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308 Lasani Town, Sargodha Road, Faisalabad - Pakistan
Mob: +92 300 3008585, Fax: +92 41 8815544
E-mail: editorpjn@gmail.com

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Helminth Parasites in the Intestinal Tract of Indigenous Chickens in Jordanian Villages

Hamad H. Al-Jamaien
Department of Medical Allied Sciences, Zarka University College, Al-Balqa Applied University, Jordan

Abstract: A study was carried out on sixty female adult indigenous chickens from local markets in four different villages (Omabhara, Iraqalamir, Albusah and Wadisheta) zones around Amman, Jordan to determine occurrence and distribution of helminth parasites in the intestinal tract of the birds. Their ages ranged between 4-6 months. All specimens of chickens were examined for helminth parasites. It was found that nematodes and cestode were recovered. Nematodes were the most commonly seen parasites. Only five chickens of 60 hens were free from parasites which are infected of rate 91.6% prevalence. The main helminths found in the intestines were Nematodes and Cestode. Nematodes were higher than Cestode by about 20 percent in duodenum, ileum and colon respectively. In conclusion, Parasitism could be big constraint to production in the study area and we recommend a sustainable control strategy. This study found high prevalence of end parasites among village chickens within the survey period and ecological zone. Based on the known of pathological effects of these parasites, the results of this study highlight both the eminent and potential constraints of these parasites to the overall village chicken production. We therefore recommend the institution of a programmed control measure for improved harnessing of the potentials of village chicken production in the region.

Key words: Helminth parasites, nematodes, cestodes

INTRODUCTION

The Poultry industry occupies an important position in the provision of animal protein (meat and egg) to man and generally plays a vital role in the national economy as a revenue provider. Poultry is one of the most intensively reared of the domesticated species and one of the most developed and profitable animal production enterprises (Obiora, 1992). Its importance in national economies of developing countries and its role in improving the nutritional status and income of many small farmers and those with small land holdings as well as landless has been recognized by various scholars and rural development agencies in the last two decades (Food and Agriculture Organization of the United Nations (FAO), 1987; Creevey, 1991; Kitalui, 1998).

Poultry production in Jordan and parts of Asia is still distinctively divided into commercialized and village enterprise subsector, each with its peculiarities (Njue *et al*., 2001; Frantovo, 2000). The former comprises of strains specifically developed on the basis of primary products into parent stocks, layers and broilers each with its specialized equipments and management approach. The latter however, consists of indigenous domestic fowls (*Gallus domesticus*) variously referred to as local or rural chickens, backyard poultry or village chickens and or free range chickens. These refer to breeds/strains/ecotypes with no improvement history (Kekeocha, 1984) and chickens indigenous to the particular locality they are found. These constitute a rich genetic resource base for any future genetic improvement and production of strains adaptable to the tropics (Horst, 1988).

Village chicken production is constrained by many extrinsic factors among which malnutrition, poor management and the absence of biosecurity are outstanding. Losses have also been attributed to limited housing and veterinary care services. Furthermore, poor genetic potential due to lack of selection and predation are also potential threats to productivity (Calnek *et al*., 1997).

MATERIALS AND METHODS

Study area: The study was conducted in four selected sites, representing different zones in Jordan. These include Omabharah, Iraqalmeer, Albusah and Wadisheta is located around Amman. The area is classified as temperate highland with an annual rainfall of about 1000 mm. The mean annual minimum and maximum temperature is 12°C and 30°C, respectively.

Animals and management: A total of 60 local female chickens, apparently healthy, of different age group were bought from local open-air markets in the respective study areas. Post-mortem examination was carried out at Zarka University College Laboratories and all parasites recovered and conditions observed were recorded. The poultry management pattern involving local chickens in the study sites were entirely free-ranging system.

Sample collection and examination procedure: Following euthanasia and evisceration, the viscera separated from the mesentery were detached in to three pieces; the duodenum, ileum and colon and the rest of the intestine put in a separate container. Each alimentary tract was spread on a dissecting board and the content was scrapped into Petri dishes containing 0.9% physiological saline.

