STUDIES ON PARASITIC HELMINTHS OF DOMESTIC BIRDS IN ASWAN GOVERNORATE

Mahmoud A. El-Seify[1], Khaled Mohamed El-Dakhly[2],Eman Sayed Mohammed[3],Samia Abdel-Motaleb Fawy[3]

[(1)] Department of Parasitology, Faculty of Veterinary Medicine, Kafrelsheikh University

[(2)] Department of Parasitology, Faculty of Veterinary Medicine, Beni-Suef University

[(3)] Department of Parasitology, Faculty of Veterinary Medicine, South Valley University

ABSTRACT

Afield study was conducted during the period from April 2016 to March 2017 to investigate the intestinal helminths. A total of 156 intestinal tracts of baladi chickens were collected from different villages in Aswan Governorate .The present study revealed that out of 156 Baladi chickens (76/156; 50.6%) were infected with intestinal helminths. Seven species of helminths were recovered. The recovered helminths were identified as cestodes (34.6%), nematodes (23.7%) and no trematodes were recorded. Mixed infection were estimated in (11/156; 7%). Four cestodal species were detected in chickens. Raillietina.tetragona was the most prevalent species (16%) followed by Raillietinaechinobothrida (10.9%), Cotugnia digonopora (6.4%) and Raillietinacesticillus which was the least common tapeworm (1.3%). It has been found that Raillietinatetragona had the highest intensity among recovered helminths and Raillietinacesticillus had the lowest one. Nematodes were identified in (23.7%) chickens. The most prevalent species were Heterakisgallinae, Ascaridia. galli and Subulura. brumpti with prevalences of (15.4%), (9%) and (1.3%) respectively. It has been found that Heterakis. gallinae had the highest intensity among recovered helminths and Subulura.brumpti had the lowest one. It has been found that the highest prevalence of worm infection was in Summer and Spring, Meanwhile, the lowest infection recorded in Autumn and Winter.

INTRODUCTION

Poultry products have become one of the most important protein sources for man throughout the world and has contributed to food production by playing a vital role in the national economy through reducing the demand for mutton and beef ***(Zubeda et al.2012)*.** Moreover poultry products (eggs and meat) constitute about 30% of human protein consumed worldwide ***(Dolberg and Petersen(1999)*.**

Helminth infections have an vital role causing hidden economic losses in the production of poultry meat and eggs. Also, they may have particularly debilitating effects on infected birds, especially the young birds , causing retarding growth, interfering with healthy development, and making older birds prone to secondary infections ***(Adang et al. 2008)***, hence helminths infection are the chief hindrances to success in raising poultry.

The present study was undertaken with the objectives of determining the prevalence rates of helminths and identifying their species in free-range backyard chickens in Aswan Governorate, Egypt.

MATERIALS AND METHODS

1. Collection and preparation of poultry samples:

A total of 156 intestinal tracts of baladi chickens were collected from different villages in Aswan Governorate during the period from April 2016 to March 2017 to investigate the intestinal helminths. The collected samples were transferred to the laboratory of Parasitology, Faculty of Veterinary Medicine, South Valley University in an ice box after packed in plastic bags, labeled with different data about the investigated poultry specimens as date, and age.

2. Parasitological examination:

2.1 Examination of intestinal tract and internal organs:

The intestinal tracts of collected birds were divided into foregut, midgut and hindgut. Longitudinal incision was carried out, then unattached helminths were carefully extracted by means of needles in separate petri dishes containing normal saline. The mucosa of each part was scraped for attached helminths, and then examined to determine the parasitic infection. The recovered helminths washed with saline then transferred to another container and left to settle down the supernatant was discarded and the sediment was washed in normal saline several times until it becomes clear. The sediment examined by nacked eye or by aid of hand lens by using dissecting microscope for fine worms.

2.1 Collection and preparation of the detected parasites:

The recovered helminths washed with saline then transferred to another container and left to settle down the supernatant was discarded and the sediment was washed in normal saline several times until it becomes clear. The sediment examined by nacked eye or by aid of hand lens by using dissecting microscope for fine worms.

