

ORIGINAL ARTICLE

Prevalence of Gastrointestinal Helminthes of *Gallus gallus domesticus* (Linnaeus, 1758) infree-range System atUpper Egypt

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ABSTRACT

Until now to our knowledge, there is no previous studies were done to investigate the prevalence of gastrointestinal helminths in local breed of chickens at Souhag governorate area at upper Egypt, so, this study was primarily conducted for exploring the helminth species and its prevalence, intensity in the alimentary canals of *Gallus gallus domesticus* (Linnaeus, 1758) baladi breeds in free-range System at Souhag Governorate, Upper Egypt, a total of (135) local chickens breeds were collected randomly from different areas from chicken slaughter houses or veterinary clinics during 2016, chickens were slaughtered and their alimentary canals were opened longitudinally searching for the presence of helminths, the percent of infection was 84.4% (114/135). The percent of cestodes was 96.5%, but nematodes percent was 73.7%. Three nematodes spp, *Heterakis gallinarum* 56.14% (64/114), *Ascaridia galli* 50.8% (58/114), *Capillaria caudinflata* 3.5% (4/114), and two cestodes species were identified, *Raillietina tetragona* 39.47% (45/114), and *Raillietina echinibothrida* (4.3%) (5/114), but there is no trematodes were found, The overall prevalence may continue to rise due to lack of functional veterinary care for free range breeding system in Egypt. Therefore, there is a need to planning for adequate preventive and control programs through good identification of helminth species in these areas. More researches are needed to identify all parasites in the region, and to understand the epidemiology, ecology, diagnosis, and control strategies for these helminths. This study is important for local authority and veterinarians and poultry farmers for improving their knowledge about these helminths to drawing a prevention and control program which help reduction of the high mortality rate of chickens in the area. It is, therefore, necessary that periodical parasitological investigations, as well as anthelmintic treatments, should be carried out regularly.

Keywords: Helminthes, free range breeding, *Gallus gallus*, Souhag, Upper Egypt.

CITATION OF THIS ARTICLE

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INTRODUCTION

Domesticated free range chickens breeding system of local baladi breed of chickens are considered a major source of income for poor families at Souhag Governorate, Upper Egypt, which is of high susceptibility to infection with internal parasites especially helminths due to the feeding habits of these birds because the picking of food from yard and taking the infection by this way. There are several problems produced in birds from parasitic infection, the most common of these manifestations are growth rate is stunted, sever emaciation especially in the breast muscle, prostration, birds appeared weak and death usually occurs in young birds, but in layers, the daily rate of egg production was decreased from tape worms infection and so it causing sever economic losses in farms of layers in Egypt, (Shahin, et al., 2011). Some of the cestodes species penetrate into an intestinal mucosa deeply producing sever inflammation and hemorrhage of the intestine (Soulsby, 1982). The incidence of tapeworm elevated in the free range breeding system or in back yard flocks. These are more frequent when the insect intermediate host is abundant which carry the larval cysticercoides stage. Many species of poultry cestods are found in huge intensive poultry breeding farms in layers and breeder farms because the birds due to the presence of beetles and house flies in deep litters of poultry farms (Reid and McDougald 1997). There are several studies on parasitic worms in the free range breeding system of Egyptian chicken, Nagwa, et al., 2013 surveyed the helminths in Gharbia Governorate, and (Shahin, et al., 2011) conducted a study on cestodiasis of chicken in Egypt. To our knowledge, until now, there are no previous studies were done to investigate the incidence of different helminth species in local

breed of chickens at Souhag governorate area at upper Egypt, so, this study was primarily conducted to determine the different species of helminths infecting indigenous breeds, *Gallus gallusdomesticus* (Linnaeus, 1758) in free-range System at Souhag Governorate, Upper Egypt.

MATERIAL AND METHODS

1. The area of the study: (fig. 3)

It is one of the governorates of Egypt that is located in the southern part of the country (Upper Egypt), and covers a stretch of the Nile Valley, of a total 1,547 km² (597 sq mi) it is located at 26.56°N 31.7°E. (Law & Gwillim, 1999).

