



ORIGINAL ARTICLE

Helminth Parasites of a hunted-wild boar (*Sus scrofa*) in the Talesh City, North of Iran

Garedaghi Yagoob^{1*}, Mojallal Saeed², Ouzbandi Ali³

1- Department of Veterinary Parasitology, Tabriz Branch, Islamic Azad University, Tabriz, Iran.

2- Department of Veterinary Medicine, Tabriz branch, Islamic Azad University, Tabriz, Iran.

3- Department of the Kaleybar city Environment protection, Kaleybar, Iran.

* E-mail: Y_garedaghi@yahoo.com

ABSTRACT

The present study aimed to investigate the status of helminth infections in a hunted-wild boar in the Talesh city, North of Iran. For this purpose, during November of 2013, a hunted-wild boar were necropsied and examined for helminths. Individual samples of tongue and diaphragm samples provided by hunters were examined by artificial digestion for *Trichinella* spp. larvae. Seven species of helminths were detected, with the following prevalence rates: *Metastrongylus apri* (34%), *Dicrocoelium dendriticum* (22%), *Macracanthorhynchus hirudinaceus* (19%), *Gongylonema pulchrum* (9%), *Physicocephalus sexalatus* (7%), *Trichuris suis* (6%), and *Taenia hydatigena* larvae (3%). Generally, lungworms were the predominant helminths. The highest mean abundance was observed for *M. apri*, and the lowest was determined for *T. hydatigena* larvae. This study is the first report describing the presence of *M. apri*, *D. dendriticum*, *M. hirudinaceus*, *P. sexalatus*, in a hunted-wild boar in Talesh city, North of Iran. All analyzed muscle samples were negative for *Trichinella* spp. larvae.

Key words: Helminth Parasites, wild boar (*Sus scrofa*), Talesh city, Iran.

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INTRODUCTION

Natural wild boar populations are distributed throughout world. These animals eat different kinds of diets including fruits, amphibians, reptiles, mushrooms, birds and their eggs, small rodents, carrion and insect larvae. Because of their feeding habits, wild boars can play a significant role in the circulation and maintenance of certain parasites, especially *Trichinella*, in the environment [1]. Studies on parasitic diseases in wildlife are important to evaluate the extent to which wild animals serve the sources of infectious agents transmitted to livestock and humans, because some wild animals inhabit areas near the suburbs. Wild boars (*Sus scrofa*) can be found in almost all of the ecosystems of Iran; however, no accurate estimation of the wild boar population is currently available [2]. In Iran, wild boars are hunted by hobby hunters and are shot by farmers to protect agricultural crops [3]. In addition, wild boars are also hunted for their meat by different ethnic groups. Even though wild boars are common and widely distributed in Iran, the parasites of these animals have received little attention, and only minimal data are available on them. Furthermore, no systematic studies on the prevalence and intensity of helminth infections in wild boars from Iran have been conducted to date [4, 5].

The present study was designed to determine: (1) visceral helminth species and *Trichinella* spp. Larvae present in a hunted-wild boar in Iran; (2) the prevalence, intensity and abundance of helminth species.

MATERIALS AND METHODS

Study area:

In the November of 2013, the helminths infecting a wild Boar that hunted by local hunters of Talesh city, North of Iran, were investigated in the Gilan Province of Iran. Talesh, also called Tavalesh va Hashtpar is a city in Gilan Province in Iran. The capital of the city is Hashtpar. At the 2006 census, the city's population was 200,000, in 50,000 families. The city is subdivided into four districts: the Central District, Asalem District, Haviq District, and Kargan Rud District. The city has five cities: Hashtpar, Lisar, Asalem, Chubar,

and Haviq. Talesh has mountainous wonderful areas, and its virgin and intact nature is a charming place for those eager of nature. Talesh is situated 140 km north-west of Rasht, on the south-west coast of the Caspian Sea. Talesh township, covering an area of 2373 square kilometers, $\frac{1}{4}$ of surface area of Gilan. Knitting of socks and stockings, weaving of coarse wool blankets are famous among different handicrafts of this township. Taleshian people at present are Muslim (Sonah and Shieah). Most of the southern Taleshian are Shiah and most northern Taleshian are Sonah.