2.2.A.Cestodes preparation:

Cestodes washed several times in saline solution followed by refrigeration for an hour to get complete relaxation of body segments to prepare it for mounting. Careful drying for the head and parts of cestode body by using of tissue paper and placed between two microscope slides, in which it held together with an elastic band at each end then fixed through putting the compressed worms in fixative material (formalin 10%) overnight. Staining was done by immersion tape worms in dilute

aceto-alum carmine ***(Fleck and Moody, 1993)*** after removed from the area between the glass slides. The specimens were usually left to be slightly stained. Then dehydrated through passage of the specimens in several ascending grades of alcohol (50, 70, 90, 95 and absolute ethyl alcohol),The clearance was done by using clove oil followed by xylene for few minutes and finally mounted in Canada balsam on clean slides which assist in the identification process.

2.2.B. Nematodes preparation:

Nematodes were collected, washed by shaking in normal saline and immediately killed and stretched in hot 70% ethyl alcohol then the sample preserved in 70% alcohol and 5% glyecrin solution. ***(Fleck and Moody, 1993)*** and clearance was carried out by using lacto-phenol mixture for few minutes ,followed by mounting in glycerol jelly

3. <u>Microscopic examination:</u>

Prepared slides were carefully examined under a light microscopy using different magnifications, and recovered helminths were identified according to ***Yamaguti (1961)*** and ***Soulsby (1982)*.**

RESULTS

1) The prevalence of parasitic infection among baladi chickens:

The present study revealed that out of (156 Baladi chickens (76/156; 50.6%) were infected with intestinal helminths during the period from April 2016 to March 2017. Seven species of helminths were recovered. The identified helminths were cestodes (54/156; 34.6%) and nematodes (37/156; 23.7%) . Mixed infection were estimated in (11/156; 7%). **(Table1**)

2) Prevalence of different parasitic species in baladi chickens:

Four cestodal species were detected in chickens. *Raillietina tetragona* was the most prevalent species (25/156; 16%) followed by *Raillietinaechinobothrida* (17/156; 10.9%) and *Cotugniadigonopora* (10/156; 6.4%). *Raillietina cesticillus* was the least common tapeworm (2/156; 1.3%). It has been found that *Raillietina tetragona* had the highest intensity among recovered helminths and *Raillietina cesticillus* had the lowest one. Nematodes were identified in 37/156 (23.7%) chickens. The most prevalent species were *Heterakis gallinae*, *Ascaridiagalli* and *Subulurabrumpti* with prevalences of (24/156; 15.4%), (14/156; 9%) and (2/156; 1.3%) respectively. It has been found that *Heterakis.gallinae* had the highest intensity among recovered helminths and *Subulura brumpti* had the lowest one. (**Table 2**)

3) Prevalence of mixed infection in baladi chickens:

Mixed infection in Baladi chickens reported in (11/156; 7%) as double and triple which represented in *R. tetragona +H. gallinae* (4/11; 36.4%), *C. digonopora + H. gallinae* (3/11; 27.3%), *R. echinobothrida+ H. gallinae* (2/11; 18.2%), *R. tetragona +A.galli* (1/11; 9.1%) and *R. echinobothrida + H.gallinae + S.brumpti* (1/11; 9.1%). (**Table3)**

4) Seasonal prevalence of intestinal helminths in baladi chickens:

It has been found that the highest prevalence of worm infection was found in Summer 39/39 (100%) and in Spring 26/39 (66.7%), Meanwhile, the lowest infection recorded in Autumn 20/39 (51.2%) and in Winter 6/39 (15.4%). Concerning cestodes, it was observed that

Raillietinatetragona and *Raillietinaechinobothrida* were more prevalent in Summer and Spring. Furthermore, *Cotugniadigonopora* were more prevalent in Summer and Autumn. *Raillietina cesticillus* recovered only in Spring. Meanwhile, the nematodal worm; *Heterakisgallinae* and *Ascaridiagalli* were more prevalent in Summer and Spring. *Subulurabrumpti* was only detected in spring. (**Table4&5**)

5) Seasonal prevalence of mixed infection in baladi chickens:

In Baladi chickens**:** Mixed infection in backyard chickens were more prevalent in Summer (6/39; 15.4%) followed by Autumn (3/39; 7.7%) then Spring (2/39; 5.1%). Mixed infection not recorded in Winter. (**Table 6)**

6) The relation between the age and infection with helminths in baladi chickens:

Concerning the age of Baladi chickens**,** which were positive for helminths displayed that chickens of 1-6 months showed low prevalence of infection 38.1%. Meanwhile, chickens of>6 months showed the highest prevalence of infection 83.7%. (**Table7**)