2. Examined samples:

One hundred and thirty-five samples of the intestine of local baladi breeds of back yards broiler, Layers, and Breeders were collected either from chicken slaughter houses at markets, veterinary clinics, and poultry farms and backyards from different areas at Souhag Governorate, Upper Egypt. Collection was during 2016. The intestine was cut longitudinally and helminths were collected by forceps in a bottle filled with Formalin 10%, labeled and stored until subjected to parasitological identification according to Soulsby(1982).

3. Permanent samples preparation: (Kruse & Pritchard, 1982)

A- Cestodes fixation: was done by pressing the parasites between two glass slides, then was fixed in 10% formalin from 4hrs-24hrs depending on the size of the specimen, then fixed samples were washed several times with distilled water and stained by acetic acid alum carmine for 12-24h. After washing, the stained worms differentiated by decolorizing by acid alcohol (1% HCL in 70% ethyl alcohol), followed by dehydration in ascending grades of alcohol, and clearing in clove oil. Canada balsam was used for mounting.

B- Nematodes: were killed extended by using hot 70% ethyl alcohol and preserved in 70% ethyl alcohol containing 5% glycerin, then were passed in ascending concentration of (alcohol –glycerol) till they reached absolute glycerol, then they cleared in Lactophenol and were mounted in glycerin gelatin.

4. Chemicals and Stains:

(Physiological saline (0.9% sodium chloride) - Concentrated Hcl - Clove oil - Lactic acid - Phenol – Glycerin - Canada balsam – Gelatin - Formalin 10% - Ethyl alcohol (different concentration) - Distilled water- Acetic acid alum carmine stain (ready for use).

5. Statistical analysis:

The data were coded, collected, tabulated, and analyzed using the independent two-sample t-test with Minitab statistical software, version 14 (Minitab Inc, Pennsylvania State College, Pennsylvania, USA). Descriptive statistics were expressed as arithmetic mean±SD as measures of central tendency and dispersion, respectively. The level of significance ($P<0.05$) was considered statistically significant.

RESULTS

Results in this present study displaying an overall prevalence with gastrointestinal helminths were 84.4% (114/135) of all examined chickens, and the only found were cestodes and nematodes species, but no trematode was found in all examined samples, The higher percent of helminth group was cestodes, of the 114 positive samples, 110 (96.5%), but nematodes percent was 84 of all 114 examined positive samples 73.7%. The birds either were infected by single or double or multiple species of helminths whatever the sex, weight and season. The collected helminths and their prevalence were as follow as in table 1, and figure 1; Three nematodes spp. were identified, the most common species was *Heterakisgallinarum* 56.14% (64/114), *Ascaridiagalli* 50.8% (58/114), the lowest common species was *Capillariacaudinflata* 3.5% (4/114), and two cestodes species were identified, *Raillietinatetragona* 39.47% (45/114), and *Raillietina echinobothrida* (4.3%) (5/114), the difference in these prevalence rates was significant ($P<0.05$). 15.8% of collected samples were multiple infections associated 3 or more species, double infection was 37.7%, but the percent of single infection was the highest 46.5%, as in table 2, figure 2, the difference in these prevalence rates was significant ($P<0.05$). The mean intensity of infection was 8 worms per chicken. Belonging to the helminth species in relation to their predilection sites, All parts of the digestive tract examined. Worms were more often located in the small intestine where the mixed helminth infections were found. *Raillietina echinobothrida* and *R. tetragona*, occupied different parts of intestine. *Heterakis gallinarum* colonized the small intestine and caecum, but *Ascaridia galli*, and *Capillariacaudinflata* only occupied small intestine.

