



Prevalence and organ distribution of larval *Oestrus ovis* (Diptera : Oestridae), *Cysticercus tenuicollis* and *Echinococcus granulosus* (Cestoda : Taeniidae) in slaughtered sheep and goats at Jeddah in Saudi Arabia

KEYWORDS

Sheep, goat, *Oestrus ovis*, *Cysticercus tenuicollis* and *Echinococcus granulosus*, prevalence.

Areej O. Bakhraibah

King Abdulaziz University, Faculty of Sciences Al Faisaliah Branch, Zoology Department.

ABSTRACT *Objective:* To determine the prevalence of *Oestrus ovis*, *Myiasis*, *Cysticercus tenuicollis* and *Echinococcus granulosus* in sheep, goats, camel and cows.

Methods: A total of 1099 sheep, 477 goats, 59 camel and 37 cows slaughtered in three different slaughter houses of Saudi Arabia Province covering a period (16 July to 29 July 2015) were carefully examined for these metacestodes.

Results: *Oestrus ovis* was found in 182 (43%) goats and 162 (14.7%). *Cysticercus tenuicollis* was found in 99 goats (23.4%) and 5 (0.45%) sheeps. *Echinococcus granulosus* was found only in female goats (100% of female goat exanimate). Any infection was observed neither in cows nor in camel.

Conclusions: The results suggest that *Oestrus ovis*, *Cysticercus tenuicollis* and *Echinococcus granulosus* are common and may constitute a health problem in sheep and goat and a source of economic loss in the meat industry, thus emphasizing the need for proper meat inspection and a great concern for both medical and veterinary authorities to design therapeutic and preventive programs to overcome this problem.

Introduction

Livestock may act as the intermediate hosts for the tape-worms of humans and other animals. *Oestrus ovis* (Diptera: Oestridae), the sheep nasal bot fly, is a cosmopolitan parasite whose larvae develop in the head sinuses and nasal passages of sheep and goats in all sheep-farming areas worldwide. *O. ovis* can thrive in different environments and has adapted to the climate prevailing wherever sheep are kept (Horak, 1977), and this ability to adapt to different environments allows for the natural persistence of infestation and makes it difficult to control it (Alcaide *et al.*, 2005).

In addition, cestodes of the family Taeniidae infect dogs as the definitive host and are transmitted to a wide range of intermediate host species where they cause coenurosis, hydatidosis, and cysticercosis. Infestations with the larval stage of some species of *Taenia* are not only of public health importance, but also of veterinary significance because they cause economic losses due to condemnation of infected offal or meat (Thompson., 1995). *Cysticercus tenuicollis* (*C. tenuicollis*) is the larval stage (cysticercoid, metacestode) of *Taenia hydatigena* (*T. hydatigena*), a tape-worm parasite of dogs and other canids (coyotes, wolves, foxes, very occasionally cats) (Payan-Carreira *et al.*, 2008; Senlik B., 2008). The intermediate hosts of *T. hydatigena* are domestic (sheep and goats) and wild ruminants (deer) (Kara *et al.*, 2005). The metacestode occurs worldwide, mainly in rural areas of countries with large sheep population.

Clinical hydatid disease is uncommon in animals, but hydatid cysts in liver and other tissues at slaughter are widespread and cause condemnation and economic loss. There are numerous distinct strains of *Echinococcus granulosus* (Smith & Sherman, 2009; Sharifiyazdi *et al.*, 2011). *Echinococcus* infections are estimated to affect approximately two to three million people worldwide, with Africa amongst the primarily endemic regions (Cummings, Rodriguez-Sosa & Satoskar 2009). Dogs and wild canids (wolves, jackals, red

foxes and others) are the primary definitive hosts, with ungulates (sheep, goats and camels) as intermediate hosts and humans are aberrant intermediate hosts (Eckert & Deplazes 2004).

Study on the prevalence of the cestodes of the family Taeniidae in stray dogs and their metacestodes in herbivores has public health significance; it is dangerous for research personnel, and expensive and time consuming for the authorities of the research centers. The present study was designed to examine the prevalence, organ distribution and socioeconomic implications of the metacestodes in sheep, goats, camel and cows in Saudi Arabia.

MATERIALS AND METHODS

Study area

This study was undertaken from 16 July to 29 July 2015 in three different slaughter houses of Saudi Arabia Province, slaughter house of JEDDA, slaughter house of RAY-DAN and slaughter house of HADDA.

Animals and post mortem examination

A total of 1099 sheep, 477 goats, 59 camel and 37 cows of both sexes and of different age ranges slaughtered at slaughterhouses were examined. Visual inspection of the mesentery, peritoneal cavity, liver, lungs, kidneys, striated muscles, heart, femoral muscle, diaphragm muscle and the head of each carcass was undertaken for the presence of *Oestrus ovis*, *Myiasis*, *Cysticercus tenuicollis* and *Echinococcus granulosus* in cattle. Number of the examined animals, their sex, and age ranges are shown in Table 1.

Data analysis

All data were recorded in the Microsoft Excel program. Statistical analysis of the data by

t-test and the X2 test established the level of significance between different species, sexes and age ranges. Differences of $p < 0.05$ were considered significant.

RESULTS

Prevalence of metacestodes according to sex and age in goats and age in sheep is presented in Table 1. *Echinococcus granulosus* was detected only in female goats (100%). The prevalence of *Cysticercus tenuicollis*(23.4%) was higher in male goats than *Oestrus ovis* (3.3%). However, the prevalence of *Oestrus ovis* (14.7%) was higher in sheep than the prevalence of *Cysticercus tenuicollis*(0.45%). Any infection by *Echinococcus granulosus* was observed in sheeps.

The prevalence of metacestodes and their distribution pattern in different organs of goats and sheep are presented

Any infection was observed neither in cows nor in camel.