Table (1): Total Prevalence of parasitic infection of baladi chicken in Aswan governorate

Total chicken examined					
156					
Total no. of bird infected 76 /156 **(**50.6%)					
Cestode		**Nematode**		**Mixed cestode and nematode**	
No. of bird infected	**Prevalence %**	**No. of bird infected**	**Prevalence %**	**No. of bird infected**	**Prevalence %**
54	34.6	37	23.7	11	7

Table (2): Prevalence and Intensity of parasitic infection of baladi chicken in Aswan governorate

Site of recovery	parasites	No of infected domestic birds	Prevalence	No of parasites	Mean intensity
Small intestine	*Cotugniadigonopora*	10	18.5%	32	3.2
Small intestine	*Raillietinatetragona*	25	46.3%	189	7.4
Small intestine	*Raillietinaechinobothrida*	17	31.5%	57	3.4
Small intestine	*Raillietinacesticillus*	2	3.7%	2	1
Cecum	*Heterakisgallinae*	24	60.0%	672	28
Small intestine	*Ascaridiagalli*	14	35.0%	70	5
Cecum	*Subulurabrumpti*	2	5.0%	6	3

Prevalence rate= No. of host infected/Total No. of bird examined X100.

Intensity= Total No. of parasites recovered /No. of bird infected.

Table (3): Mixed infection among baladi chickens

Mixed infection baladi chickens	No of mixed inf.	No	%
C. digonopora+H. gallinae	11	3	27.3
R. tetragona + H. gallinae		4	36.4
R. echinobothrida + H. gallinae		2	18.2
R. echino.+ H. gallinae + S. brumpti		1	9.1
R. tetragona + A. galli		1	9.1

Table (4): The seasonal prevalence of helminths infection among baladi chickens

season / Class	Summer No=39		Autumn No=39		Winter No=39		Spring No=39	
	Inf.		Inf.		Inf.		Inf.	
	No	%	No	%	No	%	No	%
Tapeworm	21	53.8	13	33.3	3	7.7	17	43.6
Round worm	18	46.2	7	17.9	3	7.7	9	23.1
Total	**39**	**100**	**20**	**51.2**	**6**	**15.4**	**26**	**66.8**

Table (5): Seasonal prevalence of cestodes and nematode species in baladi chickens

Season	Ex No	*Cotugnia.digono-pora*		*Raillietina.te-tragona*		*Raillietina.echinob-othrida*		*Raillietina.ces-ticillus*	
		No	%	No	%	No	%	No	%
Summer	39	5	12.8	10	25.6	6	15.4	0	0
Autumn	39	2	5.1	6	15.4	5	12.8	0	0
Winter	39	1	2.6	2	5.1	0	0	0	0
Spring	39	2	5.1	7	18	6	15.4	2	5.1
Total	156	10	6.4	25	16	17	10.9	2	1.3

Seasonal prevalence of nematodes in baladi chickens

Season	Ex No	*Heterakis.gallinae*		*Ascaridia.galli*		*Subulura.brumpti*	
		No	%	No	%	No	%
Summer	39	13	33.3	5	12.8	0	0
Autumn	39	4	10.3	3	7.7	0	0
Winter	39	1	2.7	2	5.1	0	0
Spring	39	6	15.4	4	10.3	2	5.1
Total	156	24	15.4	14	9	2	1.3

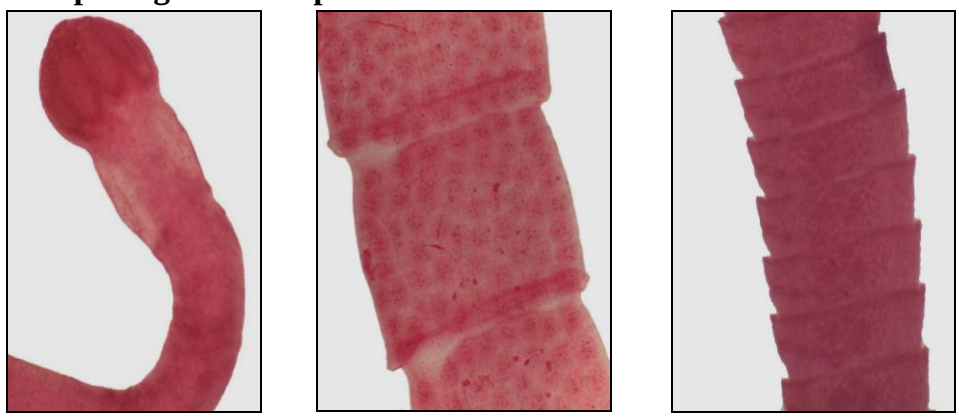
Table (6): Seasonal prevalence of mixed infection among baladi chickens