DISCUSSION

Little knowledge is available about the gastrointestinal helminths infection and their prevalence among the indigenous local baladi breeds of chickens in Souhag province at Upper Egypt, to our knowledge, no

previous studies were conducted in relation to these parasites of chickens, so, the species found in this study were considered the first record regarding the parasites of chickens in this area. The indigenous chickens that rose in the backyards of the houses without cages where the chickens moving and playing in the yard around the houses in the day so they access to the open air and picking from the ground to obtain its food, from which they have greater contact with insects intermediate host as the earthworm, and beetles where they get infections by the larval stages cysticeroids inside these insects. There are several prevalence studies was conducted on gastrointestinal helminths infection in different countries all over the world and Egypt, In Denmark, (Perminet *al.*, 1999) reported that 63.8% of the free-range/organic systems hens were infected with *A. galli* and *H. gallinarum* 72.5%. In Tanzania, (Magwishaet *al.*, 2002) found that 69 % of the chickens were infected with *Ascaridiagalli* and 1% was harbored *Capillaria* spp. In the Goromonzi District in Zimbabwe, Permin et al., (2002) showed that; percent of 48.24% *A. galli* and 64.62% *H. gallinarum* infection in the free-range chickens. Irunguet *al.*, (2004) in Kenya showed that; *A. galli* 10 %, and 21.33 % *H. gallinarum*, but only 1.5 % were infected by *Capillaria* spp. In Bangladesh, Islam et al., (2004) reported that *A. galli* 62.7%, *H. gallinarum* 54.6% and *Capillariaspp* 4.5%. More recent studies by Phiri et al., (2007) in Zambian villages revealed that *A. galli* 28.8% and *H. gallinarum* 32.8%. In Gaza, Palestine, AbdelnasserRayyanet *al.*, (2010) was recorded that; *Ascaridiagalli* was (75.6%), *H. gallinarum* was (68.9%) and (2.2%) *Capillaria* spp. From tapeworms, *Raillietinaechinobothrida* (57.8%). No trematode was found. Belonging to the intensity burden of helminths; it was high for *Heterakisgallinarum* but was low for all recovered species. In this study, the prevalence of *Ascaridiagalli* (50.8%) in the indigenous chickens was very high compared to those reported from different previous studies in Denmark, Zimbabwe, Tanzania, Kenya, Bangladesh and Zambia. The relatively lower prevalence of *Capillariacaudinflata* (3.5%) which is recorded in this study, it coincided with the results of Magwishaet *al.*, (2002) & Irunguet *al.*, (2004), and Islam et al., (2004). In this study, no trematodes were found, and this agrees with results from Gaza, Palestine by AbdelnasserRayyanet *al.* (2010). Concerning the prevalence of the cestodes, *Raillietina echinobothrida* has a cosmopolitan and a wide distribution. The percent of *R. echinobothrida* (4.3%) found in the indigenous chickens of this study was lower than that reported in Morocco by (Hassouni&Belghyti, 2006) which was (5.7 %). The range of infection of the two cestodes detected was 1-6 worms in infected chickens, and this agrees with (Hassouni&Belghyti, 2006) in Morocco. The prevalence percentage of cestodes infestation in this study was (96.5.3%), this incidence percentage disagreed with the result obtained by (Sukpanyathamet *al.*, 1982) (74.42%) & (Hayat et al., 1983) (48.9%) & (Virk, et al., 1987) (76.5%). In Egypt by (Gad. 1987), (Ibrahim, O.I. 1997) it was (29.45%), (Mahdy&Olfat, 1988) (27.62%), (El- Gayar& Amal, 1992) (Khater, 1993) (28.5%); and (Ahmed & Nabila, 2004) (12.9%). This may be attributed to the low management sanitation, no use of insecticide and other biosecurity which affect the intensity of the intermediate host and consequently the incidence of cestode infestation. The obtained findings of present study were *Raillietinatetragona* 39.47% , in Egypt, it disagreed with the previous results of (El - Azzazy, 1979) 24.9%, (Mahdy&Olfat, 1988) 10.95%, (El-Gayar& Amal, 1992) 15.84%; and (Ahmed & Nabila, 2004) 3.3%, and it agreed with (Negmel -Din et al., 1994) 37.5%; *Raillietinaechinobothrida* incidence percentage was 4.3%. These findings were lower with the results obtained by (El- Azzazy, 1979) 11.5%; and higher that results of (Ahmed & Nabila, 2004) that was 1.7%.

