prevalence of helminthes parasites in domestic chicken (*Gallus gallus domesticus*), (Number examined = 100)

Parasites	Number of chicken infected	Prevalence (%)
Trematoda	0	0
Nematodes	47	47
Cestodes	16	16
Total (%)	63	63

The parasite species found in the study are shown in Table 2. The parasitic Nematode (*Ascaridia galli*) was the most prevalent 21 (21%). Of the 2 parasitic groups encountered, the nematodes were the most prevalent followed by cestodes. All the parasites showed high predilection for specific sites in the

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gastrointestinal and pulmonary tract of the birds. Both cestodes and nematodes showed high predilection for specific sites in the gastrointestinal tract of the birds. Most of the helminth parasites were restricted to the small intestine, particularly the duodenum and syngamus trachea restricted to the trachea.

Table 2: Species composition of helminthes parasites of domestic chicken (*Gallus gallus domesticus*), (Number examined = 100)

Parasite species	No.of chicken infected	Species prevalence %
Cestodes	16	-
<i>Choanotaenia infundibulum</i>	4	4
<i>Reillietina tetragona</i>	8	8
<i>R. cesticillus</i>	1	1
<i>R. echinobothrida</i>	2	2
<i>Cotugnia digonopora</i>	1	1
Nematodes	47	-
<i>Ascaridia galli</i>	21	21
<i>Heterakis galinarum</i>	12	12
<i>Acuaria spiralis</i>	9	9
<i>Cheilospirura hamulosa</i>	2	2
<i>Syngamus trachea</i>	3	3

Mixed infections were also encountered with a prevalence of 15% (Table 3).

Table 3: Mixed infection of intestinal parasites of domestic chicken (*Gallus gallus domesticus*), (Number examined = 100)

Parasites	Number of domestic chickens infected	% Mixed Infection
<i>Ascaridia galli</i> + <i>Reillietina tetragona</i>	4	4
<i>Cotugnia digonopora</i> + <i>A.galli</i>	4	4
<i>Ascaridia galli</i> + <i>Reillietina tetragona</i>	1	1
<i>A.galli</i> + <i>R.tetragona</i> + <i>R. cesticillus</i>	1	1
<i>H. galinarum</i> + <i>Choanotaenia infundibulum</i>	3	3
<i>Cotugnia digonopora</i> + <i>Reillietina tetragona</i>	1	1
<i>Acuaria spiralis</i> + <i>R. cesticillus</i>	1	1
Total	15	15



Figure 1: Parasitic nematodes in to the intestinal lumen of native chickens



Figure 2: Parasitic cestodes in to the intestinal lumen of native chickens



Figure 3: Syngamus trachea in to the trachea of native chickens

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Discussion

The occurrence of parasites is probably, the most damaging infections of domestic chicken and a source of serious economic loss. The main effect of helminthes parasites is the amazing losses they cause to animal industries through meat contamination and morbidity (Naem and Eskandari, 2005). The generally high prevalence rate observed in this report could be due to the fact that birds kept under free range or backyard scavenging flocks are not normally fed with grains in the morning (which use to be the practice in the early years) before going out for grazing. Lack of this practice could be attributed to the present poor economic condition. The intermediate hosts (e.g. dung beetle, grasshopper, cockroach, crustaceans, earthworm and snail) for some of the helminthes parasites found are available in the environment and could constitute problems in chicken reared on free range or backyard scavenging production system. The majority of parasites reported here could be potentially pathogenic for the poultry and some to human by inducing enteritis, ulceration or granuloma followed by anorexia, depression, emaciation and death. Due to the effects in body condition, it has been shown that weight loss due to helminth infections in domestic chicken can be outstanding (Permin and Hansen, 1998). Similar reports of helminth infections found in domestic chicken in this study have been documented as described from other parts of Iran (Eslami, and Anwar, 1973). The result of this study showed that the domestic chicken was heavily parasitized by a large number of helminthes parasites. Mixed infections were also encountered and most with nematode. These results are comparatively similar to studies in some regions such as Urmia (Naem and Eskandari, 2005), which reported high prevalence of the helminthes parasites. Previous studies have attributed this high endemicity to poor sanitary conditions and lack of health services (Eslami and Anwar, 1973). This study which is in agreement with Eslami *et al.*, (2008) further support the observation that parasites are most predominant in subtropical countries due to the climatic and environmental conditions prevailing there which favour helminthes growth. From the study, nematode had the highest prevalence with *Ascaridia galli* having a remarkable prevalence of 21% and this is *in agreement* with earlier findings of Yoriyo *et al.*, (2008) which means that nematodes are always more prevalent than cestodes and trematodes in domestic chicken. The reasons being that nematodes do not require intermediate hosts and at the same time they are soil transmitted parasites. The adults lay many eggs daily which can retain their viability for as long as 12 months and so domestic chickens are constantly picking up viable eggs from the droppings that contaminate the environment as they feed (Permin and Hansen, 1998) and this also predispose them for heavy parasite burden. More so cestodes require intermediate host to complete their life cycle and so transmission is dependent on the availability of the intermediate hosts. Most of the parasites were restricted to the small intestine, particularly the duodenum where there is optimum concentration of saline and glucose (Fatihu *et al.*, 1991). Earlier report (Smyth, 1976) suggests that the preference for the small intestine by these parasites is to complement their physiological osmotic feeding nature where nutrients exist in dissolved form. The differences in the worm burden could be attributed to climate difference, availability of intermediate host, and possibly host factors such as host immunity. Parasitic intervention to limit hallmark complication of the infection is thus necessary in poultry industries.

Conclusion

Parasitic infections are the major cause of financial loss in poultry and huge losses to the livestock industries. The work carried out revealed high helminthes infections with nematodes having the highest prevalence. This may however increase due to seasonal or climatic abundance of specific invertebrate hosts. Therefore improvement of sanitary practice to interrupt the life cycle of the parasite species and as such reduce the rate as well as the burden of the infection in poultry farm is recommended.

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Competing Interests

Authors have declared that no competing interests exist.

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