Studies on the trematode parasites of stray dogs in Egypt

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ABSTRACT

In a study on trematodes of stray dogs in Ismailia Province, Egypt, 50 stray dogs of different sexes and ages were humanely euthanized, necropsied and examined for trematodes. The total prevalence of trematodes was 36%. Fourteen trematode species were recorded as the following; *Prohemistomum vivax* (4%), *Mesostephanus appendiculatus* (16%), *Mesostephanus melvi* (6%), *Mesostephanus* sp. (2%), *Echinochasmus liliputans* (16%), *Heterophyes dispar* (14%), *Pygidiopsis genata* (20%), *Pygidiopsis summa* (4%), *Ascocotyle rara* (4%), *Phagicola longus* (6%), *Phagicolla longicollis* (4%), *Metagonimus yokogawai* (4%), *Haplorchis pumilio* (6%) and *Apophallus donicus* (4%). *Pygidiopsis summa* and *Ascocotyle rara* were recorded for the first time in Ismailia Province and this may be the first time to be recorded among the Egyptian dogs. *Mesostephanus* spp. had the highest intensity 95.5 (18-170) followed by *Pygidiopsis* spp. 26.7 (10-40), *Echinochasmus liliputans* 19 (10-36), *Heterophyes dispar* 13 (5-20), *Phagicola longus* 5.7 (2-10), *Prohemistomum vivax* 3 (1-5), *Ascocotyle rara* and *Haplorchis pumilio* 3 (2-4) each, *Metagonimus yokogawai* 2.5 (2-3), *Phagicola longicollis* and *Apophallus donicus* 2 (1-3) each. There was a highly significant difference ($p<0.01$) in the prevalence of trematodes between different ages (60% in adult and 0% in young dogs), while there was no significant difference ($p > 0.05$) in the prevalence of the detected trematodes in relation to the sex of dogs. From this study, it could be concluded that stray dogs in Ismailia Province carry a multitude trematode parasites, thus posing a risk for the human population and companion dogs.

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INTRODUCTION

The dog population is composed of dogs that roam only with their owners, stray and ownerless dogs roaming sporadically. Of the estimated 500 million dogs worldwide, about 400 million are stray ones (WSPA, 2009). Egypt has a large population of stray dogs that move freely within cities and coming into contact with other urban, suburban and rural animals.

About 40-50 million people are estimated to be infected with foodborne intestinal trematodes worldwide. Globally, about 70 species of intestinal trematodes have been reported to infect humans. Almost one-half of these species belong to the families Heterophyidae and Echinostomatidae (Fried *et al.,* 2004).

The human population in Ismailia Province depends intensely on fresh water fish from fish farms as a source of dietary protein. Numerous stray dogs search offal from the fish farms and may become infected by trematodes from fish intermediate host, which may be zoonotic. Canine trematodes in Egypt include *Mesostephanus* spp., *Echinochasmus* spp., *Heterophyes* spp., and *Pygidiopsis genata* (El-Gayar, 2007).

The aim of the present work is to study the prevalence and intensity of trematode parasites of stray dogs in Ismailia Province and to discuss the zoonotic risk associated with these dogs regarding to the helminth parasitic infestation.

METHODS AND MATERIALS

This study was conducted during the period from December 2013 to January 2014 on 50 stray dogs captured from Ismailia Province, Egypt. The dogs were humanely euthanized and the alimentary tracts were removed. Each part of the alimentary tract was opened separately in petri dish containing physiological saline and its contents were shaken in a separate jar and left to settle for 30 minutes. The mixture was re-suspensed in water, sedimented and decanted for several times until the supernatant become clear, then the sediment was examined under a dissecting microscope. The collected trematodes were counted, measured, fixed in freshly prepared formalin acetic acid alcohol fixative (FAA fixative), stained with Acetic Acid Alum Carmine, dehydrated through ascending concentrations of ethanol and mounted with canada balsam. The collected trematodes were matched with the descriptive data and figures given by previous authors (Fahmy & Selim,1959, Kuntz & Chandler,1956 and Yamaguti (1939). Chi-square test was used for analysis of the categorical data and to determine the association between age and sex and the prevalence of trematodes. Differences were considered significant at ($P \leq 0.05$).

RESULTS

The total prevalence of trematodes was 36%. Fourteen trematode species were recorded. The most prevalent trematode was *Pygidiopsis summa* (4%), while *Mesostephanus* spp. had the highest mean intensity 95.5 (18-170) (Table 1). *Pygidiopsis summa* and *Ascocotyle rara* were recorded for the first time in Ismailia Province and this may be the first time to be recorded among the Egyptian dogs.

A highly significant difference ($p=0.00$) in the prevalence of trematodes between different ages (60% in adult and 0% in young dogs) was found, while there was no significant difference ($p > 0.05$) in the prevalence of the detected trematodes in relation to the sex of dogs (Chart 1).