Table 1. Prevalence of gastrointestinal helminthes of local chicken breed at Souhag Governorate, Upper Egypt (n = 114 samples).

Helminthes species	Infected samples No. (114 samples)	Prevalence %
<i>Heterakis gallinarum</i>	64	56.14%
<i>Ascaridia galli</i>	58	50.8%
<i>Capillaria caudinflata</i>	4	3.5%
<i>Raillietina tetragona</i>	45	39.47%
<i>Raillietina echinobothrida</i>	5	(4.3%)

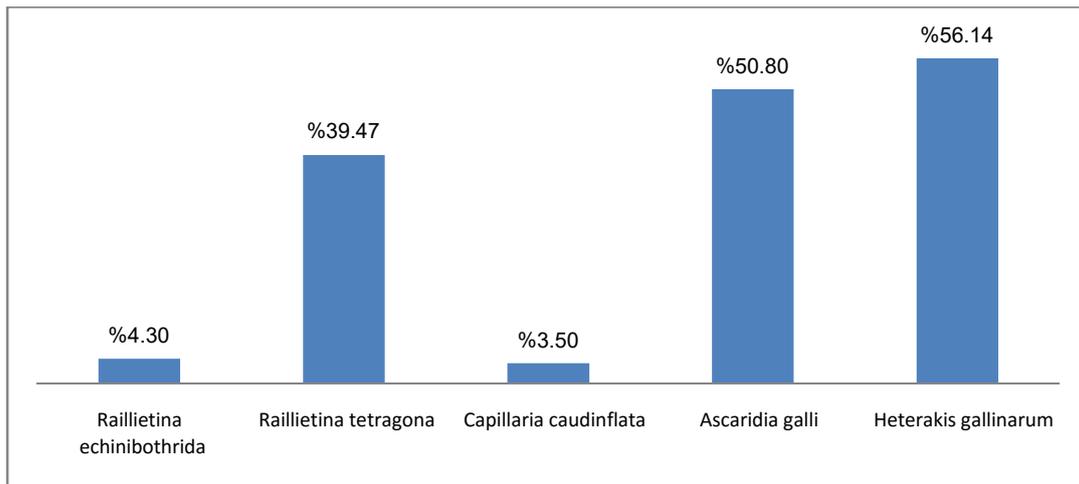


Fig. 1. Prevalence of gastrointestinal helminthes of local chicken breedat Souhag Governorate, Upper Egypt (n = 114 samples).

Table. 2. Prevalence of single or double or multiple infection of gastrointestinal helminthes among infected chickens (n = 114 samples).

Types of infections	No. of infected samples (total: 114)	%
Single	53	46.5
Double	43	37.7
multiple infection(more than two helminthes species)	18	15.8
Total		100

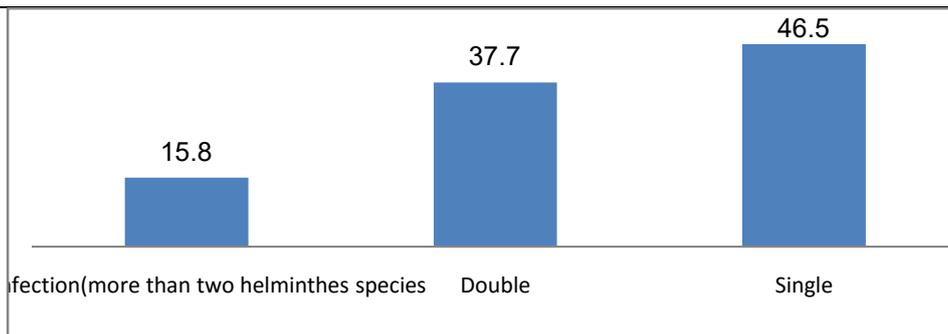


Fig. 2. Prevalence of single or double or multiple infection of gastrointestinal helminthes among infected chickens (n = 114 samples).