Each piece was identified and visible worms to the naked eye were picked up using thumb forceps and the content placed in separate beakers containing physiological saline. The mucosae of the intestine were washed to remove any adhering worms and added to the container containing intestinal content. The container was filled up with water and left to settle. The supernatant was decanted and re-filled with tap water. This process was repeated several times. Then the content was sieved, emptied on a petridish and examined under dissecting microscope. To facilitate subsequent examination and identification, worms were stained with lacto phenol and examined under higher magnification (40X). Identification of all parasites was carried out using the characters described by Soulsby (1982).

Data analysis: Variations in the prevalence of gastro-intestinal helminths in relation to the different agro-climatic zones and between hens were analyzed using the Chi-square statistics. In all cases $p<0.05$ was considered statistically significant.

RESULTS AND DISCUSSION

Large numbers of parasites were found during the microscopic study of mucosal scraping of affected duodenum. Compare and contrast of the result of present study cannot be made due to paucity of relevant literature. The exact mechanism of petechial haemorrharge is not known. However, the parasite, probably penetrate deeply into the mucosa. During penetration, large number of parasites set up petechial haemorrhage.

The overall prevalence of 91.6% recorded in the present study agrees with the works of Yori yo *et al.* (2005) in free-ranging chicken in who found prevalence of 87% and 91% in Sudan and Ghana. But prevalence of parasitic infection in these villages is not consistent with the reports from tropical areas of East and West Africa (Masarga and Tungarza, 1985; Permin *et al.*, 1997; Poalsen *et al.*, 2000; Permin *et al.*, 2002).

The intensity of infection by parasites varied from different sites as seen in Table 2 and form the two way analysis of variance it is observed that there is significant difference $p<0.005$. (NEM 19.8 and Ces 11.6). The higher infestation was in colon and lesser in ileum which was near the duodenum.

The present study revealed relatively higher overall prevalence of gastro intestinal helminths in the local chickens examined. These include 200 (22%) nematodes and 100 (11%) cestodes in Omabhara zone. While other Iraqalamir, Albusah and Wadisheta zones were 210 (23%), 93 (10%), 97 (11%) and 90 (10%), 50 (6%), 60 (7%) for nematodes and cestodes respectively. There was a statistically significant difference ($P<0.001$) in the prevalence rates of nematodes and cestodes infection between the different agro-climatic zones. The results are shown that the chicken in Omabhra zone contaminated more than other zones (Table 1).

The difference in prevalence rates of cestodes and nematodes in these chickens between (16 and 33%) respectively. It was statistically significant (<P0.05). Among the cestodes, the highest infection prevalence was due to *nematodes* followed by *cestodes* (Table 1).

The present study revealed that 83% among all poultry examined were infected by one or more species of helminth parasites (Table 1-3). Total helminth parasites were recorded of which different nematodes and cestodes (Table 1) and other different helminths are not included in this study. A prominent feature of this survey was the complete absence of trematodes. This is in conformity with the works of Fatihu *et al.* (1991). Luk and Ndams (2007) who similarly found no rematode infections among birds examined in different parts of northern Nigeria. The absence of these worms appeared to be linked with their complex life cycles requiring at least an intermediate host which is aquatic. This helps to break the life cycle where water is not available and hence reducing the spread of the worms and act as controlling measure double infections were highest in this study. Kennedy (1975) argued that

Table 1: Helminths in different Jordanian zones

	Nem	%	Ces	%
Omabhara	200.0	22.2	100.0	11.1
Iraqalamir	210.0	23.3	90.0	10.0
Albusah	93.0	10.3	50.0	5.6
Wadisheta	97.0	10.7	60.0	6.6
	600.0		300.0	

Table 2: Distribution of Nematodes in different organ of chickens

	Doudenum Nem	Illeum Nem	Colon Nem	Total
Omabhara	60	65	55	180
Iraqalamir	55	80	57	192
Albusah	30	27	30	87
Wadisheta	38	30	32	100

Table 3: Distribution of Cestodes in different organ of chickens

	Doudenum Ces	Illeum Ces	Colon Ces	Total
Omabhara	45	35	40	120
Iraqalamir	38	40	30	108
Albusah	20	20	16	56
Wadisheta	27	12	18	57