Table1. Overall prevalence of different larval infection in sheep and goats in relation to age and sex

Sheep								
		Number	Oestrus ovis	Pev.	Cysticercus tenuicollis	Prev.	Echinococcus granulosus	Prev.
Infected			162	14.7	5	0.45	0	0
Sex	Male	1099						
Age (Month)	3-6	151	111	73.5	0	0	0	0
	4	243	23	9.4	0	0	0	0
	6	705	28	3.9	5	0.7	0	0

Prev.: Prevalence

Goats								
		Number	Oestrus ovis	Prev.	Cysticercus tenuicollis	Prev.	Echinococcus granulosus	Prev.
Infected			182	43	99	23.4	54	100
Sex	Male	423	182	43	99	23.4	0	0
	Female	54	0	0	0	0	54	100
Age (Month)	2	99	0	0	99	100	0	0
	3	54	0	0	0	0	54	100
	2-6	256	179	69.6	0	0	0	0
	3-6	68	3	4.4	0	0	0	0

Table 2. Prevalnce of different larval infection and their distribution pattern in different organs in sheep and goats

Number of cases			
Organ	Oestrus ovis	Cysticercus tenuicollis	Echinococcus granulosus
	head	heart	diaphragm muscle
Sheep (1099)	162	5	0
	14.74%	0.45%	0
Goat (477)	182	99	54
	38.15%	20.75%	11.32%

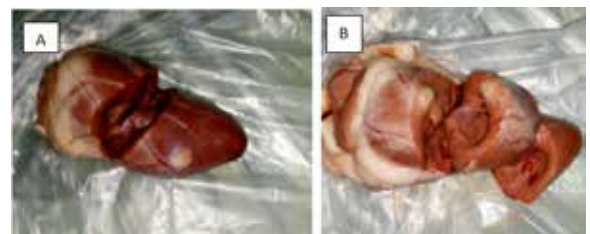


Figure2. Heart of a goat (A) and a sheep (B) infected with *Cysticercus tenuicollis*



Figure 1. Head of sheep infected with *Oestrus ovis*



Figure 3. Diaphragm muscle of a goat with *Echinococcus granulosus*

DISCUSSION

The present investigation showed high prevalence of infestation with *Oestrus ovis* in goats (43%) and sheep (14.7%) in the study area. In the world similar studies carried out in other countries such as France, where 65% of sheep was infested with *O. ovis* larvae (Yilma, Dorchie., 1991); or in Sicily, with 55.8% of prevalence (Caracappa et al., 2000); and Turkey, with 40.6% (Arslan et al., 2009). Higher prevalence was also observed in other Brazilian studies: 85.4% in the south region of the country in sheep exposed to natural infestation for one year (Ribeiro et al., 1990) and 50% prevalence in tracer sheep in Botucatu, State of São Paulo, Brazil (Silva et al., 2012). In this present study, it has been showed that goats and sheep have been infected in head by *O. ovis* (14.74% in sheep and 38.15% in goat). Prevalence of 13.7% sheep heads were infested with *O. ovis* in Brazil (Silva et al., 2012).

The present investigation showed high prevalence of infestation with *C.tenuicollis* in goats (23.4%) and sheep (0.45%) in the study area. In this study, the prevalence was low in contrast with higher prevalences reported in domestic animals, 79% in sheep and 53% in goats in Ethiopia (Sissay et al., 2008), and 18.04% in goats and 28.4% in sheep in Iran (Oryan et al., 2012; Singh et al., 2015). On the other hand, lower prevalence of 12.8% and 1.25% were respectively recorded in sheep in Iran (Radfar et al., 2005) and Saudi Arabia (El – Metenawy, 1999). As observed by Radfar et al. (2005), the grazing behavior and management system of the animals may be responsible for the differences in prevalence between this and the other studies.

Although more males than females were recorded with *C. tenuicollis* metacestodes, there was no statistical difference between males and females. Same results were observed with other findings (Senlik et al., 2008; Oryan et al., 2012), who found that infestation in male sheep and goats was higher than in females. Our study found that the predominant predilection site for *C. tenuicollis* was the heart, in contrast with others who reported that omentum (Senlik et al., 2008; Samuel et al., 2010) and liver (Mekuria et al., 2013) as the predominant predilection sites for *C. tenuicollis*.

In the present study, the prevalence of *Echinococcus granulosus* was 11.32% in female goats. All hydatid cyst were observed in diaphragm muscle of female goats. However, any infection was observed in sheep. Dalimi et al. (2002) reported a mean prevalence of 8.1% hydatidosis in sheep, 38.3% in goats and of various parts of Iran. Whereas, Daryani et al. (2007) reported prevalence values of 74.4%, 20.0%, and 38.3% hydatidosis in sheep, goats, and cattle in North of Iran, respectively. Also, prevalence of 26.6% in sheep, 22.1% in goats in Turkey (Umur, 2003), 2.3–93.3% in sheep, and 1.1–72.7% in goats in India (Deka et al., 1985), 4.5% in sheep, 2.3% in goats and 5.2% in cattle in Syria (Dajani, 1978) and 12.9% in sheep, 12.7% in goats, and 11.0% in cattle in Jordan (Kamhawi et al., 1995) have previously been reported.

Infections of sheep and goats with larval stages of *T. hydatigena* and *T. ovis* are also important because they cause economic losses due to condemnation of infected organs and carcasses (Bekele et al. 1992). Our study showed high prevalences of these parasites whose occurrence adds to the economic losses due to presence of *E. granulosus* cysts. However, although massive infections with e.g. *T. hydatigena* can cause severe disease and mortality in sheep (Gänheim et al. 1998), there are few indi-

cations that latent cysticercosis has obvious effects on the productivity of sheep and goats.

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