Season	No of mixed inf.	Mixed infection	No	%
Summer	6	*C. digonopora+H. gallinae*	1	16.7
		R. tetragona + H. gallinae	3	50
		R. echinobothrida + H. gallinae	2	33.3
Autumn	3	*R. echino.+ H. gallinae + S. brumpti*	1	33.3
		C. digonopora + H. gallinae	1	33.3
		R. tetragona + A. galli	1	33.3
Winter	0	_	0	0
Spring	2	*R. tetragona + H. gallinae*	1	50
		C. digonopora + H.gallinae	1	50

Table (7): The relation between age of chickens and infection with helminths

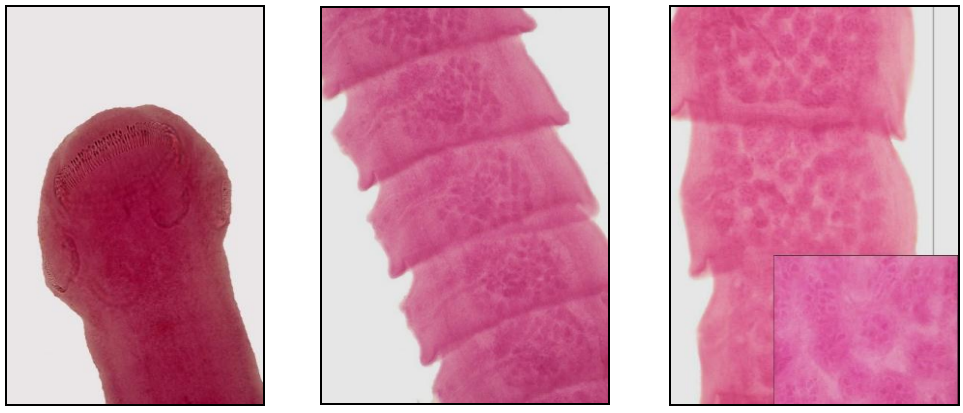
1-6 months			>6 months		
Examined	Positive		Examined	Positive	
	No	%		No	%
113	43	38.1	43	36	83.7

7) Morphological description of recovered worm:



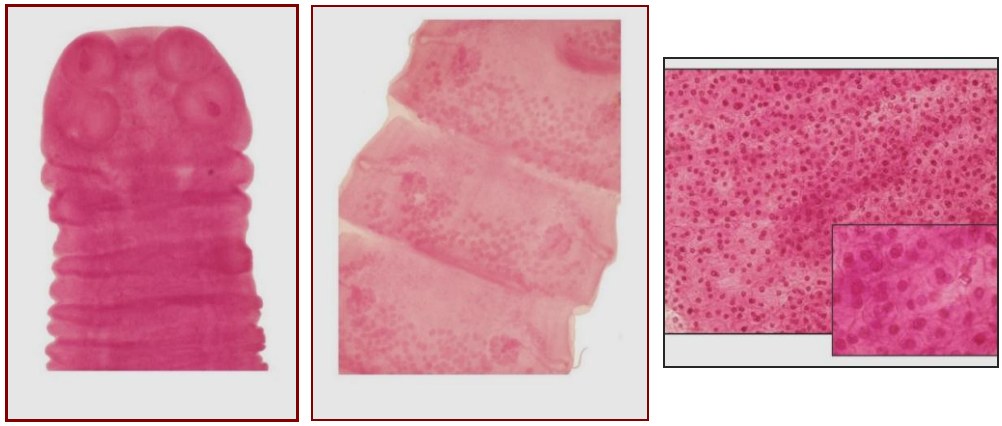
(1) **(2)** **(3)**

Fig. (A): 1:*Raillietina. tetragona* scolex (x4):characterise by 4 oval suckers and rostellum armed with hooks.2:*Raillietina. tetragona* mature segment .(x4):has unilateral genital pore, ovary in the middle tests several in number and distributed.3:*Raillietina. tetragona* gravid segment(x4): showing uterus breaks up into egg capsules each one containing 6-12 eggs.