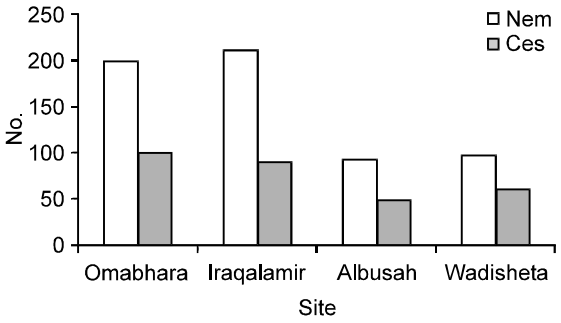

Fig. 1: Distribution Helminths in different Jordanian zones

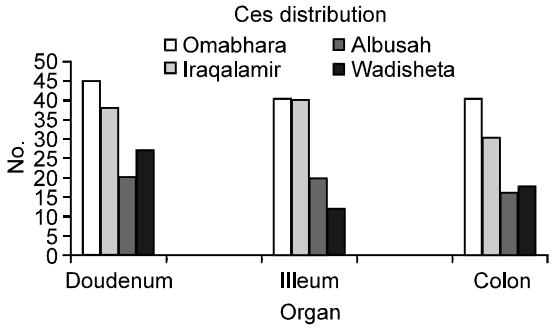

Fig. 2: Distribution of Cestode in different organ of chickens

food preference at a particular time may determine the establishment of the single or mixed infections.

Similar studies were conducted by earlier scientists but they found results were higher than recent study. Wakelin (1964) in Britain found 59.2%, Romanenko *et al*. (1985) in Roostov recorded 100% and Guclu (1994) in Turkey found 59% birds affected with helminth parasites. But the disparity in between the result of the present and earlier works in other countries might be due to the variation among the geographical location of the research area, method of study and sample size (Masarga and Tungara, 1985). The prevalence of gastrointestinal helminthes in free range poultry have been reported to be 91.0% in Ethiopia 100%, in Ghana 90.9% (Poulesen *et al*., 2000) in India 37% (Yadav and Tandon, 1991), in North Africa 87%, The Kisoe *et al*. (2003) and in Yemen 100% (Jamil *et al*., 2008).

Out of the 60 gastrointestinal tracts of chickens examined 55 (92%) harboured intestinal helminths. Cestodes and nematode were identified (Table 1 and 2). The predilection sites for both cestodes and nematodes were the duodenum, ileum and colon (Fig. 1 and 2). More nematodes were recovered than cestodes and of the nematodes, higher intensities occurred with other parasites (nematodes) ranging total number from 1-202 worms per host (Table 2). There was also a high mean total number of cestodes worm ranging 1-130 per host (Table 3). It can be concluded that backyard poultry is in

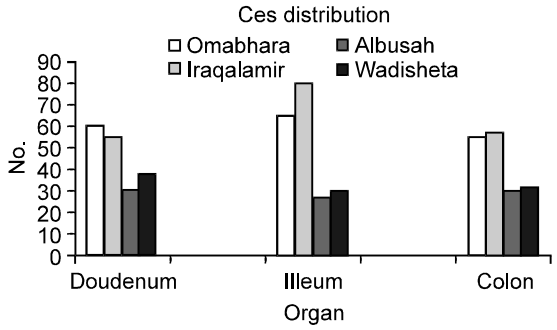

Fig. 3: Distribution of Nematodes in different organ of chickens

the high risk of helminth infection. However, layer birds are also not free from the risk of infection. Moreover, the parasites are associated with the development of pathological changes. Therefore, they have economic impact in the poultry production. So, proper deworming programme should be conducted.

Conclusions: This study revealed that helminths are common parasites of chickens in Jordan. Especially, Nematodes and Cestodes are the most common helminths in chickens. Also more attention should be focused towards the improvement of the poultry management and care of local breed of chickens which are usually free ranging. There is therefore, the need to supplement scavenging poultry with energy sources (Obi and Sonaiya, 1995).

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