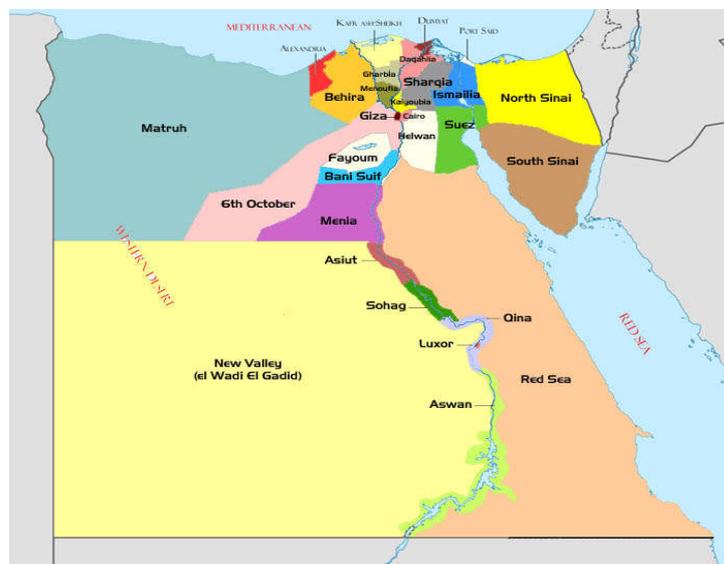


Fig. 3. The location of the study area on the map of Egypt. It is located at southern region

CONCLUSION

The current study is considered a guide for veterinary local authority, veterinary parasitologist, epidemiologist, poultry diseases researchers in Egypt and it represent the first prevalence record in Souhag province, Upper Egypt to construct a preventive and control program in this areas for chicken gastrointestinal helminths especially for poultry farmers of indigenous broilers, layers, and breeders chickens in this area.

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CONFLICT OF INTERESTS

The authors declare that they have no conflict of interests.