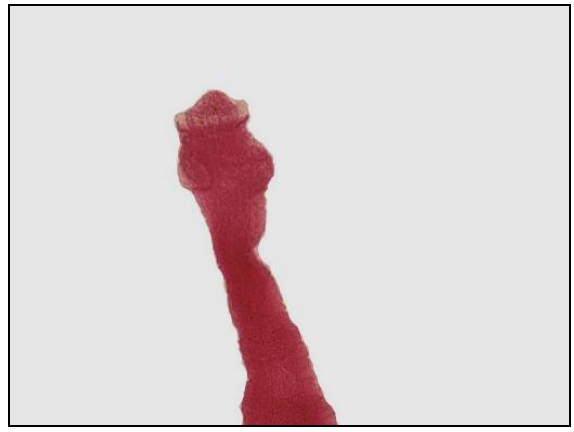
(1) **(2)** **(3)**

Fig. (B): 1:*Raillietina. echinobothrida* scolex (x40):characterise by 4 rounded suckers and rostellum armed with hooks. 2: *Raillietina. echinobothrida* mature segment .(x10): has unilateral genital pore, ovary in the middle tests several in number and distributed. 3:*Raillietina. echinobothrida* gravid segment(x10,40): showing uterus breaks up into egg capsules each one containing 6-12 eggs.



(1) **(2)** **(3)**

Fig. (C):1:*Cotugniadigonopora* scolex (x4):characterise by4 cup shaped unarmed suckers with small rostellum.2:*Cotugniadigonopora* mature segment. (x4):has double sets of genital organs.3:*Cotugnia digonopora* gravid segment(x10,40): showing uterus breaks up into egg capsules each one containing single egg.



(1)

Fig. (D):1: *Raillietina cesticillus* scolex (x4):characterise by large scolex with wide rostellum armed with hooks, suckers are un armed.

(1) **(2)** **(3)**

Fig. (E): 1:*Heterakisgallinae* anterior end (x4):characterise by bulbed shaped oesophagus . 2 : *Heterakis. gallinae* posterior end male.(x4):unequal spicules.3:*Heterakis. gallinae* posterior end female(x10): has tapering posterior end.

(1) **(2)** **(3)**

Fig. (F): 1:*Ascaridia galli* anterior end(x4):characterise by simple club shaped oesophagus. 2: *Ascaridia galli* posterior end male.(x4): equal spicules. 3: *Ascaridia galli* posterior end female (x4): has pointed posterior end.

(1) **(2)** **(3)**

Fig. (G): 1:*Subulura.brumpti* anterior end (x4):characterise by double bulb shaped oesophagus. 2: *Subulura. brumpti* posterior end male. (x10).3:*Subulura. brumpti* posterior end female(x4): has pointed posterior end.

DISSCUTION

In the current study, the overall prevalence of intestinal helminths in chickens was 50.6% (79/156) which was nearly similar to ***Abdel-fattah (1996)*** 43.4% and ***Salam (2015)*** 42.8%. Furthermore, previous literature recorded a high prevalence of intestinal helminths in different countries like **, *Lrungu et al.(2006)*** 90.7%, ***Phiri et al. (2007)*** 95.2%, ***Hamza (2009)*** 97% and ***Idika et al.(2015)*** 98.8%. On the other hand, ***Szelagiewicz and Sokol (1991), Sayed (1996)*** and ***Hassan (2011)*** reported lower infection rates 33%, 36.8 and 23.8% respectively. These variation may be attributed to the different location and different status of poultry managements.

The incidence of cestodes was 34.6% which nearly close to ***Abdel-fattah(1996)*** 25% in Egypt and ***Idika et al. (2015)*** 26.4% in chickens in Nigeria. Meanwhile, in the present study the prevalence of cestodes was higher than that which present in ***Hassan (2011),Shahin et al. (2011)*** and ***Nagwa etal. (2013)*** whose reported prevalence rates in Egypt 17.3% in Qena, 4.3% in Zagazig and 13.6% in Gharbia respectively. On the other hand, incidence of cestodes lower than those recorded by ***Ghebemariam et al. (2011)*** 63% in Eritrea,***Yousfi et al. (2013)*** 95.6% in Algeria and ***Ananda et al. (2014)*** 51.3% in Karnataka. These difference in the incidence may be due to changes of environmental conditions and high density of intermediate hosts which are involved in the life cycle of cestodes.