Collection and examination of a hunted-wild boar for helminths

Collection and examination of a hunted- wild boar for parasitic helminths were collected from local hunters during November 2013. Data for hunted-wild boar with respect to shooting site(Talesh city , North of Iran), sampling time(November 2013), sex(Male) and age(4 years old) were recorded. According to tooth development, tooth eruption patterns and physical appearance, the hunted-wild boarwere diagnosed 4 years old. During necropsy, each organ was examined macroscopically by the naked eye. The oesophagus was separated from the rest of the digestive tract, sliced longitudinally and inspected to detect any worms present. Livers were inspected for the presence of milk spots, infarcts or cysts on the surface. Larger bile ducts and the gall bladder were cut open to search for liver flukes. Subsequently, the livers were sliced into small pieces and squeezed in warm water. After discarding large tissue pieces, helminths in the sediment were collected and counted. Lungs were inspected for abscesses and cysts. The larger bronchi and bronchioles were opened with a pair of scissors, and lungworms, if any, were collected. To recover non-visible worms, the lungs were sliced into small pieces and soaked in warm water and examined in a manner similar to that for the liver. The gastrointestinal tract was separated into the following three regions: the stomach, small intestine and large intestine. The stomach was cut open along the major curvature; the small and large intestines were opened along their entire lengths. Their contents were repeatedly washed with tap water and sieved through a 50-mm aperture sieve. The mucosa of the stomach and intestinal tracts was examined to collect helminths attached to or buried in the mucosal layer. Subsequently, the mucosa was scraped and washed directly into a 50-mm aperture sieve. The heart, kidney, urinary bladder and spleen were also examined for the presence of helminths or larvae. All collected parasites were placed in 70% alcohol for preservation and later identification. All helminths were cleared with lactophenol solution and identified under a light microscope based on figures and descriptions given in [11, 16].

Examination of tongue and diaphragm for *Trichinella* spp. Larvae

Individual samples of tongue and diaphragm samples that provided by hunters were examined by trichinoscopy and artificial digestion. Trichinoscopy was performed according to No"ckler *et al.* (2000), as follows: 28 small pieces of muscle tissue of about 2mm \times 10 mm, with a total weight of about 0.5 g, were removed from each sample. The muscle pieces were compressed between two glass plates until they become translucent, and then they were examined using a stereomicroscope. Artificial digestion for the detection of muscle larvae was performed on 5 g samples using the magnetic stirring method, as recommended by the International Commission on Trichinellosis [6].

RESULTS

Helminth species, prevalence, intensity and abundance:

Seven helminth species were identified, including one trematode, four nematodes, one acanthocephalan and one cestode larva. The locations found, prevalence, mean intensity and mean abundance of the helminth species are shown in table 1.

The most commonly encountered parasites in the animals were *Dicrocoelium dendriticum* and *Metastrongylus apri*. The total helminth burden varied from 1 to 237 parasites in individual hosts, with a mean of 49. The mean intensity varied greatly between helminth species. The highest abundance was observed for *M. apri*, whereas the lowest was recorded for *Taenia hydatigena* larvae. Adult cestodes and milk spots due to the migration of *Ascaris suum* larvae in the liver were not detected. *Trichinella* spp. larvae were not detected in the muscle samples of the hunted- wild boar By either of the two different methods.

Table 1. Prevalence of helminth species in a hunted- wild boar that hunted in the Talesh city ,North of Iran.

Helminths	Internal organs	Prevalence (%)
<i>Dicrocoelium dendriticum</i>	Liver (bile ducts)	22
<i>Taenia hydatigena</i> larvae	Mesenteries	3
<i>Metastrongylus apri</i>	Lungs	34
<i>Gongylonema pulchrum</i>	Oesophagus	9
<i>Physocephalus sexalatus</i>	Stomach	7
<i>Trichuris suis</i>	Large intestine	6
<i>Macracanthorhynchus hirudinaceus</i>	Small intestine	19