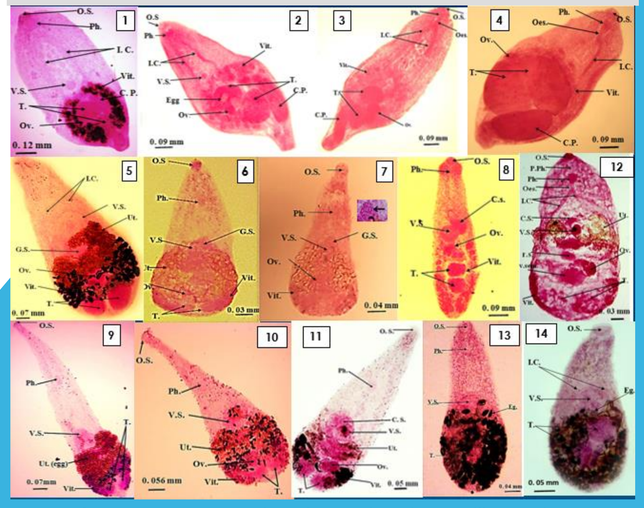

Figure 1-14. Trematodes of stray dogs in Ismailia Province; (1) *Prohemistomum vivax* adult (X4), (2) *Mesostephanus appendiculatus* adult (X4), (3) *Mesostephanus melvi* adult (X4), (4) *Mesostephanus* sp. adult (X4), (5) *Heterophyes dispar* adult (X10), (6) *Pygidiopsis genata* adult (X20) (7) *Echinochasmus liliputans* adult (X4), (8) *Pygidiopsis summa* adult (X20) (9) *Ascocotyle rara* adult (X10), (10) *Phagicola longus* adult (X10), (11) *Phagicola longicollis* adult (X10), (12) *Metagonimus yokogawai* adult (X10), (13) *Haplorchis pumillio* adult (X10) and (14) *Apophallus donicus* adult (X10) .

Species	No. of infested/ no. of examined	Prevalence (%)	Intensity (range)	Mean intensity (worm/dog)
P. vivax	2/50	4	1-5	3.0 (6/2)
M. appendiculatus	8/50	16	18-170	95.5 (764/8)
M. melvi	3/50	6		
Mesostephanus sp.	1/50	2		
E. liliputans	8/50	16	10-36	19.0 (158/8)
H. dispar	7/50	14	5-20	13.0 (93/7)
P. genata	10/50	20	10-40	26.7 (267/10)
P. summa	3/50	6		
A. rara	2/50	4	2-4	3.0 (6/2)
P. Longus	3/50	6	2-10	5.7 (17/3)
P. longicollis	2/50	4	1-3	2 (4/2)
M. yokogawai	2/50	4	2-3	2.5 (5/2)
H. pumilio	3/50	6	2-4	3.0 (6/2)
A. donicus	2/50	4	1-3	2 (4/2)

Table 1. Prevalence and intensity of trematode parasites in stray dogs.

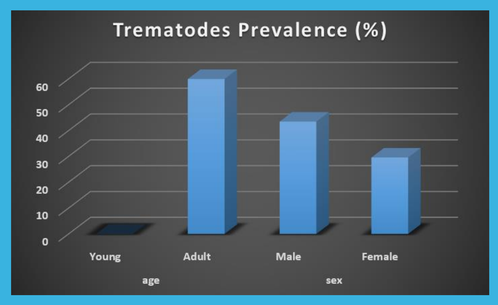

Chart 1. The prevalence of trematodes in relation to the age and sex of dogs.

DISCUSSION

This study was carried out on 50 stray dogs and 14 trematode parasites were detected. The total prevalence of trematodes was 36%, higher than that recorded by El-Gayar (2007) (13.3%). The detected trematodes were previously recorded singly or collectively by several authors from which; Fahmy and Selim (1959), in Cairo and Giza Governorates and El-Gayar (2007) in Ismailia City. This may be the first time to record *Pygidiopsis summa and Ascocotyle rara* among the Egyptian dogs. The description and measurements of the detected trematodes were matched to those of Fahmy & Selim (1959), Kuntz & Chandler (1956) and Yamaguti (1939).

Kuntz & Chandler (1956) attributed the variation in the prevalence of trematodes infesting dogs to variation in localities and the season. In our opinion, the available food such as fish, frogs and snakes play an important role in the occurrence and prevalence of digenetic trematodes in dogs in this study.

The present study reveals a highly significant difference ($p<0.01$) in the prevalence of trematodes between different ages. This may be due to the availability of intermediate hosts to adults due to the free roaming character of adult stray dogs, which leads them to be exposed to fish offal infected with encysted metacercariae. There was no significant difference ($P > 0.05$) in the prevalence of detected helminthes between sexes.

Seven trematodes, (*P. vivax*, *H. dispar*, *P. summa*, *P. longus*, *M. yokogawai*, *A. donicus* and *H. pumilio*), previously recorded in human, were detected in this study.

CONCLUSIONS

It could be concluded that stray dogs in Ismailia Province carry a multitude trematode parasites, thus posing a risk for the human population and companion dogs.

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