The present work clarified that the prevalence of *Raillietina tetragona* was 16%. These result was nearly in accordance with those mentioned previously by ***Kaingu et al. (2010)*** 13.2%, ***Mature et al. (2010)*** 22.2% in Nigeria and ***Ananda etal. (2014)*** was 12.8%. But it not in line with that reported by ***Pinckney et al. (2008), Hamza (2009), Hassan (2011), Hussen et al. (2012), Dar and Tanveer (2013), Idika et al. (2015)*** and ***Salam (2015)*** whose concluded higher prevalences 38.6% in west Indies, 59.7%, 34.5% in Qena Governorate, 56.5% in Ethiopia, 65% in India, 49.6% in Nigeria and 36.1% in Kashmir respectively. ***Yagoob and Mohsen(2014)*** recovered lower prevalence rate than that reported in the present study 8% in Iran.

The prevalence of *Raillietinaechinobothrida* was 10.9% these result was nearly similar with ***Ananda et al. (2014)*** 12.8%. Oppositely, the present study was lower than that recorded by ***Shahin et al. (2011)*** who recorded high prevalence rate 91.9% in Egypt. In other countries, ***Eshetu***

et al. (2001) 25.8% in Ethiopia, ***Hamza (2009)*** 81.4%, ***Matur et al. (2010)*** 19.6% in Nigeria, ***Hussen et al. (2012)*** 63.7%, , ***Faizullah et al. (2013)*** 19.2%, ***Yousfi et al. (2013)*** 85% and ***Idika et al. (2015)*** 64.5%. The lower prevalence was reported by ***Nagwa et al. (2013)*** 5.4% in Egypt.

In respect to the prevalence of *Raillietinacesticillus* was 3.1% in chickens it was agreed with that reported by ***Sayed (1996)*** 2.8%, ***Terregino et al. (1999)*** 2%, ***Eshetu et al. (2001)*** 5.6% and ***Idika et al. (2015)*** 4.9%. But higher than that reported with ***Faizullah et al. (2013)*** 0.8% in Pakistan. Meanwhile, lower than those reported by ***Ashenafi and Eshetu (2004)*** 19%, ***Hassouni and Belghyti (2006)*** 12% in Morocco, ***Hamza (2009)*** 12.3%, ***Hassan (2011)*** 41.4%, ***Shahin et al. (2011)*** 59.4%, ***Hussen et al. (2012)*** 40.3%, ***Radfar et al. (2012)*** 15.2%, ***Dar and Tanveer (2013)*** 22.5%, ***Yousfi et al. (2013)*** 30.7%, ***Ananda et al. (2014)*** 9.6%, ***Butt et al. (2014)*** 83.5%, ***Salam (2015)*** 23.2%.

The obtained results found that the prevalence of *Cotugnia digonopora* in chickens was 6.4% which was nearly similar to ***Sayed (1996)*** 4.1%, ***Maho et al.(1999)*** 4.7% and ***Lrungu et al. (2004)*** 3.6%. On the other hand, the present investigation was higher than that recorded by ***Abdel-Fattah (1996)*** 2.5% and ***Terregino et al. (1999)*** 2% and lower than that obtained by ***Tasawar et al. (1999)*** 31.6%, ***Hassan (2011)*** 24.1% and ***Butt et al. (2014)*** 94.5%.

It was revealed that prevalence of nematodes in chickens was 23.7% it agreed with ***Ahmed (2004)*** 24.2% and ***Nagwa et al. (2013)*** 21.3%. Oppositely, ***Mahdy (1988), Abdel-Fattah (1996)*** and ***El-kappany (2005)*** in Egypt mentioned that prevalence of nematodes was higher 29.8%, 57.5% and 41.5% respectively. ***Ghebemariam et al. (2011)***

92.5%, ***Yousfi et al. (2013)*** 93.8%, ***Ananda et al. (2014)*** 28.9% and ***Yagoob and Mohsen (2014)*** 47%. Prevalence of nematodes was lower in ***Hassan (2011)*** 7.1% and ***Idika (2015)*** 14.4%. These variations in the prevalence due to poor management and housing system of chickens.