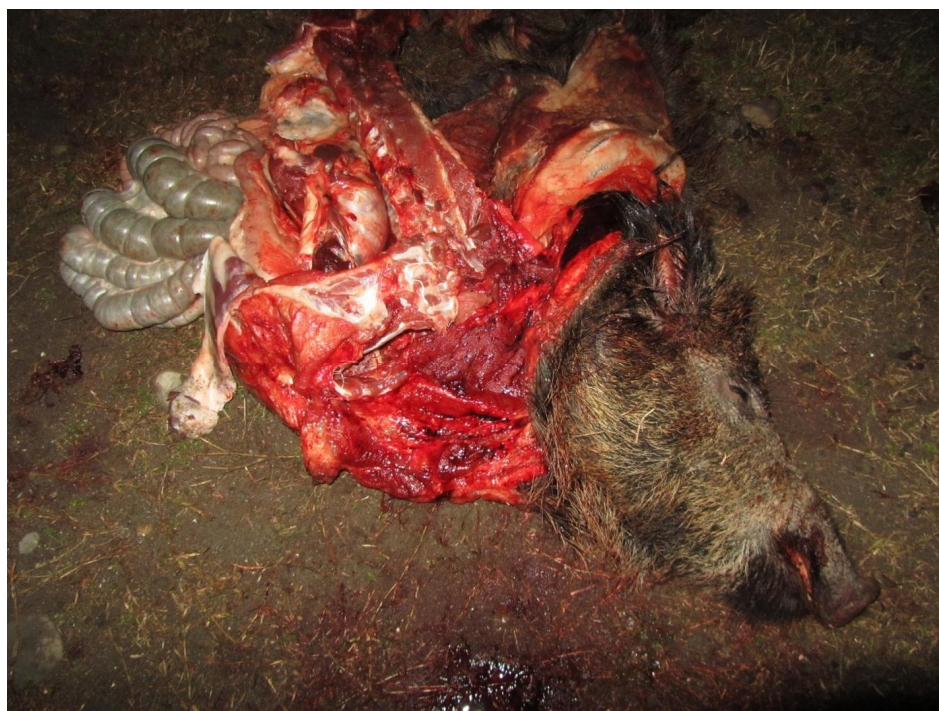


Fig 1. Hunted and necropsied wild-boar in Talesh city

DISCUSSION

There are limited data on helminth infections in wild boars in Iran and, to our knowledge, there are no detailed systematic studies on the prevalence, intensity or abundance of natural helminth infections in this animal species. The helminths reported in wild boars from Iran by Eslami (1992) are as follows: *Metastrongylus apri*, *T. hydatigena* larvae, *Gongylonema pulchrum*, *Trichuris suis*, *Fasciola hepatica*, *A. suum*, *Oesophagostomum dentatum*. The present study revealed the presence of 7 helminth species parasitizing the visceral organs, with an overall infection rate of 34%. Among the identified helminths, *Metastrongylus apri*, *D. dendriticum*,

Macracanthorhynchus hirudinaceus, *Physocephalus sexalatus* are reported for the first time in Talesh city, North of Iran. The overall prevalence of helminth infections in wild boar in this study was similar to that recorded in Iran [5], but was lower than those found in Estonia [9] and Spain [4]. Such differences in infection rates may be due to the different climatic, geographical and environmental conditions of each study area. Furthermore, the species composition of the parasite community of wild boar in our study was generally similar to that of parasite communities of wild boars investigated in other regions and countries [7,8,9,10]. Adult cestodes were not encountered in the wild boar that we examined. This finding may suggest a minor role for cestode infections in this region. Lungworms are often encountered as highly prevalent helminths in wild boars [11]. Similarly, a high prevalence rate (overall: 34%) of metastrongylids was also recorded in the present study. This result might be explained by the wide geographical distribution of different earthworm species, which form part of the diet of wild boars and act as intermediate hosts for these parasites. Moreover, the intensity and abundance of *M. apri* were considerably greater than those of any other helminth species. This finding is in agreement with that of Jarvis *et al.* (2007), who reported that infection intensity of *M. apri* was higher than that of other helminths in wild boars on the island Saaremaa in western Estonia. It is well known that host factors such as age and sex can influence the presence of helminths [12].

Trichinella is one of the most widespread zoonotic parasites infecting people and other mammals all over the world in most climates, except for deserts. In Iran, which is largely a Muslim country, although eating the meat of pigs and wild boars is strictly prohibited by Islamic instructions, and trichinellosis is believed to be extremely rare, sporadic outbreaks occur due to the ingestion of raw or inadequately cooked meat products containing parasite larvae [13]. The presence of people with different religious faiths and religious attitudes, along with increasing tourism, has stimulated an increase in wild boar meat consumption; however, these animals are not subject to veterinary control in this country. This situation poses a risk of *Trichinella* transmission to humans. However, to date, limited studies have been conducted on the presence of *Trichinella* spp. in wild boars in Iran [14].

Although *Trichinella* spp. larvae were not found in the muscle samples that we examined, the number of animal in this study may have been too small to enable the evaluation of the importance of wild boar trichinellosis in this region [15, 16].

In conclusion, the present study showed that hunted-wild boar is infected with a broad spectrum of helminths. This is one of the first studies to investigate the helminth parasites of hunted-wild boar from Talesh city, North of Iran. Therefore, further comparative studies that determine the population dynamics, prevalence, intensity and abundance of helminths would help to assess the relationship between these parasite communities and their host populations. Finally, although *Trichinella* spp. larvae were not found in the current study, the risk of human infection should not be dismissed in the case of people eating wild boar meat without any veterinary control measures.

CONFLICTS OF INTEREST

Authors declare that there is no any conflict of interest.

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