REFERENCES

2. Abdelnasser Rayyan, Adnan Al- Hindi, and Basam Al-Zain, occurrence of *gastrointestinal helminthes* in commercial and free range *chickens* in Gaza strip, Palestine. *Egypt. Poult. Sci.* Vol (30) (II): 601-606.(2010)
3. Ahmed and Nabila, S.I. (2004) : Some studies on parasitic helminthes infecting domestic chicken in Beni –Sueif Governorate . M.V.Sc. Thesis; Faculty of Vet.Med.; Cairo University.
4. El - Azzazy, O.M. (1979): Studies on helminth parasites of poultry in Sharkia governorate. M.V.Sc. Thesis, Fac. Vet. Med. Zagazig University.
5. El-Gayar and Amal, K. A. (1992): Some studies on enteric helminthes of chickens in Ismailia province .M.V.Sc. Thesis, Fac. Vet. Med. Suez Canal Univ.
6. Gad, N. A.A. (1987): Studies on some parasitic helminthes in domestic birds in Assiut governorate. M.V.Sc. Thesis, Fac. Vet. Med., Assiut University.
7. Hassouni, T., Belghyti, D.: *Distribution of gastrointestinal helminthes in chicken farms in the Gharb region—Morocco. Parasit Res.*, 2006; 99: 181–183.
8. Hayat, B. and Hayat, C.S. (1983) : Incidence of intestinal parasites of chicken in Faisalabad District . Pakistan Veterinary Journal, 3(4): 165- 167.
9. Ibrahim, O.I. 1997: Prevalence of nematode helminthes in different species of birds. B.H.D, Fac. Vet. Med., Cairo University.
10. Irungu, L.W., Kimani, R.N., Kisia, S.M.: *Helminthes parasites in the intestinal tract of indigenous poultry in parts of Kenya. J South Afr Assoc.*, 2004; 75: 58–9.
11. Islam, M. J., Rahman, M. S., Talukder, M. H., Rahman, M. H., Howlider, M. A. R.: *Investigation of parasitic infestation of scavenging chickens in Bangladesh. Bangladesh Veterinarian.*2004; 21: 74– 80.
12. Khater, H.F.(1993) : Studies on enteric helminth parasitites in domestic birds . M.V.Sc. Thesis. Fac. Vet. Med. Banha, Zagazig University.
13. Kruse, O.W. Pritchard, M.N. 1982. Collection and preservation of animal parasites Technical bull.1 Univ. Nebraska lincoln and London, 141
14. Magwisha, H.B., Kassuka, A.A., Kyvsgaard, N.C., Permin, A.: *A comparison of the prevalence and burdens of helminthes infections in growers and adult free-range chickens. Trop Anim Health Prod.*, 2002; 34: 205 –14
15. Mahdy and Olfat, A. (1988): Studies on parasitic worms infesting chickens and ducks in Giza governorate, Egypt. M.V.Sc. Thesis, Fac. Vet. Med.; Cairo University.
16. Nagwa E. A., Loubna, M. A., El-Madawy, R.S. and Toulan, E. I. (2013): Studies on Helminthes of poultry in Gharbia Governorate. Benha Veterinary Medical Journal. Vol. 25.No.2:139-144.
17. Negmel – Din, M .M; Mahdy, A. Olfat and Mousa, W. M. (1994): Observations on some helminth fauna affecting the Egyptian domestic fowl (*Gallus gallusdomesticus*) with special reference to *Fimbriaria fasciolaris*. *J. Egypt. Vet. Med, Ass.* 54 (2):137 -143.
18. Permin, A., Bisgaard, F., Frandsen, M., Pearman, J. K., Nansen, P.: *Prevalence of gastrointestinal gastrointestinal helminthes in different poultry production systems. Brit Poult Sci.*, 1999; 40: 439 – 443.
19. Permin, A., Esmann, J.B., Hoj, C.H., Hove, T., Mukaratirwa, S.: *Ecto-, endo- and haemoparasites in free-range chickens in the Goromonzi District in Zimbabwe. Prevent Vet Med.*, 2002; 54: 213 –224.
20. Phiri, I. K., Phiri, A. M., Ziela, M., Chota, A., Masuku, M., Monrad, J.: Prevalence and distribution of gastrointestinal helminthes and their effects on weight gain in free-range chickens in Central Zambia. *Trop Anim Health Prod.*, 2007; 39: 309–15.
21. Riad, W. M., and McDougald, L. R. (1997): Cestodes and Trematodes. In *Diseases of Poultry*, 10th edition, pp. 850-864. Iowa State University.
22. Shahin, A.M.;Lebdah, M.A.; Abu-Elkheir, S. A. and Elmeligy, M.M. 2011: Prevalence of Chicken Cestodiasis in Egypt. *New York Science Journal*, 2011;4(9)
23. Soulsby, E.J.L. (1982): *Helminths, Athropods and Protozoa of Domesticated Animals*. 7th Edition.809 pp. Baillière Tindall, London, UK.

24. Sukpanyatham, N.; Notamingcharern, T.; Bhodigen, S.E. and Muangyai, M. (1982): A survey of parasites in native chickens. Thai. Journal of Veterinary Medicine, 12 (4), 227-237.
25. Virk, K.J.; Jain, M. and Prasad, R.N.(1987):Qualitative and quantitative analysis of helminth fauna in Gallus gallusdomesticus .Zeitschrift – Fur AngewwandteZoologie, 74 (3):329-336.
26. Law, Gwillim (1999): Administrative Subdivisions of Countries: A Comprehensive World Reference, 1900 through 1998 (snippet view). Jefferson, NC: McFarland. p. 114. ISBN 978-0-7864-0729-3.Retrieved 2010-08-07.

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