The prevalence of *Heterakisgallinae* (15.4%) in chickens was in the line with ***Mukaratirwa et al. (2001)*** 15.2% in Zimbawe, ***Yagoob and Mohsen (2014)*** 12% and ***Idika et al. (2015)*** 12.4%.Meanwhile***, Eshetu et al. (2001), Ashenafi and Eshetu (2004), Lrungu et al. (2004), Phiri et al. (2007), Hamza (2009), Matur et al. (2010), Ghebemariam et al. (2011), Hussen et al. (2012), Radfar et al. (2012), Yousfi et al. (2013), Ananda et al. (2014)*** determined prevalence rates higher than the present study 17.2%, 32.6%, 21.3%, 32.8%, 24.7%, 31%, 52.9%, 37.9%, 23.7%, 78%, 22.6% respectively. Moreover, ***Hassouni and Belghyti (2006), Pinkney et al. (2008) and Salam (2015)*** reported lower prevalences 10%, 4.7%, 4.3% respectively.

Concerning to prevalence of *Ascaridiagalli* in chickens in the current study was 9% which was similar to those reported by ***Lrungu et al. (2004)*** 9.9%, ***Hassouni andBelghyti (2006)*** 9%, ***Pinkney et al. (2008)*** 10.3% and ***Faizullah et al. (2013)*** 10.8% and lower than those reported by ***Hassan (2011)*** 91.7%, ***Nagwa et al. (2013)*** 28.7%, ***Eshetu et al. (2001)*** 35.5%, ***Mukaratirwa et al. (2001)*** 32.9%, ***Ashenafi and Eshetu(2004)*** 55.3%, ***Phiri et al. (2007)*** 28.8%, ***Hamza (2009)*** 31.9%, ***Matur et al.(2010)*** 51.6%, ***Ghebemariam et al. (2011)*** 70.5%, ***Hussen et al. (2012)*** 32%, ***Radfar et al. (2012)*** 16.9%, ***Yousfi et al. (2013)*** 39.4%, ***Ananda et al. (2014)*** 22.6%, ***Yagoob and Mohsen (2014)*** 47% , ***Idika et al. (2015)*** 22.3% and ***Salam(2015)*** 35.3%.

The prevalence of *Subulurabrumpti* 1.3% in chickens which nearly in accordance with ***Ghebemariam et al. (2011)*** 5.8%. Meanwhile, lower than this reported by ***Eshetu et al. (2001), Ashenafi and Eshetu (2004), Hassouni and Belghti (2006) Radfar et al.(2012)*** and ***Yousfi et al. (2013)*** whose determine prevalences 17.6%, 27.4%, 15.3%, 67.7% and 62.2% respectively.

The absence of trematodes infection in this study may be due to their complex life cycles requiring at least an intermediate host which is aquatic snails so the absence of snails is helping to break the life cycle and hence reducing the spread of the worms.

With regard to seasonal prevalence of total helminths infection in chickens, the highest peak was in summer 100% and the lowest in winter 15.4%, this agreed with ***El- Kappany(2005)*** who recorded that the highest incidence was in summer 50%, ***Hassan (2011)*** who recovered highest incidence in Summer 33.3% and lowest in winter 13.9% and also ***Nagwa et al. (2013)*** prevalence of infection was the highest in Summer 56.3% and lowest prevalence detected in Winter 39.3%. But disagreed with ***Mahdy, (1988)*** who recorded that the peak of helminths infection was in spring 50% and ***Faizullah et al. (2013)*** who recovered highest infection in Winter. This may be due to spreading intermediate host in summer and spring.

Mixed infection in chickens was 7% represented in double and triple infection this agreed with ***Phiri et al. (2007)*** who recovered 88.2% mixed infection in which 8.2% double infection and 29.6% triple infection, ***Ghebemariam et al.(2011)*** detected mixed infection with 2 and 3 species was common, ***Hassan (2011)*** detected mixed infection in 0.6% and ***Faizullah et al. (2013)*** detected mixed infection 20% for double and 1.7% for triple infection.

Seasonal prevalence of mixed infection in chicken was more prevalent in Summer followed by Autumn and Spring and not recorded in Winter this disagreed with ***Kappany (2005)*** in which mixed infection was more prevalent in Winter 4.7% and lowest in Autumn while ***Hassan (2011)*** recorded mixed infection only in Summer.

CONCLUSION

The current study investigated that baladi chickens are highly susceptible with helminths infection especially cestode species in summer season .Further studies are highly recommended to be done to evaluate the impact of helminth infections on the health and production of baladi chickens and the options for successful control.

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